DEATH AND MOURNING PROCESSES IN THE TIMES OF THE CORONAVIRUS PANDEMIC (COVID-19)

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PUBLISHED IN: Frontiers in Psychiatry, Frontiers in Sociology, Frontiers in Psychology and Frontiers in Public Health

frontiers Research Topics

ISSN 1664-8714
ISBN 978-2-88976-099-2
DOI 10.3389/978-2-88976-099-2

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Citation: Gimenez-Llort, L., Gijsberts, M.-J. H. E., Oghagbon, E. K., Pereira, H. V. F. S., Invitto, S., Torres-Lista, V., eds. (2022). Death and Mourning Processes in the Times of the Coronavirus Pandemic (COVID-19). Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88976-099-2

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frontiers in Psychiatry

OPINION
published: 11 September 2020
doi: 10.3389/fpsyt.2020.570773

Silent Cries, Intensify the Pain of the Life That Is Ending: The COVID-19 Is Robbing Families of the Chance to Say a Final Goodbye

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *09 June 2020*
Accepted: *28 August 2020*
Published: *11 September 2020*

Citation:
Gonçalves Júnior J, Moreira MM and Rolim Neto ML (2020) Silent Cries, Intensify the Pain of the Life That Is Ending: The COVID-19 Is Robbing Families of the Chance to Say a Final Goodbye. Front. Psychiatry 11:570773. doi: 10.3389/fpsyt.2020.570773

Keywords: coronavirus infection, mental health, death, pain, public health

INTRODUCTION

The process of death and dying, despite being inherent to life, are phenomena that cause anxiety, fear, and anguish (1), with people's reactions to this process closely correlated with their personal beliefs, social, philosophical aspects and their culture (2). During the pandemic of the new Coronavirus, COVID-19, started in Wuhan, China 668.073 deaths have already been caused in 216 countries (3). Thus, the discussion about the process of death and dying has become a daily occurrence from the news to the families but people cannot say goodbye, as well as performing their mourning rituals. This makes the process of accepting death/dying more complicated and increases the psychological suffering of those who have lost their relatives/friends. This paper aims to reflect the impact of the absence of standard rituals on the death/dying process in the context of the COVID-19 pandemic.

DISCUSSION

In prehistory, Neanderthals already practiced funeral rituals, being the first men to perform them through their beliefs in the idea that death was not characterized as the end, but as a transition from the world of the living to the spiritual kingdom. In ancient period, funerary rites were being improved and followed the advance of civilizations, quite prominent in ancient Egypt and the Chinese empire. They gained notoriety in the Iberian Peninsula when they were introduced by the Arabs in the 8th century (4). Therefore, there are archaeological records on funeral ritual practices since prehistory, suggesting that the concern with finitude was born concomitant with the

conscience of the human being as an individual and of his life in collectivity, through ritualized care for death (5). In the 21st century, many victims of COVID-19 are dying in hospital isolation, without the presence of family or friends. The dead cannot be buried in their finest and favorite clothes. Instead, it is the grim anonymity of a hospital gown.

According to Elisabeth Kübler-Ross, in her Psychological Theory, when a person is faced with the imminence of finitude, they would experience five steps - denial, when they refuse the diagnosis; anger or revolt; negotiation or bargaining; depression, mourning process for the loss of life and, finally, acceptance of one's finitude (6). However, rituals must be present for there to be a healthy mourning process and development. In all societies, in the event of someone's death, the family and its social circle respond in a structured manner based on the meanings shared by the group (7). Thereby, there is no death without death rites. Rites are indispensable ways to express and solidify bonds, to encourage the sharing of emotions, to value certain situations, to ensure and reinforce social cohesion (8). Thus it is essential that family members and friends assist the death process to have the experience of elaborating the grief. In the COVID-19 pandemic, due to the high infectivity rate of the disease (9), this reality is being stolen from societies.

According to the literature, rituals go beyond action and are full of symbols. These symbols can have several meanings and make it possible to describe what we cannot express in words (5). Thus, they begin with agony and coincide with the initial phase of mourning. The segment takes place with the wake, funerals, condolences and public mourning (for prominent people), social (as in the case of the use of specific color of clothing) and psychological (the feeling of loss), extending with the cult of the dead or the visit to the cemetery, as it occurs on the day of the dead (10). Hence, in COVID-19 pandemic, the death is not a day worth living. It is a strange thing. Hospital morgues are flooded. Bodies and stories line up, coffins wrapped in pain and homesickness are led to cremation, leading to the creation of an emotional trauma.

Funeral rituals, therefore, mark the loss of a member to family members while affirming to society the value of the life of the deceased; provide the experience of mourning according to the values and cultural prerogatives in which that community is immersed; they allow reflection on the paradigm of the coexistence of life and death; they redefine the meaning of life by pointing out a resizing of the lives of those who remained (11). In addition, they serve to contextualize the experience, allowing for role changes and the transition of the life cycle. They provide the family with support for the feeling of belonging to a culture capable of providing predictable responses at a time when the shock of loss leaves them numb and disjointed (5). The absence of these rites of passage also causes pain, enhances emotional traumas, which worries, because pain due to trauma can cause immediate and long-term physical consequences such as fibromyalgia and post-traumatic stress disorder. This profound disruption of organic and cognitive functions is even more common in victims of disasters (12) and pandemics.

According to Bromberg, in another perspective, funeral rituals have a therapeutic function, as (1) they help family members and friends to admit the loss of their loved ones; (2) creates a space for reflection on death as a process incorporated into life; (3) it makes it easier for family/friends to understand the grieving process and assimilate (13). In this perspective, it can be inferred that the possibility of performing funeral rites according to their customs/beliefs is a protective factor for the mental health and emotional traumas of the population that is suffering. Studies in psychology and Neurosciences demonstrate that memories loaded with emotion must be analyzed and reframed in order to overcome a traumatic phenomenon and avoid psychological distress and emotional trauma (14).

During the pandemic, several studies have shown an alarming increase in the rates of depression, suicidal ideation, anxiety (15), insomnia in addition to negative feelings such as fear, anguish, anger, stress, sadness and loneliness (16). In the psychological aspect, it is important to observe patients with their type of psychological suffering enter in silent crises and emotional traumas because this goes against all the cultural paradigms of modern society and all these feelings combined with loneliness intensify the pain of the life that is ending. This situation can also build and increase tension and it can be triggers in patients with pre-existing psychiatric diseases.

In addition, it must be considered that the process of facing death has profound correlations with the historical moment, with the social, economic and cultural prerogatives in which one is immersed. In the Middle Ages until the mid-eighteenth century, for example, death was part of people's daily lives, existing a close relationship between the living and the dead. The image that we had of death was shown through two main characteristics: family simplicity and its publicity, and dying in public persisted until the end of the 19th century (17). Until the end of the 18th century, death was a public and well-organized ceremony, the moment before death was familiar, and the presence of relatives and friends in the patient's room was essential. Only in the 19th century death in the West started to separate the dead from the survivors, relating to pain and emotions shown by crying, screaming and pleading. In the 19th and 20th centuries, the rites were heavily governed by the influence of the Catholic religion (4). Therefore, rituals such as the concept of death have been reinvented over time, thinking about them reflecting their effects on people's mental health is to think and reflect to what extent the social context influences the mental health of a population. In fact, with the technological advancement and longevity of human beings, facing premature and abrupt death seems to oppose the very "sense of normality", while challenging those who lost their loved ones to reinvent themselves in a short period of time and, in parallel, fear for their deaths, those of other loved ones and of the very society in which they are immersed, that is, of their own concept of normal.

Thus, with scientific-technological advances in medical knowledge, society became a consumer of health care. However, death and the anguish/fear of death are still a *continuum* in people's lives. Rituals emerge as a therapeutic tool for emotional traumas in death context, an aid to understand and elaborate the strangeness of the moment, but also reconciling the living with the process of dying. During the

COVID-19 pandemic, the inability to perform these rites reinforces the painful nature of death, arouses the feeling of loss in family members, friends, spouses, amplifies and causes emotional trauma and confronts society with its own fragility, both because of the speed with which it is installed and because of the novelty in ways of conducting the death process. There is a need for a deep reflection on the psychological, anthropological, sociological, and medical point of view of the death-dying process in the context of the new SARS-CoV-2 Pandemic, seeking to reconfigure the symbolisms, signifiers and meanings that this process took from 2020 and how the absence of this process impacts people's mental health. After all, the COVID-19 is robbing families of the chance to say a final goodbye.

AUTHOR CONTRIBUTIONS

MLRN, JGJ, and MMM reviewed the study protocol, read, and screened articles for inclusion. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

The authors would like to thank the Scientific Writing Lab, Medicine School – Universidade Federal of Cariri (UFCA) and the Brazilian National Council for Scientific and Technological Development (CNPq).

REFERENCES

1. Silva RS, Campos AER, Pereira Á. Cuidando do paciente no processo de morte na Unidade de Terapia Intensiva. *Rev Esc Enferm USP* (2011) 45 (3):738–44. doi: 10.1590/S0080-62342011000300027
2. Peters L, Cant R, Payne S, O'Connor M, McDermott F, Hood K, et al. How death anxiety impacts nurses' caring for patients at the end of life: a review of literature. *Open Nurs J* (2013) 7:14–21. doi: 10.2174/1874434601307010014
3. World Health Organization – WHO. *Coronavirus Disease (COVID-19) pandemic*. (2020). Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019. [Accessed April 30, 2020].
4. Tomasi JM. Cortejos fúnebres e velórios: os ritos fúnebres católicos na cidade de Florianópolis (SC) na contemporaneidade. *RBHR* (2013) 17:215–30.
5. Souza CP, Souza AM. Rituais Fúnebres no Processo do Luto: Significados e Funções. *Psic: Teor e Pesq* (2019) 35:e35412. doi: 10.1590/0102.3772e35412
6. Gonçalves Júnior J, Lóssio Neto CC, Cruz LS, Santos MSV, Novais MSMC, Rollim Neto ML. *Oncologia Pediátrica – Interfaces Teóricas. 1st Ed*. CRV Editor: Curitiba (2016).
7. Meneses RA, Gomes EC. "Seu funeral, sua escolha": rituais fúnebres na contemporaneidade. *Rev Antropol* (2011) 54(1):88–132. doi: 10.2307/41825781
8. Gonçalves AC. Rituais tradicionais de solidariedade. Religião e tensões entre finitude e infinitude. In: Ramos LAO, Ribeiro JM, Polônia A, editors. *Estudos em homenagem a João Francisco Marques*, vol. 2. Porto: Faculdade de Letras da Univ. do Porto (2001).
9. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. *N Engl J Med* (2020) 382:1199–207. doi: 10.1056/NEJMoa2001316
10. Bayard JP. *Sentido oculto dos ritos mortuários: Morrer è morrer*. Paulus: São Paulo (1996).
11. Imber-Black E. Os rituais e o processo de elaboração. In: Walsh F, McGoldrick M, editors. *Morte na família: Sobrevivendo às perdas*. Porto Alegre: Artmed (1998). p. 229–45.
12. Walter S, Leibner N, Jerg-Bretzek L, Hrabal V, Traue HC. Pain and emotional processing in psychological trauma. *Psychiatr Danub* (2010) 22(3):465–70.
13. Bromberg MH. *A Psicoterapia em situações de perdas e luto*. Livro Pleno: Campinas (2000).
14. Peres JPF, Mercante JPP, Nasello AG. Promovendo resiliência em vítimas de trauma psicológico. *Rev Psiquiatr RS* (2005) 27(2):131–8. doi: 10.1590/S0101-81082005000200003
15. Xiang Y-T, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatr* (2020) 7:228–9. doi: 10.1016/S2215-0366(20)30046-8
16. Torales J, O´Higgins M, Castadelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry* (2020). doi: 10.1177/0020764020915212
17. Rezende AAM, Santos GF, Caldeira VP, Magalhães ZF. Ritos de Morte na Lembrança dos Velhos. *Rev Bras Enferm* (1995) 48(1):7–16. doi: 10.1590/S0034-71671995000100002

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychology

OPINION
published: 15 October 2020
doi: 10.3389/fpsyg.2020.583233

Acompaniment in Grief. Times of Coronavirus

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Keywords: bereavement, pandemic (COVID-19), grief source: DeCS, process of dying, dignified death

Reflection on grief, the loss of a loved one, and the way of accompanying those who experience this suffering, is quite scarce. In some way, grief constitutes one of those taboo topics with which we are not educated to live healthily either, but it is the force of the experience of death that gives us some key to face it. Nowadays, there is also a need for reflecting about how to support mourning and grief of those people who experience the loss of loved ones, without even having the chance to properly celebrate and accompany their dying, due to stringent Coronavirus measures of social distancing and thereby prevention of contagion.

Given the cultural resistance, abandonment, and active denial of death and dying and seeking full life, this article addresses a truly relevant and necessary discussion about the meaning of death. With the experience of the Coronavirus, the literature on support for death has grown. Even though there are few research studies focused on outcomes and support for bereaved people during a pandemic (Mayland et al., 2020). Studies tend to focus on survivors (Carr et al., 2020).

As with previous pandemics, through this one, multiple losses have been caused, related to death itself and also to disruption in rituals and mourning practices, and therefore increasing the risk of complicated grief (Mayland et al., 2020). As in other studies (LeRoy et al., 2020), we try to describe how to help (sick and terminally ill, dying) to cope with proximity and the experience of dying, how to help family members/loved ones/caregivers, how psychologists and health professionals can help, and whether this should be done in general or, in particular, during these times of the coronavirus.

The topic, however, is neglected in modern medicine and in the therapeutic fields, which has been widely acknowledged throughout history. In fact, medieval treatises began death education and have explored it at different depths in philosophy, psychology, anthropology (Thomas, 2019). Thanatology is a recently emerging field that contemplates death studies. It is a complex and multidisciplinary field that encompasses the range of human experiences, emotions, expectations, and realities (Becker, 1973; Meagher and Balk, 2013). In fact, there has always been a need of finding meaning, giving continuity, or transcending death (Kübler-Ross, 1969, 2005; Lifton, 1979).

The science of death and dying emerged in a historical context marked by intense social, economic, and political changes that in turn has contributed to the concept of death being excluded from social life (Fonseca and Testoni, 2011). On the occasion of the coronavirus pandemic, society has become more aware of the value of accompaniment at the end of life and in mourning. The legal ban on visiting hospitals (except for small meetings in terminal situations), as well as participating in grief, both in morgues and rites, has put on the table a reality already existing before, in other contexts. Certainly, some immigrants have encountered in this way the end and mourning of their loved ones; some did not even have any information about their deaths. However, on the occasion of the pandemic, this situation has been escalated and universalized for months.

Is it possible to think that the death of the others, besides tearing, can teach us to live and humanize? Is there anything positive that we can find in death or in the process of dying when they have been deprived of their community dimension, of the accompaniment of those who

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Specialty section:
This article was submitted to Cultural Psychology, a section of the journal Frontiers in Psychology

Received: *14 July 2020*
Accepted: *02 September 2020*
Published: *15 October 2020*

Citation:
Bermejo JC (2020) Acompaniment in Grief. Times of Coronavirus. Front. Psychol. 11:583233. doi: 10.3389/fpsyg.2020.583233

lived their own death, or that of loved ones separated from their families? Can this contribute something to being happier? Isn't the death of a loved one a painful loss that, above all, tears us apart and puts us in crisis? Does psychological intervention help and prevent something?

Dying and death demand truth, and we learn certain truths that can contribute to humanizing us (Bermejo, 2009a).

Death puts us hopelessly in front of the mystery of life. It imposes silence and inevitable reflection on us. And, in a way, it makes us all philosophers, thinkers about the ultimate meaning of life, relationships, and love. Death does not trigger any thought, but intensely felt thoughts. It is like living before an enigma that possesses us, as the pregnant woman possesses her child to give meaning. Death, thus, can teach us to live and humanize and accompany these processes from psychology. It represents an ethical duty and an opportunity to generate biographical health.

Accompanying in dying, also by telephone and video call, can teach us to live because it claims values that can easily be relegated in daily life, values evoked more by feeling than by reason, values that claim relationship and accompaniment.

This topic "not knowing what to say," which is typical of accompaniment at the end of life and in mourning, is as significant because it reveals our identities of limitation, vulnerability, and poverty. It reveals the value of our silent and absent presence, the value of the embrace, which cannot now be given, and of the hand stretched—in the metaphorical sense—of the caress now impossible (Bermejo, 2020a); it reveals the power of the small and simple, the need for the symbolic to survive, to continue living.

Dying according to these parameters is a feature to speak of a dignified death.

Human beings desire the possibility of living their own deaths, not to be deceased by others. Not being able to accompany loved ones due to the coronavirus pandemic situation has generated a certain expropriation of this possibility. This is the first characteristic that a dignified death should have: an appropriate death, not expropriated, as Tolstoy so clearly makes us see in *The Death of Ivan Illich* (Illich, 1997). That chain of calls and messages in which the patient is spoken, but without the patient, generates a very notable isolation in the patient.

Dying worthily (Küng and Walter, 1997) consists of making the effort to characterize the personal process and accompanying from the environment to make a final narrative. Each person, thus, could imagine his own process, describing it with proper personal qualifiers, which make this moment of his existence such an important moment that it is, definitely, the last. Hardly a person would wish it in the loneliness and impossibility of face-to-face communication.

A death will be more dignified the more it is spoken by the subject and the people who are most affected. A spoken death is one in which there is room for the voice, for the words around death, where you can hear what is said and what is not said.

A dignified death will be one that deserves the adjective of beautiful, but not in an idealized sense, but a death in which the person lives until the last moment. The isolation by coronavirus has generated outrage due to the feeling that my beloved one is not dying close to me but among others, among other sick persons and professionals, who have been entrusted with a strange accompaniment.

A characterized death (Bermejo, 2009b) is the one in which the subjects are happy to live, that is, saved by death, because to kill death would be to feel how love and solidarity dies. It is death that gives ultimate meaning to our lives. It will be satisfied if we are able to fill our relationships with content (*con-tenti*) and communion. Characterizing death entails doing what we can for constructing the process of dying as a dimension of life, in other words, learning to lose and to progressively integrate our condition of finesse (Bermejo and Magaña, 2014).

Talking about dignified death means working toward the person governing himself in the best of his means, thus ruling the space (physical, personal, affective, etc.) that surrounds him in the last months or days, to the extent that nature and personal limitation permits. The coronavirus has pushed the vital world out of the patient, creating suffering added to the process of dying and losing.

A humanized death is one where the legitimate rarity of each one can be developed, where the feelings, desires, desired companies or not, and expectations can be adequately expressed...

A dignified death would be one that becomes a true experience of love because the death experience is made only by the one who loves. We should talk about death as lovers speak, who love life because it is limited, because they want to make the most of life and joy at every moment.

Death should be an exercise in learning, of art, because the only thing is the "*ars vivendi*" and the "*ars moriendi*" when the idea that dying is an instant and conceived as a process in the human journey toward the realization of who we are and what we are called to be has been overcome. Those who have been sick with coronavirus and family members have been forced to learn an "*ars novus*" (Paglia, 2017).

It is more human the death that can be narrated. Because, deep down, we cannot talk about that; the best thing that can be done is to narrate it. A narrated death allows it to be characterized by oneself, by loved ones. It finds no explanation for reasons but fills it with words when it talks about how.

Ultimately, a healthy characterized death can be called an elegant death because it is tailored to the responsible, the capacity for one's own personal choice (election), considering life as a gift for those who interpret it, and it does not lead us to live exclusively to gambling of the capricious non-rational nature (Requena, 2017).

The coronavirus has made dying an archipelago, which is characterized precisely of being united by what it separates.

Adjectivized death would thus become a mystery experience rather than a simple problem to manage. Mystery is not something that is outside of us and has a solution. The mystery is within us; it surrounds us, and we have no choice but to live with it. Living it humanly entails the ultimate expression of the health of a person, which results in "*meditatio mortis*" that will not be the unpleasant obsession but the human understanding of

the ultimate value of life in view of its end, in the midst of the dynamism of hope (Bermejo, 2020b).

Health professionals, sufficiently trained in psychology, particularly in counseling, will help prevent complicated and pathological grief if they accompany healthy processes at the end of the lives of loved ones, playing special mediators, sent in times of pandemic, transmitting messages, reading letters, interpreting, etc. to encourage possible communication.

AUTHOR CONTRIBUTIONS

The whole article has been written by JB.

REFERENCES

Becker, E. (1973). *The Denial of Death.* New York, NY: The Free Press.

Bermejo, J. C. (2009a). *Estoy en Duelo.* Madrid: PPC.

Bermejo, J. C. (2009b). "Sanar el morir," in: *Fichas sobre la muerte y el morir,* ed J. L. Cabria (Burgos: Monte Carmelo), 117–119.

Bermejo, J. C. (2020a). *Duelo Digital*. Bilbao: Desclée De Brouwer.

Bermejo, J. C. (2020b). *La esperanza en Tiempo de Coronavirus*. Santander: Sal Terrae.

Bermejo, J. C., and Magaña, M. (2014). *"Modelo Humanizar" de Intervención en Duelo*. Madrid: Sal Terrae.

Carr, D., Boerner, K., and Moorman, S. (2020). Bereavement in the time of coronavirus: unprecedented challenges demand novel interventions. *J. Aging Soc. Policy* 32, 425–431. doi: 10.1080/08959420.2020.1764320

Fonseca, L. M., and Testoni, I. (2011). The emergence of thanatology and current practice in death education. *Omega* 64, 157–169. doi: 10.2190/om.64.2.d

Illich, I. (1997). *Nemesi Medica. L'espropriazione della salute*. Milano: Arnoldo Mondadori Editore.

Kübler-Ross, E. (1969). *On Death and Dying*. New York, NY: Routledge.

Kübler-Ross, E. (2005). *On Grief and Grieving: Finding the Meaning of Grief Through the Five Stages of Loss*. New York, NY: Simon and Schuster.

Küng, H., and Walter, J. (1997). *Morir con Dignidad.* Un alegato a favor de la responsabilidad. Madrid: Trotta.

LeRoy, A. S., Robles, B., Kilpela, L. S., and Garcini, L. M. (2020). Dying in the face of the COVID-19 pandemic: contextual considerations and clinical recommendations. *Psychol. Trauma Theor. Res. Pract. Policy* 12, S98–S99. doi: 10.1037/tra0000818

Lifton, R. (1979) *The Broken Connection: On Death and the Continuity of Life*. New York, NY: Simon and Schuster.

Mayland, C. R., Harding, A. J. E., Preston, N., and Payne, S. (2020). Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J. Pain Sympt. Manage.* 60, e33–e39. doi: 10.1016/j.jpainsymman.2020.05.012

Meagher, D. K., and Balk, D. E. (eds.). (2013). *Handbook of Thanatology*. London: Routledge.

Paglia, V. (2017). *La hermana muerte.* La dignidad del vivir y del morir. Santander: Sal Terrae.

Requena, P. (2017). *Doctor, no haga todo lo posible!* De la limitación a la prudencia terapéutica. Granada: Comares.

Thomas, D. A. (2019). Death and renewal. *Am. Anthropol.* 121, 7–10. doi: 10.1111/aman.13204

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

OPINION
published: 30 October 2020
doi: 10.3389/fpsyt.2020.570439

Spiritual Beliefs, Mental Health and the 2019 Coronavirus (2019-nCoV) Outbreak: What Does Literature Have to Tell Us?

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Keywords: coronavirus infection, mental health, spirituality, coping, public health

INTRODUCTION

On December 2019, when the β-coronavirus 2019-nCoV (COVID-19) pandemic started in Wuhan, China (1, 2) the social relations were completely changed. Due to the fact that several key characteristics of the transmissibility and natural history of COVID-19 are currently unknown (3) and the dubious or even false information about factors related to virus transmission, the incubation period, its geographic reach, the number of infected, and the actual mortality rate has led to insecurity and fear in the population (4).

The literature suggests that the Spirituality is a common way that people cope with illnesses (5) and there are papers reporting that 65 percent of patients with depression, anxiety, and other psychiatric conditions indicate that they want spirituality to play a part in their treatment (6). However, the use of Spirituality to deal with the COVID-19 pandemic is still uncertain. Therefore, the objective was to describe the impact of these strategies to promote mental health in psychiatric patients.

DISCUSSION

Epidemiological data from developing countries suggest that Spirituality evokes in health-care receivers the sources to find the necessary inner strengths, which include perspective thinking, rituals for transcending immediate physical condition, and modalities of coping with their illnesses (7). In COVID-19 context, spirituality can be a tool to face the negative symptoms that appear in general community and psychiatry patients. However, the influence of spirituality on mental health is a phenomenon resulting from several factors such as: lifestyle, social support, a belief system, religious practices, ways of expressing stress, spiritual direction, and guidance (8). Thus, some groups could benefit more from spiritual practices than others, such as those who use drugs, those with mood or anxiety disorders and compensated psychotic disorders as long as they obviously have belief in the rituals practiced.

Spirituality, during the COVID-19 pandemic, can assist in the prevention and adjuvant treatment of psychiatric illnesses by giving meaning and resignifying the patient's life; positively reinforce their beliefs in the quest to improve themselves; assist in overcoming one's own limits, increasing adherence to treatment and implementing strength at will (9). This positive reinforcement is essential, as it allows the patient to maintain a center of balance, optimism and hope and, therefore, to continue with the proposed treatment without "relapses" or unfavorable developments. Thus, another of the possible benefits would be an improvement in the self-care

OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *08 June 2020*
Accepted: *29 September 2020*
Published: *30 October 2020*

Citation:
Gonçalves Júnior J, Sales JP, Moreira MM, Lima CKT and Rolim Neto ML (2020) Spiritual Beliefs, Mental Health and the 2019 Coronavirus (2019-nCoV) Outbreak: What Does Literature Have to Tell Us? Front. Psychiatry 11:570439. doi: 10.3389/fpsyt.2020.570439

of psychiatric patients, which would denote less demand for health services and, therefore, less exposure. It is important to remember that people with mental disorders can be exposed to more barriers in accessing timely health services, because of discrimination associated with mental ill-health in health-care settings (10).

On the other hand, people with mental health conditions could be more substantially influenced by the emotional responses brought on by the COVID-19 pandemic, resulting in relapses or worsening of an already existing mental health condition because of high susceptibility to stress compared with the general population (10, 11). Strategies associated with thought based on faith and hope can provide a search for the reframing and for the momentary relief of the suffering, based on spiritual values and religious beliefs (12). Among the strategies to deal with negative symptoms raised during the pandemic, we can mention: reflections and readings of religious texts; online prayer meetings and exchange of experiences; online support groups made possible by churches / temples; and meditation. Thus, spiritual practices can guide psychiatric patients in the search for self-knowledge, self-control and assist in the creation of autonomous practices (8) in the management of their pathologies and the balance between underlying diseases and situations inherent to the pandemic itself.

Another determining factor is the capacity that spirituality has to assist in the elaboration of the concept and coping with grief by the individual, extremely present during the COVID-19 pandemic. Literature review showed that patients with spiritual practices find it easier to deal with losses and face the mourning of loved ones in a more harmonious way than those who do not, improving their quality of life (13). Besides that, spirituality evokes hope in patients and optimizes the quality of life by withstanding negative symptoms. As a result of a study conducted in Nepal, hope was considered a predictive factor of quality of life, since the increase in the levels of hope culminated in improving the quality of life of the patients studied (14).

Although quarantine is an effective mean, thus far, in the management of COVID-19 pandemic it can predispose to isolation, feeling of abandonment and deepens whether depressive, anxiety (including panic attacks and post-traumatic stress), psychotic or paranoid, and can even lead to suicide (4). In this context, Spirituality appears to be beneficial in improving coping abilities in people with mental disorders as well as in reducing suicidality. A study carried out in the USA with 472 patients with post-traumatic stress disorder showed that religious/spiritual practices, regardless of sex, age group or ethnicity are protective factors in the fight against suicidal ideation (15). Similar findings were found in an Indian paper carried out with 160 university students (16). Research carried out in Switzerland with schizophrenic patients, 3 years after the diagnosis, showed that religion/spirituality was understood as a way of coping with illness (17). In the United Kingdom, when analyzing 7,403 participants in an attempt to relate the prevalence of mental disorders and religious practices, among those who had no spiritual practice there was greater use of psychotropic medications, 95% complained of phobia or anxiety, 73% had already had some experience with drugs in life, and 56% reported not eating properly (18).

Spirituality is a source of strength and comfort, helps with relieving psychiatric symptoms and it is associated with reduced length of hospital stay and improved satisfaction with life (19). A research carried out with 881 hospitalized patients over 50 years of age demonstrated that the organization of religious activities had a positive impact, decreasing the length of hospital stay (20). Meta-analyzes demonstrated that 30-90% of people with schizophrenia or severe mental illnesses considered spirituality to be an essential resource for dealing with difficult/stressful events (21).

Spirituality is also a strength tool for caregivers to deal with their emotions and improve care for the psychiatry patients. According to Weaver, Flannely and Oppenheimer, family caregivers also rely heavily upon their religious faith to cope with the burden of caring for their loved ones (5). Brazilian studies with caregivers and patients with chronic diseases show that Spirituality, as a strategy for coping, becomes an important ally when dealing with difficulties, being an important form of support and well-being for caregivers (12).

Therefore, during the COVID-19 pandemic, which already counts 976,249 cases and 50,489 deaths in 207 countries (22), spirituality has the potential to reinforce the patient's positive symptoms (5, 12, 13, 21) in relation to the disease, to the way they deal with limitations or problems during the pandemic, optimize their therapeutic adherence (8, 9) to pharmacological and non-pharmacological approaches, but also empowering the patient in other spheres of their life, such as emotional (improving self-esteem and self-control); social—expanding their friendship circle and strengthening family ties; and intellectual, as it engages them in activities such as reading, singing, meditation, and oratory (13, 17, 19), reducing the negative effects of the pandemic, social isolation and routine deprivation, deeply necessary to establish a sense of security and normality. However, these benefits only seem to be demonstrated in patients with well-established spiritual ties/practices and willing to believe/perform the recommended rituals. Additionally, patients with psychiatric disorders such as severe psychoses or in intensive care units in sedoanalgesia, whose connection with reality has been interrupted in some way, would not be able to enjoy the aforementioned benefits, being relegated this opportunity to their families and caregivers. Thus, evaluating spirituality as a tool that provides comprehensive and more assertive care is essential for effective psychiatric and psychological care and is particularly urgent in COVID-19 times.

AUTHOR CONTRIBUTIONS

MLRN, JGJ, CKTL, and MMM reviewed the study protocol. JPS read and screened articles for inclusion. All authors critically reviewed drafts and approved the final manuscript.

ACKNOWLEDGMENTS

The authors would like to thank the researchs groups: Statistical Modeling, Simulation and Risk Optimization, Department of Engineer and Scientific Writing Lab, Medicine School – Universidade Federal of Cariri (UFCA) and the Brazilian National Council for Scientific and Technological Development (CNPq).

REFERENCES

1. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med*. (2020) 382:1199–207. doi: 10.1056/NEJMoa2001316
2. Yan-Rong G, Qin-Dong C, Zhong-Si H, Tan YY, Chen S-D, Jin H-J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. *Mil Med Res*. (2020) 13:1–11. doi: 10.1186/s40779-020-00240-0
3. Hellewell J, Abbott S, Gimma A, Bossi MI, Jarvis CI, Russel TW, et al. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *Lancet Glob Health*. (2020) 8:e488–96. doi: 10.1016/S2214-109X(20)30074-7
4. Ornell F, Schuch JB, Sordi AO, Kessler FHP. Pandemic fear and COVID-19: mental health burden and strategies. *Braz J Psychiatry*. (2020) 42:232–5. doi: 10.1590/1516-4446-2020-0008
5. Weaver AJ, Flannelly KJ, Oppenheimer JE. Religion, spirituality, and chaplains in the biomedical literature: 1965–2000. *Int J Psychiatry Med.* (2003) 33:155–61. doi: 10.2190/B0H1-38QG-7PLG-6Q4V
6. Rao MS. Spirituality in psychiatry? *Psychiatry*. (2005) 2:20–2.
7. López-Sierra HF. Cultural diversity and spiritual/religious health care of patients with cancer at the Dominican Republic. *Asia Pac J Oncol Nurs*. (2019) 6:130–6. doi: 10.4103/apjon.apjon_70_18
8. Oliveira MR, Junges JR. Saúde mental e espiritualidade/religiosidade: a visão de psicólogos. *Estudos Psicol.* (2012) 17:469–76. doi: 10.1590/S1413-294X2012000300016
9. Leite IS, Seminotti EP. A Influência da Espiritualidade na Prática Clínica em Saúde Mental: Uma Revisão Sistemática. *R bras ci saúde*. (2013) 17:189–96. doi: 10.4034/RBCS.2013.17.02.13
10. Yao H, Chen J-H, Xu Y-F. Patients with mental health disorders in the COVID-19 epidemic. *Lancet Psychiatry*. (2020) 7:e21. doi: 10.1016/S2215-0366(20)30090-0
11. World Health Organization – WHO. *Mental Health and Psychosocial Considerations During the COVID-19 Outbreak*. Genebra (2020). Available online at: https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf?sfvrsn=6d3578af_2
12. Machado BM, Dahdah DF, Kebbe LM. Cuidadores de familiares com doenças crônicas: estratégias de enfrentamento utilizadas no cotidiano. *Cad Bras Ter Ocup.* (2018) 26:299–313. doi: 10.4322/2526-8910.ctoAO1188
13. Melo CF, Sampaio IF, Souza DLA, Pinto NS. Correlação entre religiosidade, espiritualidade e qualidade de vida: uma revisão de literatura. *Estud Pesqui Psicol.* (2015) 15:447–64.
14. Yadav S. Perceived social support, hope, and quality of life of persons living with HIV/AIDS: a case study from Nepal. *Qual Life Res.* (2010) 19: 157–66. doi: 10.1007/s11136-009-9574-z
15. Kopacz MS, Currier JM, Drescher KD, Pigeon WR. Suicidal behavior and spiritual functioning in a sample of Veterans diagnosed with PTSD. *J Inj Violence Res*. (2016) 8: 6–14. doi: 10.5249/jivr.v8i1.728
16. Wagani R, Colucci E. Spirituality and wellbeing in the context of a study on suicide prevention in North India. *Religions.* (2018) 9:183. doi: 10.3390/rel9060183
17. Pargament KI, Lomax JW. Understanding and addressing religion among people with mental illness. *World Psychiatry*. (2013) 12:26–32. doi: 10.1002/wps.20005
18. Smolak A, Gearing RE, Alonzo D, Baldwin S, Harmon S, McHugh K. Social support and religion: mental health service use and treatment of schizophrenia. *Community Ment Health J.* (2013) 49:444–50. doi: 10.1007/s10597-012-9536-8
19. Jones S, Sutton K, Isaacs A. Concepts, practices and advantages of spirituality among people with a chronic mental illness in Melbourne. *J Relig Health*. (2018) 58:342–55. doi: 10.1007/s10943-014-9896-1
20. Koenig HG, George LK, Titus P, Meador KG. Religion, spirituality, and acute care hospitalization and long-term care use by older patients. *Arch Intern Med*. (2004) 164:1579–85. doi: 10.1001/archinte.164.14.1579
21. Ho RTH, Chan CKP, Lo PHY, Wong PH, Chan CLW, Leung PPY, et al. Understandings of spirituality and its role in illness recovery in persons with schizophrenia and mental-health professionals: a qualitative study. *BMC Psychiatry*. (2016)16: 86. doi: 10.1186/s12888-016-0796-7
22. World Health Organization. *WHO Coronavirus Disease (COVID-19) Outbreak Situation*. Genebra (2020). Available online at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

OPINION
published: 23 November 2020
doi: 10.3389/fpsyt.2020.599722

Changes in Communicating Bad News in the Context of COVID-19: Adaptations to the SPIKES Protocol in the Context of Telemedicine

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Keywords: coronavirus infection, health communication, death, mental health, palliative care, public health, SPIKES protocol

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *27 August 2020*
Accepted: *30 September 2020*
Published: *23 November 2020*

Citation:
Gonçalves Júnior J, Nascimento TGL, Pereira MMM and Moreira EB (2020) Changes in Communicating Bad News in the Context of COVID-19: Adaptations to the SPIKES Protocol in the Context of Telemedicine. Front. Psychiatry 11:599722. doi: 10.3389/fpsyt.2020.599722

INTRODUCTION

The Death/Dying process (DDP) has profound repercussions on the mental health of patients, family members and friends submitted to it. These consequences bring fear, sadness, feeling of loneliness, abandonment and anguish (1). The representations of this process depend on social, economic, political and historical factors in which that community is inserted. Tools such as the humanization of care based on active listening, assertive communication and a good doctor-patient relationship are essential to face the difficulties inherent in terminality (2). However, several studies have already demonstrated difficulties on the part of health professionals in dealing with issues related to terminality. Therefore, these professionals have difficulty in the realization of effective communication (3).

Since the start of Pandemic by the COVID-19, to date, more than 761,779 deaths have occurred and more than 20 million people have been infected (4). Due to the high infectivity of the virus, patients are separated from family and friends (5). Professionals are forced to transmit news, including bad news, impersonally and without prior training via mobile telephony. Thus, conversations using online communication systems have an increasing role in palliative care. These online telecommunications-based services challenge effective communication and communicating bad news (CBN). Tools such as the SPIKES protocol (6) are essential to operationalize care and prepare professionals for a more welcoming, effective and less impactful approach.

Robert Buckman (1992) created the SPIKES Protocol in order to guide health professionals in communicating bad news to patients and their families. The protocol is divide in steps: (a). This procedure consists of a six-step mnemonic: S - Setting up; P - Perception; I - Invitation; K - Knowledge; E - Emotions; S - Strategy and Summary (6). However, with the advent of the COVID-19 pandemic there was an overload of the health system. The health team's ability to perform welcoming work, active listening and care were harmed.

In this context, strategies and protocols designed to establish professional security in terminal situations, such as the SPIKES Protocol, are difficult to implement. Thus, health professionals worldwide face an unprecedented challenge (7, 8)—how to establish care without touching, without eye contact, without physical presence? How to mourn without seeing the bodies? How do you bond with people you don't know without being there? Therefore, health teams have been adapting and incorporating the use of social media in practice making the implementation of protocols such as SPIKES challenging (3, 6, 9, 10).

Therefore, the aim of this article was to suggest an adaptation of the SPIKES protocol for CBN in the management of patients hospitalized with COVID-19 when the therapeutic interventions are limited. In particular, we will use scientific literature on the COVID-19 related challenges to highlight key points of adaptation to the SPIKES protocol.

A PROPOSAL FOR THE ADAPTATION OF THE SPIKES PROTOCOL FOR REMOTE COMMUNICATION IN THE COVID-19 PANDEMIC

(S): Setting Up

Preparing for communication. At this step, the physician thinks about how to speak, the possible reactions of family members and how to deal with them and prepares the place for the conversation (6).

Some health professionals, who previously had no direct contact with DDP, are having to deal with this situation daily and intensely during the pandemic. The DDP in Western culture it is still taboo (3) and a representation goes back to the conception of death adopted from the eighteenth century (5). It is synonymous with failure/fallibility, impotence, sadness, suffering and abandonment (3). Besides that, the uncertainties about the natural history of COVID-19, the lack of scientific information and the experimental protocols cause psychological distress in the team, compromising care and the realization of protocols such as SPIKES. Steps like "S" (Setting Up), "P" (Perception), and "I" (Information), for example, are impaired in the protocol. How will I prepare the environment well if family members are sometimes in a distant neighborhood or even in a different city? Interactions through social media? How to provide information safely if the knowledge produced so far is scarce? (6, 10). So in the step "S" (Setting Up), in the context of the pandemic, we advise that:

a. There is a suitable place where the professional can make the calls and/or video calls, if possible even outside the COVID-19 unit so that he can remove the PPE, eat beforehand and go to the bathroom, if necessary. It is advisable to use video calls at CBN due to the possibility of identifying, on the part of the professional, non-verbal signals coming from the receiver in order to direct the conversation (10);
b. Prepare a script listing the main topics of the patient's evolution, his name and the name of the companion who usually answers the phone. It is important to emphasize that, in search of success in communication, it is necessary to have a deep knowledge about the clinic and the patient's demand (11, 12);
c. Organize, according to the demand, the main priorities for the discussion (those he perceives will be more delicate information should be prioritized) (6, 10).

(P): Perception

It is necessary to perceive the physical and psychological state, the expectations and understanding of the companion/family member. At this step, the professional tries to realize how much the patient/family understood the disease and corrects misinformation (6). Thus, at this step, perhaps the most challenging for professionals, due to social distance, there is a difficulty in capturing signals and expressions from the recipients of information:

a. Call the companion by name, as well as the patient by name. This action helps to consolidate the doctor-patient/family relationship (11–14);
b. Always ask if there is someone close to the companion who is receiving the information and advice that, if the companion is unable to keep it going, pass it on (12, 14);
c. Notice variations in the companion's tone of voice (tones of doubt, sadness, pauses) (6, 13);
d. In the case of a video call, attention to non-verbal language such as crossing arms, frequent deviations in the look. Research has shown that 84.3% of professionals are aware of the role of non-verbal communication and use these cues when they are communicating (13).

(I): Invitation

Inviting companions to understand the disease. Sometimes, patient's/family members do not want to know details about the disease. At this time, the professional must be available to answer any future questions (6). So, in this step, two elements are fundamental:

a. Ask the companions how far they know about the patient's illness, diagnosis, health status and prognosis. This step is analogous to what is seen in face-to-face clinical practice (2, 14–16);
b. Make yourself available to answer questions (14, 16).
c. Try to create an intimate atmosphere even on the smartphone screen, A safe and welcoming environment, showing willing to help (14).

(K): Knowledge

Providing information. At this stage it is essential to provide information in a simple way, with accessible language and to be interested in patients' doubts about technical terms.

Conversations using online communication systems have an increasing role in palliative care, as families are faced with so many changes, including reduced face-to-face contact and even abandonment of traditional funeral services. These online telecommunications-based services challenge effective communication and CBN (2, 7, 17). This impersonal process makes it difficult to understand the DDP and the palliative approach because it promotes a reality break—family members deliver a person with shortness of breath to the hospital and find themselves collecting a dead body in a very short period of time (2). In association with that, the potential psychological impact on loved ones and patients can vary from mourning to depression or from feeling of loss to immense guilt for not being physically present at the moment of death (17, 18). In the context of the SPIKES protocol, the steps "E" (Emotions) and "K" (Knowledge) (6) are especially harmed.

Thus, at the "K" (Knowledge) step, it is essential that the health professional mention the medical needs that need to be discussed:

a. Offer information about the patient's evolution, diagnosis, prognosis respecting the family's social, economic and cultural limitations (13, 14, 16, 19);
b. Avoid using medical jargon (e.g., sedoanalgesia) to the detriment of terms such as "she/he are sleeping under medication" (13, 14, 19);
c. Always ask, at the end of each orientation, if the message was heard and understood (2, 6);

(E): Emotions

Expressing emotions. The professional must offer support and solidarity through a gesture or a phrase of affection. At this step, professional attention is essential:

a. One must perceive and become sympathetic to the manifestations of sadness and/or joy, depending on the news, the family members/companions (2);
b. Show available and empathetic posture—demonstrate that you understand suffering and difficulties; Given that in many cases after passing on difficult information, people do not actively pay attention to what is said later (12, 14);
c. Getting emotional is allowed, it just can't be more than the companions themselves. A survey carried out in 2017 showed that about 40% of doctors feel sad when they had to give bad news (13, 14).

(S): Strategy and Summary

Before discussing therapeutic plans, it is important to ask the patient if he is ready for this moment. Before discussing therapeutic plans, it is important to ask the patient if he is ready for this moment. It is important to always make it clear that the patient will not be abandoned. And there is a treatment plan thinking about the best that can be offered to him at that moment (6).

Two factors directly affect step "S" (Strategy and Summary). The first is the little time spent on communication. This factor also affects not only step "S" (Strategy and Summary), but also the "S" (Setting Up) and "P" (Perception) (6). This fact rests on two prerogatives: (I) the work overload due to the exhaustive routines of the care units for COVID-19 and (II) the lack of training in palliative care, which is usually reflected in some professional discourse rich in automatic, impersonal and technical information (10). Therefore, the COVID-19 pandemic has led to growing concerns not only about limited medical and hospital resources (e.g.,: ventilators, medications, gauze, and intensive care beds), but concern about the professionals' interpersonal limitations (20).

The second element to be considered is the lack of communication between professionals in the sector. It is not uncommon for the doctor/nurse who gives the news in the daily bulletin to not be the same person who is daily assessing the patient. This lack of consistency causes dissonance in information and suffering to family members due to a feeling of insecurity, because the hospital's restriction on families, *per se*, already contributes to high levels of psychological suffering in the general population and also made it difficult for overworked teams to establish trusting relationships through digital means (21, 22). Thus, the implementation of telemedicine can be a facilitating agent in these meetings with inpatients (19). However, the lack of skills and attitudes about the use of technologies and social media (6, 10) in a stressful environment such as the COVID-19 units can also be a factor that impairs care.

Therefore, at this step, two elements must be taken into account:

a. Summarize the information given, preferably repeating it in the same way as it was presented (13–16);
b. Announce that the call is coming to an end (3, 6, 14);
c. Inform the date of the next call, as well as, if possible, the name of the professional who will be responsible for it. Here, the need to be the same professional is highlighted, in order to maintain continuity of care and relationship (6, 15).

FINAL CONSIDERATIONS

In the terminal environment the effective communication is a valuable and powerful care weapon. There is a need to reinvent, research and, above all, reflect practices based on scientific rigor. The protocol to CBN suggested in this opinion paper aims to reduce the psychological distress of the health professional and foster discussion and improvement of assertive communication in the terminal environment due to the in the pandemic of COVID- 19. For, although the way in which palliative and end-of-life care is approached has changed dramatically with the pandemic, effective and honest communication must remain (3).

AUTHOR CONTRIBUTIONS

All authors prepared the review, developed the inclusion criteria, selected titles and abstracts, evaluated the quality of the articles included, and wrote the manuscript.

ACKNOWLEDGMENTS

The authors would like to thank the Scientific Writing Laboratory of the Faculty of Medicine of the Federal University of Cariri (UFCA) and the National Council for Scientific and Technological Development (CNPq).

REFERENCES

1. Fontes WHA, Gonçalves Júnior J, Vasconcelos CAC, Silva CGL, Gadelha MSV. Impacts of the SARS-CoV-2 pandemic on the mental health of the elderly. *Front Psychiatry*. (2020) 11:841. doi: 10.3389/fpsyt.2020.00841
2. Gonçalves Júnior J, Lóssio Neto CC, Cruz LS, Novais MSMC, Gadelha MSV, Rolim Neto ML. Morte e Morrer na Criança com câncer. In: Curitiba PR, editor. *Pediatric Oncology: Theoretical Interfaces*. CRV (2016). p. 132.
3. Cardoso DH, Viegas AC, Santos BP, Muniz RM, Schwartz E, Thofehrn, MB. Care in terminality: difficulties of a multidisciplinary team in hospital care. *Avances Enfermería*. (2020) 31:83–91.

4. World Health Organization (WHO). *Coronavirus Disease (COVID-19) Dashboard*. (2020). Available online at: https://covid19.who.int/ (accessed 20 August, 2020).
5. Gonçalves Júnior J, Sales JP, Moreira MM, Pinheiro WR, Lima CKT, Rolim Neto ML. A crisis within the crisis: the mental health situation of refugees in the world during the 2019 coronavirus (2019-nCoV) outbreak. *Psychiatry Res*. (2020) 288:113000. doi: 10.1016/j.psychres.2020.113000
6. Cruz CO, Rieira R. Communicating bad news: the SPIKES protocol. *Diagn Tratamento*. (2016) 21:106–8.
7. Ritchey KC, Foy A, McArdel E, Gruenewald DA. Reinventing palliative care delivery in the era of COVID-19: how telemedicine can support end of life care. *Am J Hosp Palliat Me*. (2016) 37:992–7. doi: 10.1177/1049909120948235
8. Lai L, Sato R, He S, Ouchi K, Leiter R, Thomas Jd, et al. Usage patterns of a web-based palliative care content platform (PalliCOVID) during the COVID-19 pandemic. *J Pain Symptom Manage*. (2020) S0885-3924:30627–8. doi: 10.1016/j.jpainsymman.2020.07.016
9. Rhee J, Grant M, Clayton J, Detering K, Arthurs K. Dying still matters in the age of COVID-19. *Aust J Gen Pract*. (2020) 49(Suppl.):28. doi: 10.31128/AJGP-COVID-28
10. Hanson LC. We will all be changed: palliative care transformation in the time of COVID-19. *J Palliat Med*. (2020). doi: 10.1089/jpm.2020.0446
11. Cruz CO, Riera, R. Communicating bad news: the SPIKES protocol. *Diagn Treat*. (2016) 21:106–8.
12. Silveira FJF, Botelho CC, Valadão CC. Breaking bad news: doctors 'skills in communicating with patients. *Sao Paulo Med J*. (2017) 135:323–31. doi: 10.1590/1516-3180.20160221270117
13. Narayanan V, Bista B, Koshy C. 'BREAKS'protocol for breaking bad news. *Indian J Palliat Care*. (2010) 16:61–5. doi: 10.4103/0973-1075.68401
14. Holstead RG, Robinson AG. Discussing serious news remotely: navigating difficult conversations during a pandemic. *JCO Oncol Practice*. (2020) 16:363–8. doi: 10.1200/OP.20.00269
15. Kuntz JG, Kavalieratos D, Esper GJ, Mitchell J, Ellis CM, Quest T. Feasibility and acceptability of inpatient palliative care e-family meetings during COVID-19 pandemic. *J Pain Symptom Manag*. (2020) 60:e29–32. doi: 10.1016/j.jpainsymman.2020.06.001
16. Neto JAC, Sirimarco MT, Cândido TC, Bicalho TC, Matos BO, Berbert GH, et al. Health professionals and the communication of bad news from the patient's perspective. *Rev Med Minas Gerais*. (2012) 23:518–25. doi: 10.5935/2238-3182.20130079
17. Wang SS, Teo WZW, Teo WZY, Chai YW. Virtual reality as a bridge in palliative care during COVID-19. *J Palliat Med*. (2020) 23:212. doi: 10.1089/jpm.2020.0212
18. Bakar M, Capano E, Patterson M, McIntyre B, Walsh CJ. The role of palliative care in caring for the families of patients with COVID-19. *Am J Hosp Palliat Me*. (2020) 37:866–8. doi: 10.1177/1049909120931506
19. Wallace CL, Wladkowski SP, Gibson A, White P. Grief during the COVID-19 pandemic: considerations for palliative care providers. *J Pain Symptom Manag*. (2020) 60:E70–6. doi: 10.1016/j.jpainsymman.2020.04.012
20. Cheng JOS, Ping L, Wah-Pun Sin E. The effects of nonconventional palliative and end-of-life care during COVID-19 pandemic on mental health—Junior doctors 'perspective. *Psychol Trauma*. (2020) 12(Suppl.1):S146–7. doi: 10.1037/tra0000628
21. Feder SL, Akgün KM, Schulman-Green D. Palliative care strategies offer guidance to clinicians and comfort for COVID-19 patient and families. research, practice and policy in the covid-19 pandemic. *Heart Lung*. (2020) 49:227–8. doi: 10.1016/j.hrtlng.2020.04.001
22. Peter S, Jonas B, Lisa M, Staffan L. Dying from Covid-19: loneliness, end-of-life discussions and support for patients and their families in nursing homes and hospitals. A national register study. *J Pain Symptom Manag*. (2020). doi: 10.1016/j.jpainsymman.2020.07.020

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 24 November 2020
doi: 10.3389/fpsyt.2020.572583

Impact of Social Isolation on the Behavioral, Functional Profiles, and Hippocampal Atrophy Asymmetry in Dementia in Times of Coronavirus Pandemic (COVID-19): A Translational Neuroscience Approach

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OPEN ACCESS

Edited by:
Amit Anand, Case Western Reserve University, United States

Reviewed by:
Laura Orsolini, University of Hertfordshire, United Kingdom
Raquel Luiza Santos, Federal University of Rio de Janeiro, Brazil

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Specialty section:
This article was submitted to Mood and Anxiety Disorders, a section of the journal Frontiers in Psychiatry

Received: *15 June 2020*
Accepted: *28 September 2020*
Published: *24 November 2020*

Citation:
Muntsant A and Giménez-Llort L (2020) Impact of Social Isolation on the Behavioral, Functional Profiles, and Hippocampal Atrophy Asymmetry in Dementia in Times of Coronavirus Pandemic (COVID-19): A Translational Neuroscience Approach. Front. Psychiatry 11:572583. doi: 10.3389/fpsyt.2020.572583

The impact of COVID-19 on the elderly is devastating, and nursing homes are struggling to provide the best care to the most fragile. The urgency and severity of the pandemic forces the use of segregation in restricted areas and confinement in individual rooms as desperate strategies to avoid the spread of disease and the worst-case scenario of becoming a deadly trap. The conceptualization of the post–COVID-19 era implies strong efforts to redesign all living conditions, care/rehabilitation interventions, and management of loneliness forced by social distance measures. Recently, a study of gender differences in COVID-19 found that men are more likely to suffer more severe effects of the disease and are over twice as likely to die. It is well-known that dementia is associated with increased mortality, and males have worse survival and deranged neuro-immuno-endocrine systems than females. The present study examines the impact of long-term isolation in male 3xTg-AD mice modeling advanced stages of Alzheimer's disease (AD) and as compared to age-matched counterparts with normal aging. We used a battery of ethological and unconditioned tests resembling several areas in nursing homes. The main findings refer to an exacerbated (two-fold increase) hyperactivity and emergence of bizarre behaviors in isolated 3xTg-AD mice, worrisome results since agitation is a challenge in the clinical management of dementia and an important cause of caregiver burden. This increase was consistently shown in gross (activity in most of the tests) and fine (thermoregulatory nesting) motor functions. Isolated animals also exhibited re-structured anxiety-like patterns and coping-with-stress strategies. Bodyweight and kidney weight loss were found in AD-phenotypes and increased by isolation. Spleen weight loss was isolation dependent. Hippocampal tau pathology was not modified, but asymmetric atrophy of the hippocampus, recently described in human patients with dementia and modeled here for the first time in an animal model of AD, was found to increase with isolation. Overall, the results show awareness of the impact of isolation in elderly patients with dementia, offering some guidance from translational

neuroscience in these times of coronavirus and post–COVID-19 pandemic. They also highlight the relevance of personalized-based interventions tailored to the heterogeneous and complex clinical profile of the individuals with dementia and to consider the implications on caregiver burden.

Keywords: isolation, confinement, risk factors, neuropsychiatric symptoms in dementia, gender, nursery homes, animal models-rodent, brain asymmetry

INTRODUCTION

The impact of COVID-19 on the elderly is devastating despite nursing homes and residential care homes struggling to provide the best care to the most fragile of the elderly population, who due to their physical and/or mental conditions already needed continuous surveillance and/or professional care. Between 70 and 80% of nursing home residents are affected by dementia (1), a mental disease that, *per se*, is associated with increased mortality in comparison with aged control populations (2, 3). In these scenarios, the severe constraints that all other parts of the society are facing not only exist but also may have a greater impact on the elderly due to their vulnerability, frailty, and increased risk of mortality (4).

Official data on the numbers of death linked to COVID-19 in care home residents are still difficult to ascertain. Differences in testing and the policies of different countries make international comparisons difficult. Despite these difficulties, it is obvious that nursing home residents have a higher risk of dying from COVID-19. The most recent report in Europe (Amsterdam) shows that mortality is higher in residents with confirmed COVID-19 with more typical symptoms (fever, dyspnea, coughing), reaching 37%, but even when no typical symptoms but sore throat and delirium are present, mortality in residents with confirmed COVID-19 is 27% (5). Early international evidence, with the actual official data, indicates that about half of all people who have died from COVID-19 were care home residents (6).

The urgency and severity of this pandemic has forced care institutions to use segregation in restricted areas (floors) and confinement in individual rooms as desperate strategies, first, to avoid the spread of disease, and thereafter to hamper the worst-case scenario of becoming a deadly trap. With visits to nursing homes and long-term care facilities banned, residents have no face-to-face contact with their families. Group activities are no longer possible in care homes or nursing homes. Residents have become more socially isolated, lacking the social and environmental enrichment that are key rehabilitation factors to counteract their progressive physical and/or mental deterioration. Moreover, redistribution and relocation of rooms can increase the stress and behavioral problems as the new arrangements become a new environment for the patient (7, 8).

While we wait for the vaccine to arrive, the conceptualization of elderly care in the post–COVID-19 era implies strong efforts to redesign all living conditions and lifestyles, to find new care and rehabilitation strategies, and to provide better management of loneliness forced by physical distance. Due to the impact of isolation on mental well-being, the WHO cautions about the incorrect use of the term "social distancing" to refer to a number of measures to increase physical space between people to prevent the spread of COVID-19 (9). It also highlights the relevance of referring instead to "physical distancing" and to conceptualize the policies to avoid disconnection from family and loved ones because in the current situation there is a pressing need to stay emotionally and socially connected (9). Social vulnerability, frailty, and mortality are a dangerous triad for the elderly as well (4). Social isolation is considered a risk factor for morbidity and mortality since it strongly contributes to comorbid conditions such as hypertension, cardiovascular disease, cognitive decline, depression, and early mortality or the disabilities related to them (10–14). Social isolation not only increases the risk of dementia but it is also associated with an increased memory decline and exacerbation of the symptoms in dementia patients (15, 16). Thus, the singular features of this pandemic will also generate collateral effects in people's health, mostly in patients (those already ill) without COVID-19 (17). Recent reports suggest that a pandemic can be a traumatic experience for some individuals and lead to posttraumatic stress disorder (PTSD). Although it may depend on several other risk factors, the COVID-19 pandemic can be a trigger for mental health problems (18, 19). The emergence of psychiatric problems and/or deterioration of mental health are getting attention, and technical guides for interventions focusing on the individual needs are being developed urgently. New adaptations, such as telecare, are playing a very important role (20, 21). Telepsychiatry is becoming a useful tool for patients with mental disorders (22). For example, a current report on older adults with mild cognitive impairment or mild dementia performed by Telehealth home support shows that those who were living alone during the confinement reported decreased well-being, greater anxiety, and more sleeping problems (23). Coping with stress and negative and sad emotions have a stronger impact on the elderly due to their age-related immunosenescence and the neuro-immune dysregulation associated with these psycho-social processes (24).

A current study of gender differences in COVID-19 found that in spite of males and females having the same prevalence of the disease, males are more at risk for worse outcomes and death independent of age (25). According to the morbidity/mortality paradox, also in dementia males show worse survival and deranged neuro-immuno-endocrine system than females despite their less bad neuropathological status (2, 3). AD, as many other forms of dementia, is one of the principal causes of disability in old adulthood. It is defined as an accumulation of amyloid-β (Aβ) plaques and tau-containing neurofibrillary tangles (NFTs), accompanied by a progressive memory decline

(26). Neuropsychiatric symptoms (NPS) (27), also called behavioral and psychological symptoms of dementia (BPSD), are observed in 90% of patients and may include agitation, anxiety, verbal or physical aggression, sundowning behavior, wandering, depression, challenging and disruptive behaviors, hallucinations, etc. For instance, the prevalence of aggression is between 33 and 46%, with males especially affected (28, 29). These NPS are highly associated with caregiver burnout (30), frequently leading to institutionalization (31) as their management usually needs pharmacological treatment supported by non-pharmacological interventions. However, despite efficacy in the reduction of most of these challenging symptoms by antipsychotics (32), they should not be used routinely for the treatment of aggression and psychosis in these patients because they have an associated increased risk of cerebrovascular accidents, respiratory diseases, and mortality (33–35). Unfortunately, at a practical level, the medication reviews are infrequent, and antipsychotics are used on a long-term basis despite their higher mortality risk (36). It also has been noted that care homes usually present a higher prevalence of antipsychotic prescription, and this seems to be increased in those with fewer staff (37, 38), important data to be taken into account within the pandemic consequences.

The present report aims to address these questions from a translational approach, studying the impact of long-term isolation in male 3xTg-AD mice modeling advanced stages of AD and as compared to age-matched group-housed 3xTg-AD mice and non-transgenic (NTg) counterparts with normal aging. This mice model of AD, created in the laboratory of Prof. Frank M. LaFerla at the University of California, Irvine, harbors PS1/M146V, APPswe, and tau P301L human transgenes and uniquely mimics various symptoms of the disease in temporal and neuroanatomical patterns like those observed in patients (39, 40). Moreover, 3xTg-AD male mice have shown increased mortality as compared to females and NTg counterparts (41–44), which means many 3xTg-AD males arrived at old age in socially isolated housing conditions. The impact of individual housing conditions at different ages of the rodents' lifespan is used as an animal model for some mental health disorders. Post-weaning social isolation of mice is a well-established animal model for developmental disorders, such as attention-deficit hyperactivity disorder, autism spectrum disorder, and specific learning disability (45). In the case of adolescent rodents, social isolation is regarded as a model of heightened vulnerability to comorbid alcoholism and anxiety disorders (46), while in adults it is used for pharmacological treatments for PTSD (47). Yet, only a few laboratories have studied the effects of poor social housing, and they show a worsening of the cognitive and beta-amyloid pathology in animal models for dementia (48–50). Here, for the first time, we investigated the impact of long-term social isolation in the elder 3xTg-AD male mice, focusing on several cognitive, BPSD-like, and daily-life-activity functions, physical status (body, liver, kidney, and spleen weights) as well as the neuropathological AD-phenotype. Thus, the animals were confronted with a battery of tests that included enclosures of differing levels of anxiogenic conditions that, for the purpose of the present work, could resemble or translate into several areas in nursing homes.

MATERIALS AND METHODS

Animals

A total of 29 11-month-old (11.1 ± 0.16) male mice from the Spanish colonies of homozygous 3xTg-AD ($n = 20$) and non-transgenic (NTg, $n = 9$) mice in a C57BL/6 background were used. The 3xTg-AD mice were genetically engineered at the University of California, Irvine as described previously (51).

Animals were housed three or four per cage or isolated and maintained in Macrolon cages (35 × 35 × 25 cm) under standard laboratory conditions of food and water ad libitum, 22 ± 2°C, a 12-h light/dark cycle, and relative humidity of 50–60%. When isolated, animals still were socially connected through olfaction and audition, and as in the group-housed conditions, the cages were enriched with nesting materials. Behavioral assessments were performed blind to the experiment, in a counterbalanced manner, in the light cycle, from 09:00 to 13:00 h. All procedures were in accordance with the Spanish legislation on the "Protection of Animals Used for Experimental and Other Scientific Purposes" and the EU Directive (2010/63/UE) on this subject. The protocol CEEAH 3588/DMAH 9452 was approved by Departament de Medi Ambient i Habitatge, Generalitat de Catalunya. The study complies with the ARRIVE guidelines developed by the NC3Rs and the aim to reduce the number of animals used.

Behavioral Assessments

The impact of social isolation was measured in 11-month-old 3xTg-AD mice after a long-term, naturally occurring housed isolation (8.5 ± 0.3 months). The battery of behavioral tests consisted of a series of classical unconditioned tasks measuring locomotion and exploratory activity, anxiety-like behaviors, cognitive functions, and daily life activities (39). The results were compared to age-matched, group-housed 3xTg-AD mice and non-transgenic counterparts with normal aging.

Day 1: Corner Test and Open Field Test

Neophobia to a new home-cage was assessed by a 30-s trial. Animals were placed individually in the center of a clean standard home-cage, filled with wood shaving bedding. The number of corners visited was recorded (52). The latency to realize the first rearing (vertical displacement) and the number of rearings were also registered (39).

Immediately after the corner test, mice were placed in the center of an illuminated (20 lx) open field (metalwork, white box, 42 × 38 × 15 cm) and exploratory and anxiety-like behaviors were evaluated during 5 min (53). First, the ethogram of action programs described by the temporal profile of the following sequence of behavioral events was recorded: duration of freezing behavior, latency to leave the central square and enter the peripheral ring, and performing first wall rearing as well as latency and total duration of self-grooming behavior. Second, the time course and total levels of exploratory activity were measured as horizontal (number of crossings of 10 × 10-cm squares) and vertical (rearings with a wall support) locomotor activity. Third, variables of emotionality (54) included the number of defecations, the presence of urine, and the grooming behavior,

their number, latency, and total time. Finally, as described previously (55), we evaluated the presence of bizarre behaviors such as stereotyped rearings without wall support.

Day 2: Spontaneous Activity Test

The mice were individually tested in a new home-cage containing a small amount (25 ml) of clean sawdust on the floor. Here, (horizontal) spontaneous locomotor activity was continuously recorded during a 45-min period and short-term spatial habituation was determined by means of the VideoTrack analysis system (ViewPoint Behavior Technology, Lion, France) (56).

Day 3: T-Maze

Coping-with-stress strategies, risk assessment, and working memory were assessed in a spontaneous alternation task (57) in a black T-shaped maze. The apparatus consisted of a woodwork, two short arms of 30 × 10 cm, and a long arm of 50 × 10 cm. The animal was placed inside the long arm of the maze with its head facing the end wall, and it was allowed to explore the maze for a maximum of 5 min. The goal latencies, namely to move and turn (freezing behavior), to reach the intersection, the time elapsed until the animal crossed (4 paws criteria) the intersection of the three arms, and the total time invested to explore the three arms of the maze (test completion criteria) were recorded. The entry of an already visited arm in the trial before completing the test was considered an error. Defecation boli and urination were also noted.

Days 4–6: Nesting

In a regular manner, for animal well-being, the cages were enriched with nesting material. However, in order to specifically assess this daily life activity, our 3-day protocol for nesting behavior using tissue paper was used (58). One paper towel tissue (70 × 30 mm of "paper towel") (Sudelab, Rubí, Barcelona, Spain) was introduced in the home-cage. On the next day, 48 and 72 h later, the nests were assessed according to the Deacon 5-point scale (59) from 1 to 5 as follows: 1 = not noticeably touched, 2 = partially torn up, 3 = mostly shredded but often no identifiable site, 4 = identifiable but flat, 5 = perfect or nearby. Pictures were taken prior to evaluation for documentation.

Day 6: Pathological Status

Bodyweight was recorded to monitor the physical status of animals. The size (weight in mg) and relative size (% vs. bodyweight) of liver, kidneys, and spleen were also recorded, as an indirect measure of the physiological status of the metabolic, excretory, and peripheral immune organs, respectively (41). Tissue samples were stored at −80°C for further biochemical analysis (see below). For biochemical analysis of the level of tau pathology, right and left hippocampus were dissected, frozen in dry ice, and kept at −80°C. Thereafter, frozen samples were lysed in cold lysis buffer containing protease and phosphatase inhibitors (Sigma). Protein content was quantified with the BCA Protein Assay Kit (Thermo Scientific), resolved with SDS-polyacrylamide gel electrophoresis, and detected by Western blotting using the mouse anti-phosphorylated Ser396/404 (PHF-1; 1:1000) antibody. Quantification was performed using the ImageStudio Lite 5.2 software.

Statistics

Results are expressed as mean ± SEM. SPSS 20.0 software was used. Differences were studied using multivariate general linear model analysis, followed by *post hoc* Duncan's tests when possible. Repeated measures ANOVA was used to study differences in the time course of behaviors. Student's *t*-test was used to compare two independent groups, per genotype or isolation. For categorical variables, chi square or Fisher's exact test with 2 × 2 were used. Pearson's correlation analysis evaluated the pathological/behavioral correlates. In all the tests, $p < 0.05$ was considered statistically significant.

RESULTS

The results, depicted in **Figures 1**–**7** and **Table 1**, show the impact of social isolation on the behavioral, functional, and neuropathological phenotype of 11-month-old male 3xTg-AD mice, an age mimicking advanced stages of the disease and as compared to age-matched NTg mice.

Corner Test

The horizontal and vertical behaviors in the corner test are illustrated in **Figure 1**. Increased neophobia as compared to NTg mice was found in 3xTg-AD mice shown as a statistically significant reduction in the number of visited corners and rearings ($p < 0.05$). In the single-housed 3xTg-AD mice, genetic differences with NTg mice were lost as a result of increased horizontal and vertical activities. Although their rearing latencies did not reach statistical significance, in both 3xTg-AD groups, they were indicative of increased neophobia response.

Open Field Test

Figures 2A–C illustrates the temporal curves (left) and total accumulated counts (right) of horizontal and vertical exploratory activity during the 5 min in the open field test performed immediately after the corner test. The ethogram was developed similarly in the three groups of mice, and the presence of thigmotaxis indicated the preference for peripheral protected areas as compared to the open and central ones (see **Table 1**). However, the time course of the horizontal (**Figure 2A** left, $p < 0.001$) and vertical (**Figure 2B** left, $p < 0.001$) activities also indicated that isolated 3xTg-AD mice exhibited a hyperactive pattern. Thus, a two-fold increase in horizontal activity (groups $p < 0.05$, *post hoc* isolated 3xTg-AD $p < 0.05$ vs. NTg and vs. 3xTg-AD) and increasing elicitation of vertical exploration through the test (groups $p < 0.05$, *post hoc* isolated 3xTg-AD $p < 0.05$ vs. NTg). These enhanced activity levels resulted in statistically significant increased total levels of both horizontal and vertical activities (**Figures 2A,B** right, respectively; $p < 0.05$ vs. NTg and vs. 3xTg-AD mice). In contrast, the levels of horizontal activity were very low in both middle-aged NTg and 3xTg-AD mice housed in standard conditions, and their patterns were regular, with poor habituation to the test. As illustrated in **Figure 2C**, the presence of stereotyped vertical rearing without wall support, absent in NTg mice, was late (210 s), exhibited in only 1/10 group-housed 3xTg-AD mice. In contrast, 4/10 isolated 3xTg-AD mice exhibited this bizarre behavior with an

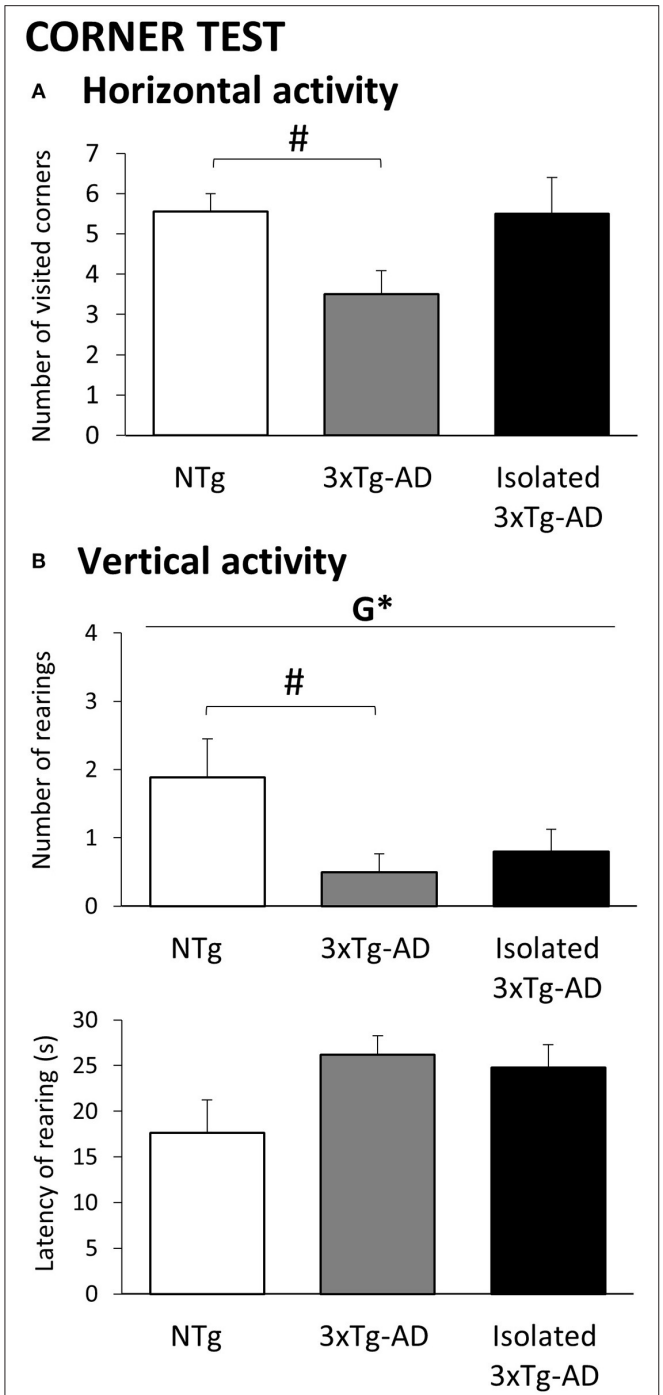

FIGURE 1 | Effects of isolation on 11-month-old male 3xTg-AD mice in the Corner test. Results are expressed as mean ± SEM. **(A)** Horizontal activity; **(B)** Vertical activity. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. Statistics: G, genotype effect, $^{*}p < 0.05$. Student *t*-test comparisons are shown in the graphs as $^{\#}p < 0.05$ vs. the NTg-group.

early appearance as part of the fearful response during the first minute of the test (statistics on the mean latency, $p < 0.05$ vs. NTg and vs. 3xTg-AD mice). No statistically significant differences were found among groups in the other variables of the test (see **Table 1**).

Spontaneous Activity Test

As illustrated in **Figure 3**, the spontaneous activity assessed during a long period of 45 min demonstrated a statistically significant sustained hyperactivity pattern induced by isolation in 3xTg-AD mice in contrast to the poor activity levels shown in animals housed in standard conditions. Here, although the locomotor activity levels of 3xTg-AD mice did not reach statistical significance, they were below those of NTg mice. The initial 5-min period reproduced the results found in the 5-min session in the open field test. The hyperactive pattern was evolving during the different periods of habituation to the test, but still with significantly higher levels of activity as compared to 3xTg-AD mice housed in standard conditions (time $p < 0.001$; groups, $p < 0.05$, *post hoc* isolated 3xTg-AD mice vs. 3xTg-AD mice).

T-Maze

Figure 4A depicts the fast ethogram performed by isolated 3xTg-AD animals as compared to NTg and 3xTg-AD mice in a spontaneous alternation paradigm in the T-maze. Although all animals showed similar latencies to turn from the "facing the wall" starting position, the latency to cross the intersection of the three arms and the latency to complete the task were significantly shorter as compared to the long delays usually exhibited by 3xTg-AD mice ($p < 0.05$ vs. 3xTg-AD). Decision making, measured as the difference between latency to intersection and latency to cross it with 4 paws criteria, was longer in both 3xTg-AD groups, while NTg mice made the decision in a short gap of 10 s (genotype effect, $p < 0.05$). As in the previous tests, the increase in locomotor activity of the isolated 3xTg-AD mice resulted in completing the test faster than the other groups ($p < 0.05$ vs. NTg and vs. 3xTg-AD). As detailed in **Figure 4B**, a number of animals (3/9) exhibited the NTg coping-with-stress strategy of resting with their backs protected in the starting point. Another two of them spent the time but did not cross the intersection (2/9) or did not complete the test successfully (1/9). Among 3xTg-AD mice, a similar total number of animals did not even start (4/10) or complete (1/10) the test. The proactive strategy of isolated 3xTg-AD mice resulted only in mice resting (1/10), and two were not able to complete the test (2/10). In this small representation (NTg: 6/9; 3xTg-AD: 6/10; isolated 3xTg-AD: 9/10), the number of spatial working memory errors (revisiting an explored area) were recorded in those animals able to initiate the task. Although the sample size was not enough to reach statistical significance, an increased number of errors in spatial alternation was noted in the isolated 3xTg-AD mice (**Figure 3C**).

Nesting

Representative nest buildings at 72 h are shown in **Figure 5**. The effect of isolation was consistently shown since the first day of assessment. While nests of NTg and 3xT-AD mice were partially torn up (mean score 2), those of isolated 3xTg-AD mice were mostly shredded although not yet in an identifiable site (mean score 3). The progressive improvement in nest building allowed

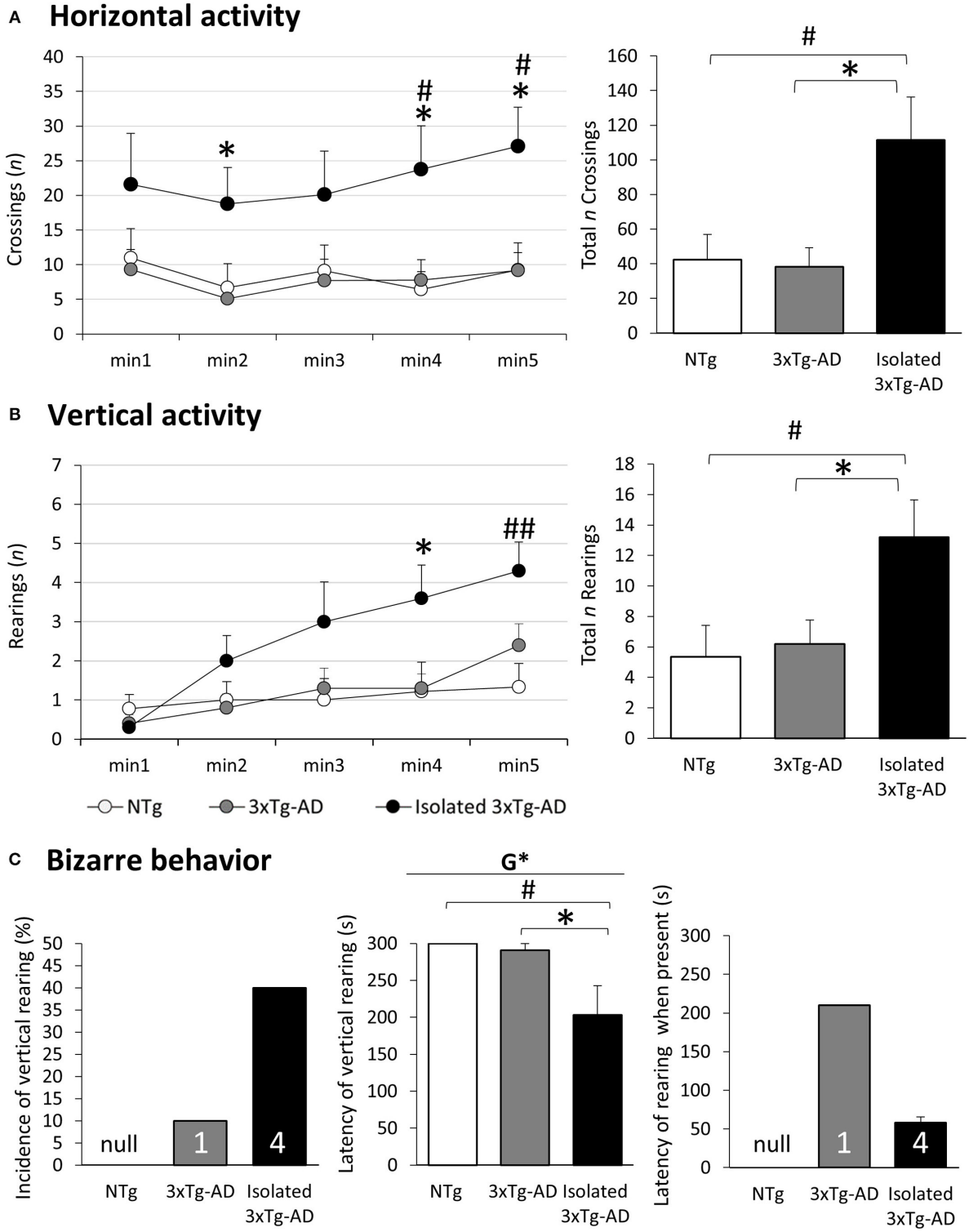

FIGURE 2 | Effects of isolation on 11-month-old male 3xTg-AD mice in the Open field test. Results are expressed as mean ± SEM or incidence (%). **(A)** Horizontal activity: Left, time course; right, total; **(B)** Vertical activity: Left, time course; right, total; **(C)** Bizarre behavior: Incidence (left), latency (center), latency when present. Groups: NTg, group-housed non-transgenic mice; 3×Tg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. Inset of bars, number of animals exhibiting the behavior. Statistics: G, genotype effect, $^{*}p < 0.05$. Student *t*-test comparisons are shown as $^{\#}p < 0.05$, $^{\#\#}p < 0.01$ vs. the NTg-group; $^{*}p < 0.05$ vs. the 3×Tg-AD mice.

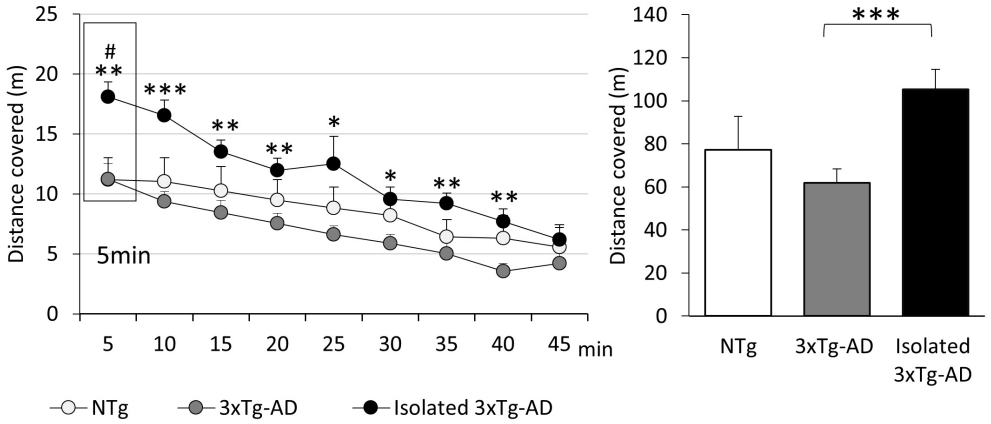

FIGURE 3 | Effects of isolation on 11-month-old male 3xTg-AD mice in the Spontaneous activity test. Results are expressed as mean ± SEM. Horizontal activity: left, time course; right, total distance covered. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. Statistics: Student *t*-test comparisons are shown as $^{\#}p < 0.05$ and vs. the NTg-group; $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$ vs. the 3xTg-AD mice.

us to see a delay in 3xTg-AD mice. Thus, the mean score 3 for nest construction was achieved by NTg at 48 h, but 3xTg-AD mice needed an extra day (72 h). At the endpoint, identifiable but flat nests (mean score 4) were only seen in the isolated group, with nests of very few animals considered perfect or nearly reaching the maximum score of 5 (1/9 NTg, 0/10 3xTg-AD but 3/10 isolated 3xTg-AD mice).

Pathological Status

Bodyweight of animals was monitored during the battery of behavioral tests as a measure of their physical/healthy status. **Figures 6**, **7** illustrate the results of a representative sample of animals used for pathological evaluation. As detailed in **Figure 6A**, genotype effects in the bodyweight indicated a decrease in the groups of 3xTg-AD mice ($p < 0.05$). This effect was mostly due to the notorious weight loss in isolated 3xTg-AD mice, which reached statistical significance as compared to the normal weight of NTg mice ($p < 0.05$). In **Figure 6B**, the size (weight in mg) and relative size (% vs. bodyweight) of liver, kidneys, and spleen were also recorded as an indirect measure of their physiological/healthy status. Similarly, the bodyweight loss was reflected in the liver, kidneys, and spleen but only reached statistical significance in the excretory (genotype effects, $p < 0.01$) and immune (isolation effect, $p < 0.001$) organs. The analysis of relative weight indicates that the weight loss induced by isolation may refer to a general reduction in somatic size in transgenic animals. Still, the spleen was the most sensitive organ to show the effects of isolation.

Figure 7 shows the weights and biochemical analysis of the levels of tau pathology in the left and right hippocampus, the AD-target area. The size (weight in mg) of L/R hippocampus is depicted in **Figure 7A**. Differences in L/R hippocampus weight were seen in all the groups (less weight in the right hippocampus) although the hippocampal asymmetry was only attributable to AD-genotype (mean weight; right hippocampus: 12.0 ± 0.57 mg vs. left hippocampus 16.5 ± 0.83 mg, $p < 0.001$). The effects of isolation were seen as a trend of the lower mean weight of the hippocampus. Western blot analysis showed a significant AD-genotype-dependent ($p < 0.01$) increase in phosphorylated tau at Ser396/404 (PHF1) residues in hippocampal lysates of both groups of 3xTg-AD mice as compared with NTg mice (both, $p < 0.01$). The levels of tau did not differ between the right and left hemispheres. Isolation induced in 3xTg-AD mice showed a slight increase in tau, but it did not reach statistical significance.

Meaningful correlation analysis with behavioral variables sensitive to genotype and/or isolation are indicated as insets in **Figures 7A,B**. The weight of the hippocampus was found to be positively correlated with the activity cage variables ($p < 0.05$), kidney weight ($p < 0.05$), and bodyweight ($p < 0.05$), while it was found to be negatively correlated with the nest building end point at 72 h ($p < 0.05$). The left hemisphere was correlated with the activity test ($p < 0.05$), while the right hippocampus was the one involved with the correlates in body ($p < 0.05$) and kidney ($p < 0.01$) weights, as well as nesting behavior at 24 h ($p < 0.05$). Conversely, the levels of tau pathology were negatively correlated with most time points and total activity developed in the activity-cages and the kidney weight (all, $p < 0.05$).

DISCUSSION

In the assessment of the long-term effects of preventive/therapeutic interventions, risk factors, and hazards through different periods of our lives, the translational neuroscience approach benefits of the shorter life span of rodents as compared to humans is a key time frame that can be critical in this respect. Like in humans, housing conditions can have a significant impact on animal behavior, and this

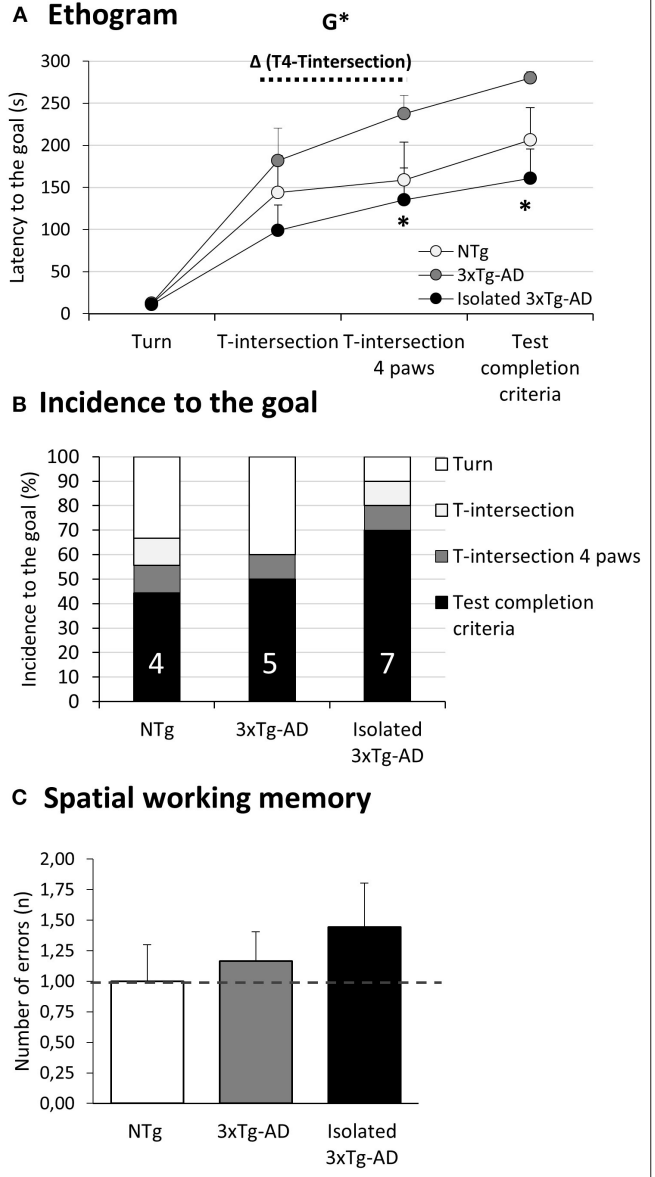

FIGURE 4 | Effects of isolation on 11-month-old male 3xTg-AD mice in the T-maze. Data are expressed as the mean ± SEM or incidence (%). **(A)** Ethogram; **(B)** Incidence to the goal; **(C)** Spatial working memory. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. Inset of bars, number of animals exhibiting the behavior. Statistics: G, genotype effect, $^*p < 0.05$. Student *t*-test comparisons are shown as $^*p < 0.05$ vs. the 3xTg-AD mice.

can also be important in those modeling diseases where social behavior is already impoverished (60). Using these advantages, we can explore in rodents the impact of social isolation or social restrictions due to social distance imposed by COVID-19 and in post-COVID scenarios in the most fragile elder population. Recently, gender differences in COVID-19 found that men are likely to suffer more severe effects of the disease and are more than twice as likely to die (25). On the other hand, it is well-known that dementia is associated with increased mortality, and according to the morbidity/mortality paradox, males show worse survival and deranged neuro-immuno-endocrine system than females despite their decreased bad neuropathological status (2, 3). In the present work, at a translational level, we studied the effects of social isolation in the behavioral, functional, and neuropathological profiles of male 3xTg-AD mice, one of the most used models mimicking the AD shown in humans, at 11 months of age mimicking advanced stages of AD (40), and as compared to age-matched NTg and 3xTg-AD mice housed in standard (grouped) conditions. Fear, anxiety, and agitation are the most common neuropsychiatric symptoms (NPS) associated with dementia that can be studied in mice models of AD (39). They are also called behavioral and psychological symptoms associated with dementia (BPSD) since they also include behavioral disruptive behaviors, they have an early onset, and they worsen with the progression of the disease. Since most behavioral tests assess the animals in behavioral paradigms, the analysis of the actions program (61) allows us to dissect several behavioral domains and constructs including not only the hallmark cognitive dysfunction of AD but also NPS-like behaviors to be recorded (62). For that purpose, a battery of classical unconditioned and ethological tests with the purpose of recording the quantitative and qualitative features of cognitive dysfunction as well as BPSD-like behaviors modeled in 3xTg-AD mice was used (39, 63). The tests evaluated cognition, locomotion/exploration, emotionality, and anxiety-like behaviors in four enclosures differing in the levels of anxiogenic conditions and that, for the purpose of the present work, could resemble or translate into several areas in nursing homes: the mild neophobia response in a cleaned home-cage (Corner test); the direct exposure to an open and illuminated area, which is aversive to nocturnal species like rodents (Open-field); the spontaneous activity and habituation in an activity cage during a long 45-min period (Activity test); and the coping-with-stress strategies and spontaneous alternation in black corridors of a maze resembling burrows (T-maze test). Finally, an ethological nesting behavior was included as a daily life activity involving executive but also protective/thermoregulatory functions. The health status, inferred from their physical status, was monitored by means of the bodyweight and the weight of liver, kidneys, and spleen, organs that show severe complications associated with the COVID-19 scenario (64, 65). Brain pathology of the left and right hippocampus, the hallmark target area in AD, measured by weight and hallmark tau pathology, was performed and correlated with behavior. The main findings refer to an exacerbated (two-fold increase) hyperactivity and emergence of bizarre behaviors in isolated 3xTg-AD mice, worrisome results since agitation is a challenge in the clinical management of dementia and an important cause of caregiver burden. This increase was consistently shown in gross (activity in most of the tests) and fine-motor (thermoregulatory nesting) function. Isolated animals also exhibited re-structured anxiety patterns (negative valence system), emergence of bizarre behaviors, and flight coping-with-stress strategies. Worse risk assessment was dependent on AD-genotype. Bodyweight and kidney weight loss

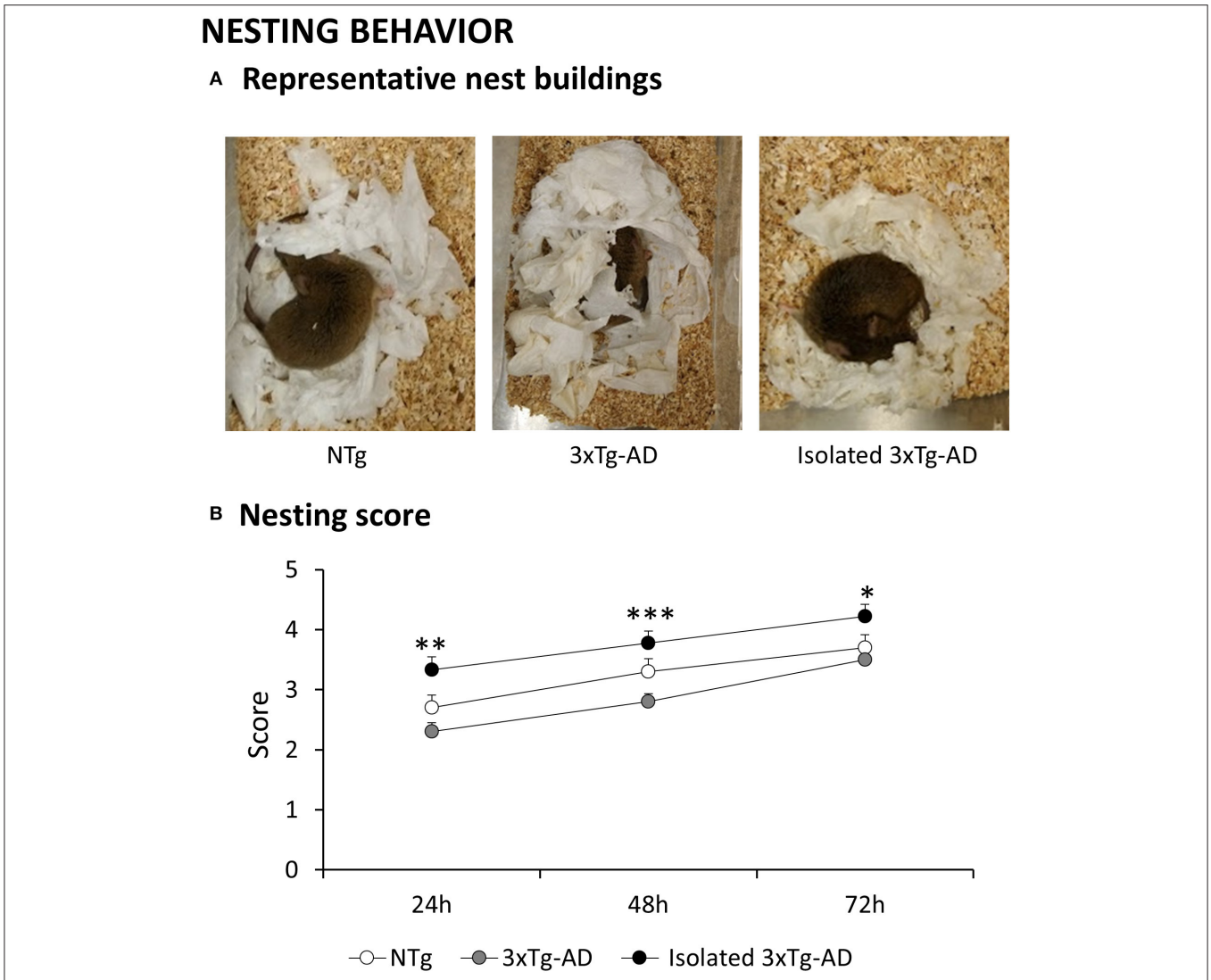

FIGURE 5 | Effects of isolation on 11-month-old male 3xTg-AD mice in the Nesting behavior. Data are expressed as the mean ± SEM. **(A)** Representative images of nest buildings: **(B)** Nesting score at 24, 48, and 72 h. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. Statistics: Student *t*-test comparisons are shown as $*p < 0.05$, $**p < 0.01$, $***p < 0.001$ vs. the 3xTg-AD mice.

were found in the AD-phenotype and increased with isolation. Isolation-dependent spleen weight loss was observed. Tau pathology in the hippocampus, a target area in AD, was not modified, but asymmetric atrophy of hippocampus, recently described in human patients with dementia and modeled here for the first time in an animal model of AD, was found to increase with isolation. These results are discussed in detail in the next paragraphs.

Effects of Isolation in the Innate Neophobia

Changes in the innate neophobic response of animals immediately elicited when being held and put in a new place, before they can recognize it as novel or familiar, is one of the most sensitive ethological behaviors of the early phenotype in the 3xTg-AD mice modeling AD (39, 41, 55, 66, 67). Here, we benefit from the use of a clean standard home-cage to transport the animal to the area where the open field will be performed, to assess this immediate fearful response. As shown, both horizontal and vertical components confirmed that house-grouped 3xTg-AD mice exhibited increased levels of fear in this natural neophobia response as compared to age-matched NTg mice. This was shown as a two-fold decrease in horizontal and vertical activities and a longer time to elicit the first rearing. The delay in vertical exploratory activity was also present in isolated 3xTg-AD animals, indicating an increased fearful response. However, differences with NTg counterparts were lost since the coping strategy exhibited was a fight-to-flight behavior that counteracted the low activity levels due to the AD-genotype. This was similar to the psychostimulant effect that our laboratory

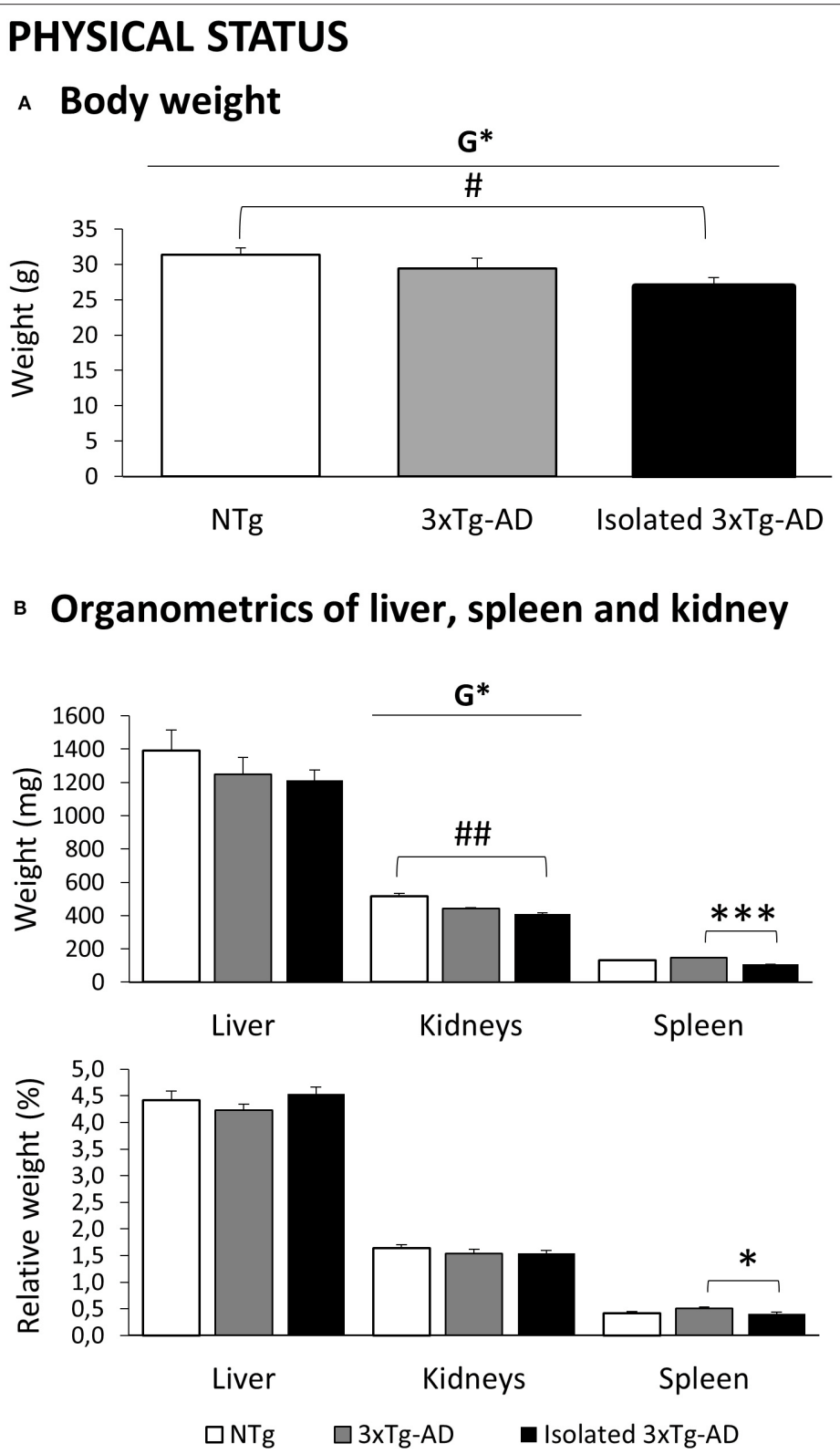

FIGURE 6 | Effects of isolation on 11-month-old male 3xTg-AD mice in the Physical status. Results are expressed as mean ± SEM. **(A)** Body weight; **(B)** Organometrics of liver, spleen, and kidney. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. Statistics: G, genotype effect, $^{*}p < 0.05$. Student *t*-test comparisons are shown as $^{\#}p < 0.05$, $^{\#\#}p < 0.01$ vs. the NTg-group; $^{*}p < 0.05$, $^{***}p < 0.001$ vs. the 3xTg-AD mice.

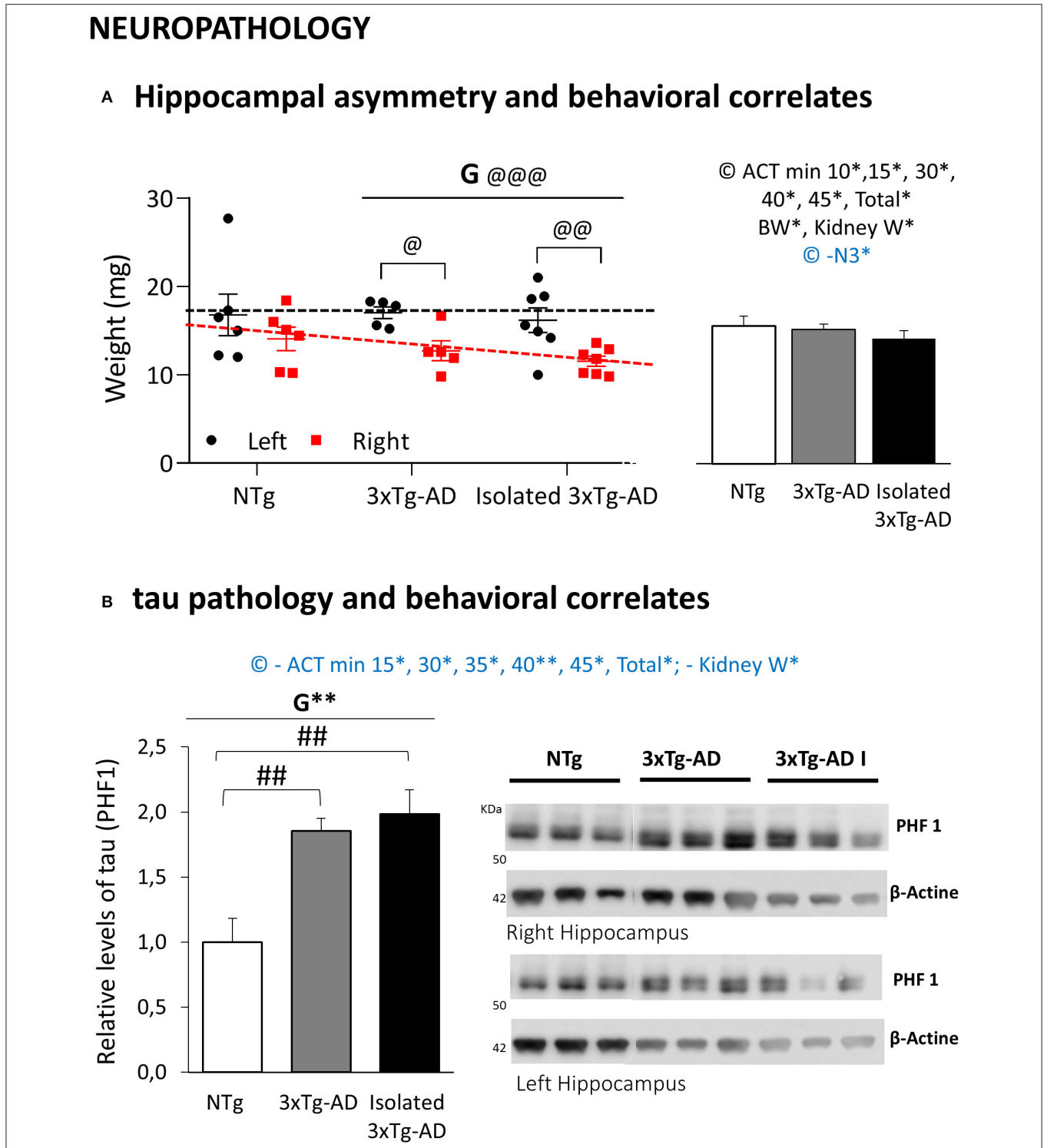

FIGURE 7 | Effects of isolation on 11-month-old male 3xTg-AD mice in Neuropathology, R/L hippocampal asymmetry, and Behavioral correlates. Data are depicted and also expressed as mean ± SEM. **(A)** Hippocampal asymmetry; Left, R/L weights, Individual data of the corresponding area in the left (black) and right (red) hemispheres; Right, mean hippocampal weight and behavioral correlates. **(B)** Tau pathology; Left, Relative levels of tau (PHF1); Right, Western blots of right and left hippocampus. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; isolated 3xTg-AD, single-housed 3xTg-AD mice. Statistics: Paired *t*-test: G, genotype effect in asymmetry between R/L hippocampus, $^{@@@}p < 0.001$. Paired *t*-test R/L asymmetry in each group; $^{@}p < 0.05$, $^{@@}p < 0.01$. G, genotype effect, $^{**}p < 0.05$. Student *t*-test comparisons are shown as $^{\#\#}p < 0.01$ vs. the NTg-group. Positive (black) and negative (blue) Pearson's correlation analysis evaluating hippocampus weight or the hippocampal relative levels of tau/behavioral correlates $^{*}p < 0.05$; ACT min x, Activity test in the minute x; Total, Total activity in the activity test; BW, Bodyweight; Kidney W, Kidney weight.

TABLE 1 | Effects of isolation on 11-months-old male 3xTg-AD mice in the Open field test.

Males, 11-month-old Ethogram and Emotionality Open field test	NTg ($n = 9$)	3xTg-AD mice $n = 20$		Statistics	
		3xTg-AD ($n = 10$)	Isolated 3xTg-AD ($n = 10$)	AD Genotype	Isolation
Initial freezing (latency, s)	16.44 ± 12.40	17.80 ± 6.08	9.00 ± 2.61	n.s	n.s
Exit of the center (latency, s)	45.22 ± 19.39	59.30 ± 31.08	22.30 ± 12.65	n.s	n.s
Entrance to the periphery (latency, s)	68.67 ± 33.11	60.60 ± 30.96	64.00 ± 28.66	n.s	n.s
Vertical activity (latency, s)	146.89 ± 41.68	131.90 ± 34.67	116.40 ± 27.22	n.s	n.s
Thigmotaxis (total crossings periphery/center)	3.20 ± 0.95	3.70 ± 0.88	3.80 ± 1.18	n.s	n.s
Self-grooming (latency, s)	204.00 ± 32.24	199.10 ± 36.21	162.40 ± 22.27	n.s	n.s
Self-grooming (number)	1.00 ± 0.29	1.20 ± 0.20	1.20 ± 0.20	n.s	n.s
Defecation boli (number)	4.22 ± 0.52	3.90 ± 0.58	4.50 ± 0.45	n.s	n.s

Ethogram, thigmotaxis, self-grooming and defecation. Results are expressed as mean ± SEM. Groups: NTg, group-housed non-transgenic mice; 3xTg-AD, group-housed 3xTg-AD mice; Isolated 3xTg-AD, single-housed 3xTg-AD mice. All n.s., $p>0.05$.

has shown in this animal model after chronic treatment with caffeine (68).

Effects of Isolation in the BPSD-Like and Cognition in the Open Field and Activity Tests

When confronting an open and illuminated environment such as the open field, both group-housed mice exhibited a poor exploratory activity pattern. This result was confirmed during the first 5 min of the activity test, where equal performances were also observed in NTg and 3xTg-AD mice. In this other test, which did not reach statistical significance, the subsequent analysis of the long-term habituation in the activity cages showed a worse (lower) pattern in the 3xTg-AD mice. Our laboratory has previously described the convergence of profiles in the context of poor aging and related physical and cognitive declines in NTg mice as part of the complexity of age-related scenarios and heterogeneity among all populations, including wild-type mice (not just 3xTg-AD mice) (69). Interestingly, these smooth patterns in middle-aged mice housed in standard conditions also emphasized the impact of isolation shown as prominent levels of both horizontal and vertical activities. This effect was more noticeable in the horizontal locomotor component of activity as they were sustained from the very first minute of the test, in agreement with the flight-to-fight response shown also in the corner test and all the subsequent behavioral tests. As in the other two groups, the levels of vertical exploratory activity of isolated 3xTg-AD mice were mostly null at the beginning of the test, in agreement with the immediate fear response in an anxiogenic open and illuminated enclosure. However, according to the action program described by Lát (61), as soon as this initial fear was managed, the level of vertical exploration rose and progressively increased during the test until its end. Isolation not only increased the levels of standard locomotor and exploratory behaviors but also elicited the emergence of bizarre actions not shown in wild-type mice. Here, the presence of vertical activity without wall support, indicative of an escape behavior (55), was scarcely seen in 3xTg-AD mice (only one animal, late-onset) but was exhibited early in half of the 3xTg-AD mice housed in isolation conditions. This result reinforces the above-mentioned increased active fearful response induced by isolation.

In contrast to the open field test, the low anxiogenic levels of activity cages facilitate the expression of hyperactive patterns as already shown in our laboratory in 12-month-old female 3xTg-AD mice (39). Therefore, the activity levels recorded here, with a maximum of 10 m in group-housed NTg and 3xTg-AD mice but 20 m in isolated 3xTg-AD mice, emphasized the noticeable hyperactivity pattern induced by isolation of individuals. Thus, the results in spontaneous locomotor activity not only confirmed the hyperactive fearful response of isolated 3xTg-AD mice already shown in the previous tests (corner test for neophobia and the 5 min of the open field test) but also demonstrated that the effect of isolation was sustained on time, despite habituation to the enclosure. Differences were maintained statistically significant during 40 of the 45 min duration of the test. This is important because habituation is considered the simplest form of learning and memory (70, 71). In fact, the results would also be in agreement with the psychostimulant effects induced by chronic treatment with a low dose of caffeine in this animal model of AD as measured in a spatial learning cognitive task (68).

Effects of Isolation in the BPSD-Like and Cognition in the T-Maze

The spontaneous alternation in the T-shaped maze with black and narrow corridors resembling burrows is a paradigm mostly used to evaluate spatial working memory in a naturalistic manner. More recently, some authors have dissected other cognitive aspects (72). The test also involves emotionality/anxiety and exploratory activity as we have shown extensively, in both male and female mice, from young to old age under healthy and diverse neuropathological conditions (39, 62, 63, 66, 73). This neuropsychiatric component was also pointed out here by the correlation analysis. Thus, the T-maze ethogram correlated

with that shown in the open-field test, the horizontal and vertical activities in the first minute where a fearful response is elicited, and the total horizontal and vertical activities developed.

Interestingly, the latency to cross the intersection of the maze allows us to assess the coping-with-stress strategies of animals. Alterations in this parameter, as compared to the standard wild-type performance to cope, have been found to correlate with a worse neuro-immunoendocrine function, indicators of accelerated aging and premature death in mice (74). Although no significant differences were observed in the number of errors in the spontaneous alternation behavior, most 3xTg-AD mice revisited areas of the maze previously explored. The 3xTg-AD mice and those isolated exhibited opposite performances since the latency to reach the intersection and the time to complete the maze were delayed or fastened, respectively, in a statistically significant manner. In previous studies, we have shown that young 3xTg-AD mice mimicking prodromal stages of disease exhibit a fast-speed performance to reach the intersection in comparison with age-matched NTg mice, in a typical flight behavior in the fight-or-flight strategy. At old or middle ages, like those of the animals used here, a slow performance involving petrification is the most common behavioral response (75). In the present work, the fast pattern in isolated animals, resembling that of chronically psycho-stimulated 3xTg-AD mice (68), suggests that the hyperactive pattern also involves a switch in their coping-with-stress strategies. The impaired decision-making process is shown as a delay to cross the intersection, a function that depends on prefrontal cortical areas, and was not modified by isolation. We have previously reported similar delays in the decision to move from one side to another in the dark-light box test, suggesting that the AD genotype models differences in risk assessment (39, 62, 63, 66). Sensorial tactile stimulation known to modulate cognitive and anxiety-like behaviors hampered this phenomenon in the 3xTg-AD mice (76, 77) and infantile cerebral palsy model (78). Impairment in working memory in other spatial tasks has also been reported in APP/PS1 and Tg2576 mice after social isolation (79, 80). The conspicuous neuropsychiatric-like profile of 3xTg-AD mice models the complexity of the advanced stages of the disease where behavioral alterations disrupt cognitive function and cause the most important burden of disease for the patients and caregivers. In fact, in addition to cognitive aspects, pharmacological management of dementia targets agitation, irritability, aggressiveness, disorientation, and wandering among other neuropsychiatric symptomatology. In this respect, our most recent translational study on the pharmacological treatment of these endophenotypes also found efficiency to reach the goals in this T-maze task being compromised in middle-aged male 3xTg-AD mice, a poor performance that was slightly affected by long-term treatment with the antipsychotic risperidone (81).

Effects of Isolation in the Daily Life Activity

Deterioration in daily life activities and executive functions are early functional signs in patients with dementia. They worsen with the progress of disease and demand important caregiver attention (82). On the other hand, age-related deficits in thermoregulation are more pronounced in AD patients (83). The impact of isolation in these questions was addressed, at the translational level, by means of nesting behavior, an innate ethological inference to assess well-being and daily life activity in normal mice and models for neuropsychiatric diseases (58, 59, 84). Conversely, nesting material is considered a tool for the improvement of the animal's welfare. Nesting behavior is observed in the context of maternal affiliative behaviors, facilitating family structures, maternal interaction, and protecting the offspring from outsiders and predators. However, nesting behavior also extends to males and non-pregnant females driven by protection and thermoregulation needs. We first described deficiencies of 3xTg-AD mice in this instrumental task involving executive functions and as dependent on the protocol and nesting material. As we demonstrated, a 3-day assessment with paper towel instead of standard protocols (using cotton, assessing only at 24 h) revealed genotype-, gender- and age-dependent differences in 3xTg-AD mice under different social settings (58). In the present work, the mean nesting scores and 3-day patterns for NTg and 3xTg-AD mice are in agreement with those observed in 12-month-old NTg and 3xTg-AD males (isolated during the 3 days of nest-building assessment) as reported in our previous work (58). Here, we demonstrate that long-term isolation of 3xTg-AD mice not only resulted in hyperactive locomotor patterns but also higher nest-building scores and smaller nests. This can be understood in the context of "thermoregulatory nesting," a behavioral construct demonstrated by geographic cline in nest-building behavior (85). Thus, the lower core body temperature of aged 3xTg-AD mice (86), the worse thermoregulation shown also in other models (87), and the loss of group-sleeping behavior in isolated 3xTg-AD animals may have enhanced the utility of nests to cover increased metabolic, thermoregulation, and protective needs. Regarding their hyperactive phenotype, it is interesting to note that several studies have identified a negative genetic correlation between thermoregulatory nesting and wheel-running activity with increased wheel running in mice selected to build small nests (88, 89). Inverse relation of nesting with body mass and litter size (85) and body temperature (90) has also been demonstrated and would be in agreement with the trend to a lower bodyweight of isolated 3xTg-AD mice found here. Overall, the present results point out that isolation induces increases in both gross (hyperactivity) and fine (nesting) motor function. Therefore, maximal aerobic capacity enabling such sustained activities, resting metabolic rates, thermoregulatory abilities, and energy requirements are key aspects to take into account in the isolation scenarios (89).

Effects of Isolation in the Physical Status

Overweight, a characteristic of the Spanish colony of 3xTg-AD mice (63), was not found in this particular experimental set. However, a trend of reduced weight was found in isolated animals resembling the effects we described previously in male 3xTg-AD mice receiving long-term treatment with caffeine (68). In that work, we measured the psychostimulant effects of caffeine in a whole light/dark cycle. We observed that hyperactivity in their diurnal sleeping period was followed by enhanced expression of hyperactivity in their active nocturnal activity period, which

could explain their weight loss. In other words, we have also reported that 3xTg-AD are more sensitive than NTg mice to weight loss under the stressful environment of a forced treadmill exercise (63) but not voluntary wheel running (66). In those experiments, the decrease in weight was more evident in the females, both because of their higher corticosterone response and their lower basal weight than males. Therefore, the bodyweight decrease found in the present work in isolated males may be of functional significance. As mentioned previously, the results of weight and relative weight suggest that isolation may induce a general weight loss or reduction of somatic size in 3xTg-AD mice. Separation of mice increases metabolic demands and has been proposed as a new and easy-to-perform animal model for weight loss (91). Sex differences in the psychobiological effects in Swiss kumming mice undergoing 1–4 months social isolation have also been demonstrated (92). There, both isolated males and females showed less bodyweight gain; however, male mice were more affected by isolation.

Effects of Isolation in the Metabolic, Excretory, and Peripheral Immunity Organs

Although brain oxidative stress in AD is accepted, the contribution of the disease to peripheral oxidative redox state has been little studied. In this regard, we reported peripheral alterations (41, 63) in early oxidative stress status in male and female 3xTg-AD mice, with a decrease in antioxidant defenses and an increase in xanthine oxidase activity in most peripheral tissues, among them the liver, kidney, and spleen studied here (93, 94). Interestingly, these genotype differences were more exacerbated in male than in female mice. In the present and other works, we used the size and relative size of liver, kidneys, and spleen as an indirect measure of their physiological status as we have proposed that these parameters can be a tool for sonographic monitoring of patients (41, 75). Other laboratories have also confirmed in this animal model this liver and spleen dysfunction reflected as hepato- and splenomegaly (95, 96) and fatty liver pathology (97). Consistent associations of liver function with AD patients has been recently described, indicating metabolic disturbances (98). In the current pandemic, persistent inflammatory syndrome is an important negative prognostic indicator for survival. A relation with COVID-19 and liver dysfunction has been reported (65), and metabolic-associated fatty liver disease has been related to a worse evolution of COVID-19 (99).

Since our first report (41) proposing sex-specific immuno-endocrine aging in old 3xTg-AD mice (worse in males), we have consistently reported thymus involution and splenomegaly as characteristic of the impairment of the neuro-immune-endocrine system in this animal model (100). The easy measurement of their weight and relative weight (organometrics), with clinical translation, can be used as early indicators of peripheral immunological system aging (75, 93, 100), as also confirmed by other laboratories (96). We have shown previously that the alterations in the brain redox state (66, 67) develop in parallel to the impaired splenic redox state, measured as an increased xanthine oxidase activity and lower total glutathione levels and glutathione peroxidase and reductase activities, as well as in terms of pro-inflammatory (IL-10 decreased)/anti-inflammatory (IL-1beta and TNF-alpha increased) balance in leucocytes in male and female 3xTg-AD mice since the prodromal stages of the disease (93, 101). In the present work, weight and relative weight of spleen were found reduced in isolated 3xTg-AD mice, mimicking again the effect of long-term stimulant effects of caffeine (68). The increase in chronic physiological stress induced by long-term isolation may also support these results since elevated levels of stress have been related to a decreased spleen mass (102, 103) and models of physical stress combined with social isolation show a worsening of the immuno-endocrine system (104).

With regard to the kidney, acute renal impairment complicating viral infection was already observed in some patients affected by SARS-CoV (105). Although AKI was reported as uncommon and likely to be related to multi-organ failure rather than the viral tropism in the kidney, it was recognized as carrying a risk of high mortality. The prevalence of kidney disease in patients with COVID-19 on admission and the development of acute kidney injury during hospitalization are high and are also associated with in-hospital mortality (64). As a *Kidney International* editorial noted, early risk identification, rapid and effective treatments, and avoidance of nephrotoxins may help provide a better prognosis of patients with COVID-19. A case report also describes the rapid development of collapsing glomerulopathy, which further deteriorated despite the improvement of respiratory symptoms. In this sense, the linkage between chronic kidney disease and AD may suggest a higher vulnerability in AD patients in the COVID-19 pandemic (95). At the translational level, we have preliminary observations on severe glomerular affectation of kidneys in 3xTg-AD mice. That also would be in agreement with the correlation analysis that, in the present work, found a relation between weight loss of the hippocampus and its relative levels of tau with the kidneys' weight loss. Therefore, the AD-genotype effects found in the present work in the weight loss in the kidneys worsen by isolation and may suggest clinical implications.

Effects of Isolation in the Right/Left Brain Asymmetry

Several psychiatric disorders and psychological conditions associated with stress and trauma, such as PTSD (106) and major depressive disorder (107), are associated with a reduction in hippocampal volume and alterations in hippocampal memory function as a result of the key role of the hippocampus in the regulation of the hypothalamic-pituitary-adrenocortical axis in acute and chronic stress (108). In addition, brain hemispheric left–right asymmetry and lateralization is known to exist at several anatomical levels in the brain, and hippocampal asymmetry has been suggested to indicate lateralized differences in vulnerability to trauma (106). A meta-analysis also shows that hippocampal atrophy was associated with trauma exposure independent of PTSD diagnosis, PTSD-induced additional

hippocampal reduction, with the right hippocampus being smaller in the PTSD group than the trauma-exposed group without PTSD (109). Also, in the context of the present work, the whole-brain analysis has revealed increased neuroanatomical asymmetries in dementia for hippocampus and amygdala (110). At the translational level, recent studies in rodents have explored left–right hippocampal asymmetry, providing further evidence at the neurochemical and molecular levels with regard to the glutamatergic system (111). The lateralization of the stress regulatory system has also been shown, with long-term isolation stress in rats producing right–left asymmetry of the hippocampus norepinephrine and changes in catecholamine synthesis and reuptake (112). At the functional level, hippocampal asymmetry is important for the acquisition of spatial reference memory and retention of working memory (113) as wells as for certain characteristics of non-spatial learning (111). Here, in the present work, our results show that in all the animals, the weight of the hippocampus from the right hemisphere was lower than that of the left hemisphere and that this asymmetry was increased in the animals with AD-genotype, reaching the maximum statistical significance. To our knowledge, this is the first time that increased asymmetry in the hippocampus of an animal model of AD is demonstrated, thus modeling the above-mentioned asymmetry found in AD human patients. This modeling will be useful for the translational development and assessment of preventive/therapeutic interventions and those of the risk factors and hazards, as well as monitoring disease progression. In this respect, it already indicates that isolation induces an increase of one degree of magnitude in the statistical significance of the left–right differences since in the 3xTg-AD mice housed in standard conditions the left–right hippocampal asymmetry reached $p < 0.05$ while in isolated 3xTg-AD mice the significance reached the an order of magnitude of $p < 0.01$. Further quantitative and qualitative analysis of regional neuronal density in CA1, CA2, and ventral hippocampus to quantify distinct neuron depletion may reveal a regionally gradient neuronal loss, specific also for the hippocampus of each hemisphere. Interestingly, in the present work, the weight of the left hippocampus was maintained constant, while the right hippocampus decreased with genotype and with isolation, suggesting hemisphere-dependent cellular vulnerability.

Behavioral Correlates of Pathological Status

Considering the three groups, the behavioral correlates of neuropathology indicated that the levels of tau were negatively correlated with most time points and total activity developed in the activity-cages and the weight of the kidneys. Conversely, the total weight of the hippocampus was found positively correlated with the kidneys and bodyweights, as discussed previously, as well as the performance in the activity, but negatively correlated with the nest building. Considering each hemisphere, lateralization was found since the left hippocampus correlated with the activity, while the right hippocampus positively correlated with bodyweight and kidney weights, and negatively with nesting behavior. However, the activity patterns of the two 3xTg-mice groups were allocated in two opposed positions concerning the activity shown by NTg mice (low in 3xTg-AD mice, high in isolated 3xTg-AD mice): the selective atrophy in the right hippocampus in AD-genotypes and its enhancement by isolation. Altogether, the correlation analysis may show the overall relationship between weight and activity but cannot be directly related to the hippocampal asymmetry found in the AD-genotype or the loss of weight of the right hippocampus and the enhancement of these aspects by isolation.

Social Isolation in Other Animal Models of Alzheimer's Disease

Finally, studies in Tg2576, APP/PS1, 5xFAD mice have reported effects of social isolation in the AD pathology as related to an increase in Aβ peptide (48, 80, 114). However, the work by Pietropaolo et al. (50) assessing the impact of isolation in the 3xTg-AD mice from post weaning (postnatal day 21) until the onset of disease (6 months of age) found no significant changes. Our present report, in a complementary manner, studied the impact of a similar period of isolation on advanced stages of the disease, in naturally occurring scenarios (disruptive behaviors or death of partners). The biochemical analysis of these samples confirmed the increased relative levels of phosphorylated tau protein in the hippocampus of 3xTg-AD mice as measured by PHF1, with a significant genotype effect but no left–right differences. Isolation induced a slight increase in the AD-pathology but did not reach the statistical significance.

Conclusions

In summary, the present study shows that single-housed 3xTg-AD for AD showed a prominent hyperactive pattern as shown in gross motor function in all the tests, the emergence of bizarre behaviors, and intensified nesting behavior (fine-motor function), probably responding to increased demands of protection and thermoregulation induced by isolation in an already AD-frail scenario. Anxiogenic patterns were broken and coping-with-stress strategies were changed (from freeze) to flight behavior in isolated 3xTg-AD male. Although isolation did not exacerbate the hallmark tau pathology in the hippocampus, we could demonstrate, for the first time, hippocampal atrophy and left–right asymmetry and lateralization (behavioral correlates). Hippocampal atrophy was selective of the right hemisphere and related to bodyweight and kidney weight loss and (negatively) nesting behavior. Isolation-induced weight loss was observed in peripheral immune organs (spleen). Despite limitations of translating animal models into human application, these results point at isolation having an impact on aspects that increase the intrinsically AD-associated deficits and vulnerability. It would be interesting to perform a translational approach of these preliminary findings in a clinical sample of AD patients to study the impact of COVID-19–related social isolation from a psychological and neuroimaging (fMRI) point of view. The present results help make us aware of the severe impact

of the new physical distancing measures not only on those expected in cognition but also on the expression of BPSD. More importantly, the results point to the worsening of the AD-brain hippocampal asymmetry. These results from translational neuroscience research models provide guidance about the complexity of the new scenarios. This will be important when considering the best preventive/therapeutic strategies in times of coronavirus and the post–COVID-19 pandemic. From our perspective, there is a strong need for non-pharmacological interventions for managing BPSD as those provided by the last international consensus (i.e., caregiver training, environmental adaptations, music therapy, and other person-centered care and activities) before any pharmacological approaches (8, 115, 116). The coordinating role of different health system actors (geriatricians, nurses, psychologists, occupational therapists, physiotherapists) will be critical for the implementation and success of these interventions (117). Thus, the present work also highlights the relevance of personalized-based interventions tailored to the heterogeneous and complex clinical profile of the individuals with dementia as well as the effects that the worsening of some symptoms have on the caregiver burden.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The animal study was reviewed and approved by CEEAH Universitat Autònoma de Barcelona & Generalitat de Catalunya.

AUTHOR CONTRIBUTIONS

LG-L: conceptualization. AM: performance, analysis of behavior, and illustrations. Both authors: equally contributed to the scientific discussions, writing, and approval of the manuscript.

FUNDING

This work was funded by UAB-GE-260408 and ArrestAD H2020 Fet-OPEN-1-2016-2017-737390 to LG-L.

ACKNOWLEDGMENTS

We thank Prof. Frank M. LaFerla, Institute for Memory Impairments and Neurological Disorders, University of California, Irvine, USA, for kindly providing the progenitors of the Spanish colonies of homozygous 3xTg-AD and NTg mice. Special thanks are due to Prof. Dulce Papy and Dr. Mohand Ou Idir Ouidja, Laboratoire CRRET EA 4397/ERL CNRS 9215 Université Paris-Est Créteil (UPEC), for assistance in the tau determination; and Dr. Peter Davies, Albert Einstein College of Medicine, New York, USA, for providing the PHF-1 antibody.

REFERENCES

1. Seitz D, Purandare N, Conn D. Prevalence of psychiatric disorders among older adults in long-term care homes: a systematic review. *Int Psychogeriatrics.* (2010) 22:1025–39. doi: 10.1017/S1041610210000608
2. Mitchell SL, Miller SC, Teno JM, Kiely DK, Davis RB, Shaffer ML. Prediction of 6-month survival of nursing home residents with advanced dementia using ADEPT vs hospice eligibility guidelines. (2010) 304:1929–35. doi: 10.1001/jama.2010.1572
3. van Dijk PT, Dippel DW, Habbema JDF. Survival of patients with dementia. *J Am Geriatr Soc.* (1991) 39:603–10. doi: 10.1111/j.1532-5415.1991.tb03602.x
4. Andrew MK, Mitnitski AB, Rockwood K. Social vulnerability, frailty and mortality in elderly people. *PLoS ONE.* (2008) 3:e2232. doi: 10.1371/journal.pone.0002232
5. Van Loon A, Rutten J, Van Buul L, Joling K, Smalbrugge M, Hertogh C. Nursing home residents with (suspected) COVID-19 factsheet 1: symptoms and course. (2020)
6. Comas-Herrera A, Zalakaín J, Litwin C, Hsu AT, Lane N, Fernández J-L. *ltccovid.org | Mortality associated with COVID-19 outbreaks in care homes Mortality associated with COVID-19 outbreaks in care homes: early international evidence.* (2020). Available online at: https://www.ontario.ca/page/how-ontario-is-responding-covid-19#section-1 (accessed June 7, 2020)
7. Wang H, Li T, Barbarino P, Gauthier S, Brodaty H, Molinuevo JL, et al. Dementia care during COVID-19. *Lancet.* (2020) 395:1190–1. doi: 10.1016/S0140-6736(20)30755-8
8. Kales HC, Lyketsos CG, Miller EM, Ballard C. Management of behavioral and psychological symptoms in people with alzheimer's disease: an international delphi consensus. *Int Psychogeriatrics.* (2019) 31:83–90. doi: 10.1017/S1041610218000534
9. *COVID-19 advice - Know the facts | WHO Western Pacific.* Available online at: https://www.who.int/westernpacific/emergencies/covid-19/information/physical-distancing (accessed August 24, 2020)
10. Arthur HM. Depression, isolation, social support, and cardiovascular disease in older adults. *J Cardiovasc Nurs.* (2006) 21(5 Suppl 1):S2–7. doi: 10.1097/00005082-200609001-00002
11. Gerst-Emerson K, Jayawardhana J. Loneliness as a public health issue: the impact of loneliness on health care utilization among older adults. *Am J Public Health.* (2015) 105:1013–9. doi: 10.2105/AJPH.2014.302427
12. Read S, Comas-Herrera A, Grundy E. Social isolation and memory decline in later-life. *Journals Gerontol Ser B.* (2020) 75:367–76. doi: 10.1093/geronb/gbz152
13. Paul C, Ayis S, Ebrahim S. Psychological distress, loneliness and disability in old age. *Psychol Heal Med.* (2006) 11:221–32. doi: 10.1080/13548500500262945
14. Cacioppo JT, Hawkley LC. Social isolation and health, with an emphasis on underlying mechanisms. *Perspect Biol Med.* (2003) 46(3 Suppl.):S39–52. doi: 10.1353/pbm.2003.0049
15. Friedler B, Crapser J, McCullough L. One is the deadliest number: the detrimental effects of social isolation on cerebrovascular diseases and cognition. *Acta Neuropathol.* (2015) 129:493–509. doi: 10.1007/s00401-014-1377-9
16. Wilson RS, Krueger KR, Arnold SE, Schneider JA, Kelly JF, Barnes LL, et al. Loneliness and risk of Alzheimer disease. *Arch Gen Psychiatry.* (2007) 64:234–40. doi: 10.1001/archpsyc.64.2.234
17. Rosenbaum L. The untold toll — the pandemic's effects on patients without Covid-19. *N Engl J Med.* (2020) 382:2368–71. doi: 10.1056/NEJMms2009984
18. Sun L, Sun Z, Wu L, Zhu Z, Zhang F, Shang Z, et al. Prevalence and risk factors of acute posttraumatic stress symptoms during the covid-19 outbreak in Wuhan, China. *medRxiv [preprint].* (2020). doi: 10.1101/2020.03.06.20032425

19. Boyraz G, Legros DN. Coronavirus disease (COVID-19) and traumatic stress: probable risk factors and correlates of posttraumatic stress disorder. *J Loss Trauma.* (2020) 25:503–22. doi: 10.1080/15325024.2020.1763556
20. Pereira-Sanchez V, Adiukwu F, El Hayek S, Bytyçi DG, Gonzalez-Diaz JM, Kundadak GK, et al. COVID-19 effect on mental health: patients and workforce. *Lancet Psychiatry.* (2020) 7:e29–e30. doi: 10.1016/S2215-0366(20)30153-X
21. Ransing R, Adiukwu F, Pereira-Sanchez V, Ramalho R, Orsolini L, Teixeira ALS, et al. Mental health interventions during the COVID-19 pandemic: a conceptual framework by early career psychiatrists. *Asian J Psychiatr.* (2020) 51:102085. doi: 10.1016/j.ajp.2020.102085
22. Ramalho R, Adiukwu F, Gashi Bytyçi D, El Hayek S, Gonzalez-Diaz JM, Larnaout A, et al. Telepsychiatry and healthcare access inequities during the COVID-19 pandemic. *Asian J Psychiatr.* (2020) 53:102234. doi: 10.1016/j.ajp.2020.102234
23. Goodman-Casanova JM, Durá-Pérez E, Guzmán-Parra J, Cuesta-Vargas A, Mayoral-Cleries F. Telehealth home support during COVID-19 confinement: survey study among community-dwelling older adults with mild cognitive impairment or mild dementia (Preprint). *J Med Internet Res.* (2020) 2**2**:e19434. doi: 10.2196/19434
24. Kiecolt-Glaser JK, McGuire L, Robles TF, Glaser R. Psychoneuroimmunology and psychosomatic medicine: back to the future. *Psychosom Med.* (2002) 64:15–28. doi: 10.1097/00006842-200201000-00004
25. Jin J-M, Bai P, He W, Wu F, Liu X-F, Han D-M, et al. Gender differences in patients with covid-19: focus on severity and mortality. *Front Public Heal.* (2020) 8:152. doi: 10.3389/fpubh.2020.00152
26. Spires-Jones TL, Hyman BT. The intersection of amyloid beta and tau at synapses in alzheimer's disease. *Neuron.* (2014) 82:756–71. doi: 10.1016/j.neuron.2014.05.004
27. Cummings JL. The neuropsychiatric inventory: assessing psychopathology in dementia patients. *Neurology.* (1997) 48:(5 Suppl 6):S10–6. doi: 10.1212/WNL.48.5_Suppl_6.10S
28. Lövheim H, Sandman PO, Karlsson S, Gustafson Y. Sex differences in the prevalence of behavioral and psychological symptoms of dementia. *Int Psychogeriatr.* (2009) 21:469–75. doi: 10.1017/S1041610209008497
29. Zhao QF, Tan L, Wang HF, Jiang T, Tan MS, Tan L, et al. The prevalence of neuropsychiatric symptoms in Alzheimer's disease: systematic review and meta-analysis. *J Affect Disord.* (2016) 190:264–71. doi: 10.1016/j.jad.2015.09.069
30. Kamiya M, Sakurai T, Ogama N, Maki Y, Toba K. Factors associated with increased caregivers' burden in several cognitive stages of Alzheimer's disease. *Geriatr Gerontol Int.* (2014) 14:45–55. doi: 10.1111/ggi.12260
31. De Vugt ME, Stevens F, Aalten P, Lousberg R, Jaspers N, Verhey FRJ. A prospective study of the effects of behavioral symptoms on the institutionalization of patients with dementia. *Int Psychogeriatrics.* (2005) 17:577–89. doi: 10.1017/S1041610205002292
32. Onor ML, Saina M, Trevisiol M, Cristante T, Aguglia E. Clinical experience with risperidone in the treatment of behavioral and psychological symptoms of dementia. *Prog Neuropsychopharmacol Biol Psychiatry.* (2007) 31:205–9. doi: 10.1016/j.pnpbp.2006.09.001
33. Huybrechts KF, Gerhard T, Crystal S, Olfson M, Avorn J, Levin R, et al. Differential risk of death in older residents in nursing homes prescribed specific antipsychotic drugs: Population based cohort study. *BMJ.* (2012) 3**44**:e977. doi: 10.1136/bmj.e977
34. Schneider LS, Dagerman KS, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia: meta-analysis of randomized placebo-controlled trials. *J Am Med Assoc.* (2005) 294:1934–43. doi: 10.1001/jama.294.15.1934
35. Maust DT, Kim HM, Seyfried LS, Chiang C, Kavanagh J, Schneider LS, et al. Antipsychotics, other psychotropics, and the risk of death in patients with dementia: number needed to harm. *JAMA Psychiatry.* (2015) 72:438–45. doi: 10.1001/jamapsychiatry.2014.3018
36. Barnes TRE, Banerjee S, Collins N, Treloar A, McIntyre SM, Paton C. Antipsychotics in dementia: prevalence and quality of antipsychotic drug prescribing in UK mental health services. *Br J Psychiatry.* (2012) 201:221–6. doi: 10.1192/bjp.bp.111.107631
37. U.S Government Accountability Office. *Antipsychotic Drug Use: HHS Has Initiatives to Reduce Use Among Older Adults in Nursing Homes, But Should Expand Efforts to Other Settings. Report to Congressional Requesters United States Government Accountability Office.* Washington, DC: U.S. Government Printing Office (2015).
38. Richter T, Mann E, Meyer G, Haastert B, Köpke S. Prevalence of psychotropic medication use among German and Austrian nursing home residents: a comparison of 3 cohorts. *J Am Med Dir Assoc.* (2012) 13:187.e7–187.e13. doi: 10.1016/j.jamda.2011.03.007
39. Giménez-Llort L, Blázquez G, Cañete T, Johansson B, Oddo S, Tobeña A, et al. Modeling behavioral and neuronal symptoms of Alzheimer's disease in mice: a role for intraneuronal amyloid. *Neurosci Biobehav Rev.* (2007) 31:125–47. doi: 10.1016/j.neubiorev.2006.07.007
40. Belfiore R, Rodin A, Ferreira E, Velazquez R, Branca C, Caccamo A, et al. Temporal and regional progression of Alzheimer's disease-like pathology in 3xTg-AD mice. *Aging Cell.* (2019) 18:e12873. doi: 10.1111/acel.12873
41. Giménez-Llort L, Arranz L, Maté I, De La Fuente M. Gender-specific neuroimmunoendocrine aging in a triple-transgenic 3×Tg-AD mouse model for alzheimer's disease and its relation with longevity. *Neuroimmunomodulation.* (2008) 15:331–43. doi: 10.1159/000156475
42. Kane AE, Shin S, Wong AA, Fertan E, Faustova NS, Howlett SE, et al. Sex differences in healthspan predict lifespan in the 3xTg-AD mouse model of alzheimer's disease. *Front Aging Neurosci.* (2018) 18:e12873. doi: 10.3389/fnagi.2018.00172
43. Arranz L, De Castro NM, Baeza I, Giménez-Llort L, De La Fuente M. Effect of environmental enrichment on the immunoendocrine aging of male and female triple-transgenic 3xTg-AD mice for alzheimer's disease. *J Alzheimers Dis.* (2011) 25:727–37. doi: 10.3233/JAD-2011-110236
44. Blázquez G, Cañete T, Tobeña A, Giménez-Llort L, Fernández-Teruel A. Cognitive and emotional profiles of aged alzheimer's disease (3×TgAD) mice: effects of environmental enrichment and sexual dimorphism. *Behav Brain Res.* (2014) 268:185–201. doi: 10.1016/j.bbr.2014.04.008
45. Matsumoto K, Fujiwara H, Araki R, Yabe T. Post-weaning social isolation of mice: a putative animal model of developmental disorders. *J Pharmacol Sci.* (2019) 141:111–8. doi: 10.1016/j.jphs.2019.10.002
46. Butler TR, Karkhanis AN, Jones SR, Weiner JL. Adolescent social isolation as a model of heightened vulnerability to comorbid alcoholism and anxiety disorders. *Alcohol Clin Exp Res.* (2016) 40:1202–14. doi: 10.1111/acer.13075
47. Aspesi D, Pinna G. Animal models of post-traumatic stress disorder and novel treatment targets. *Behav Pharmacol.* (2019) 30:130–50. doi: 10.1097/FBP.0000000000000467
48. Peterman JL, White JD, Calcagno A, Hagen C, Quiring M, Paulhus K, et al. Prolonged isolation stress accelerates the onset of Alzheimer's disease-related pathology in 5xFAD mice despite running wheels and environmental enrichment. *Behav Brain Res.* (2020) 3**79**:112366. doi: 10.1016/j.bbr.2019.112366
49. Huang H, Wang L, Cao M, Marshall C, Gao J, Xiao N, et al. Isolation housing exacerbates alzheimer's disease-like pathophysiology in aged APP/PS1 mice. *Int J Neuropsychopharmacol.* (2015) 18:pyu116. doi: 10.1093/ijnp/pyu116
50. Pietropaolo S, Sun Y, Li R, Brana C, Feldon J, Yee BK. Limited impact of social isolation on alzheimer-like symptoms in a triple transgenic mouse model. *Behav Neurosci.* (2009) 123:181–95. doi: 10.1037/a0013607
51. Oddo S, Caccamo A, Shepherd JD, Murphy MP, Golde TE, Kayed R, et al. Triple-transgenic model of alzheimer's disease with plaques and tangles: intracellular Aβ and synaptic dysfunction. *Neuron.* (2003) 39:409–21. doi: 10.1016/S0896-6273(03)00434-3
52. Belzung C, Le Pape G. Comparison of different behavioral test situations used in psychopharmacology for measurement of anxiety. *Physiol Behav.* (1994) 56:623–8. doi: 10.1016/0031-9384(94)90311-5
53. Hall C, in EB-U of CP (1932). A study of the rat's behavior in a field. A contribution to method in comparative psychology. *psycnet.apa.org* Available at: https://psycnet.apa.org/record/1932-04321-001 (accessed June 5, 2020)
54. Hall CS. Emotional behavior in the rat. I. Defecation and urination as measures of individual differences in emotionality. *J Comp Psychol.* (1934) 18:385–403. doi: 10.1037/h0071444
55. Baeta-Corral R, Giménez-Llort L. Bizarre behaviors and risk assessment in 3xTg-AD mice at early stages of the disease. *Behav Brain Res.* (2014) 258:97–105. doi: 10.1016/j.bbr.2013.10.017

56. Giménez-Llort L, Martínez E, Ferré S. Dopamine-independent and adenosine-dependent mechanisms involved in the effects of N-methyl-d-aspartate on motor activity in mice. *Eur J Pharmacol.* (1995) 275:171–7. doi: 10.1016/0014-2999(94)00768-3
57. Douglas RJ. Cues for spontaneous alternation. *J Comp Physiol Psychol.* (1966) 62:171–83. doi: 10.1037/h0023668
58. Torres-Lista V, Giménez-Llort L. Impairment of nesting behaviour in 3xTg-AD mice. *Behav Brain Res.* (2013) 247:153–7. doi: 10.1016/j.bbr.2013.03.021
59. Deacon RMJ. Assessing nest building in mice. *Nat Protoc.* (2006) 1:1117–9. doi: 10.1038/nprot.2006.170
60. Torres-Lista V, Giménez-Llort L. Vibrating tail, digging, body/face interaction, and lack of barbering: sex-dependent behavioral signatures of social dysfunction in 3xTg-AD mice as compared to mice with normal aging. *J Alzheimers Dis.* (2019) 69:969–77. doi: 10.3233/JAD-190253
61. Lát J. The analysis of habituation. *Acta Neurobiol Exp.* (1973) 33:771–89
62. Giménez-Llort L, Schiffmann SN, Shmidt T, Canela L, Camón L, Wassholm M, et al. Working memory deficits in transgenic rats overexpressing human adenosine A2A receptors in the brain. *Neurobiol Learn Mem.* (2007) 87:42–56. doi: 10.1016/j.nlm.2006.05.004
63. Giménez-Llort L, García Y, Buccieri K, Revilla S, Suñol C, Cristofol R, et al. Gender-specific neuroimmunoendocrine response to treadmill exercise in 3xTg-AD Mice. *Int J Alzheimers Dis.* (2010) 2010:128354. doi: 10.4061/2010/128354
64. Cheng Y, Luo R, Wang K, Zhang M, Wang Z, Dong L, et al. Kidney disease is associated with in-hospital death of patients with COVID-19. *Kidney Int.* (2020) 97:829–38. doi: 10.1016/j.kint.2020.03.005
65. Feng G, Zheng KI, Yan QQ, Rios RS, Targher G, Byrne CD, et al. COVID-19 and liver dysfunction: current insights and emergent therapeutic strategies. *J Clin Transl Hepatol.* (2020) 8:1–7. doi: 10.14218/JCTH.2020.00018
66. García-Mesa Y, López-Ramos JC, Giménez-Llort L, Revilla S, Guerra R, Gruart A, et al. Physical exercise protects against Alzheimer's disease in 3xTg-AD mice. *J Alzheimers Dis.* (2011) 24:421–54. doi: 10.3233/JAD-2011-101635
67. Torres-Lista V, Parrado-Fernández C, Alvarez-Montón I, Frontiñán-Rubio J, Durán-Prado M, Peinado JR, et al. Neophobia, NQO1 and SIRT1 as premorbid and prodromal indicators of AD in 3xTg-AD mice. *Behav Brain Res.* (2014) 271:140–6. doi: 10.1016/j.bbr.2014.04.055
68. Baeta-Corral R, Johansson B, Giménez-Llort L. Long-term treatment with low-dose caffeine worsens BPSD-Like profile in 3xTg-AD mice model of Alzheimer'S disease and affects mice with normal aging. *Front Pharmacol.* (2018) 9:79. doi: 10.3389/fphar.2018.00079
69. Torres-Lista V, De la Fuente M, Giménez-Llort L. Survival curves and behavioral profiles of female 3xtg-ad mice surviving to 18-months of age as compared to mice with normal aging. *J Alzheimers Dis Rep.* (2017) 1:47–57. doi: 10.3233/ADR-170011
70. Thompson RF, Spencer WA. habituation: a model phenomenon for the study of neuronal substrates of behavior. *Psychol Rev.* (1966) 73:16–43. doi: 10.1037/h0022681
71. Rankin CH, Abrams T, Barry RJ, Bhatnagar S, Clayton DF, Colombo J, et al. Habituation revisited: an updated and revised description of the behavioral characteristics of habituation. *Neurobiol Learn Mem.* (2009) 92:135–8. doi: 10.1016/j.nlm.2008.09.012
72. Sanderson DJ, Bannerman DM. The role of habituation in hippocampus-dependent spatial working memory tasks: evidence from GluA1 AMPA receptor subunit knockout mice. *Hippocampus.* (2012) 22:981–94. doi: 10.1002/hipo.20896
73. Ariza L, Giménez-Llort L, Cubizolle A, Pagès G, García-Lareu B, Serratrice N, et al. Central nervous system delivery of helper-dependent canine adenovirus corrects neuropathology and behavior in mucopolysaccharidosis type VII mice. *Hum Gene Ther.* (2014) 25:199–211. doi: 10.1089/hum.2013.152
74. Guayerbas N, Puerto M, Ferrández MD, De La Fuente M. A diet supplemented with thiolic anti-oxidants improves leucocyte function in two strains of prematurely ageing mice. *Clin Exp Pharmacol Physiol.* (2002) 29:1009–14. doi: 10.1046/j.1440-1681.2002.03758.x
75. Giménez-Llort L, Maté I, Manassra R, Vida C, De la Fuente M. Peripheral immune system and neuroimmune communication impairment in a mouse model of Alzheimer's disease. *Ann N Y Acad Sci.* (2012) 1262:74–84. doi: 10.1111/j.1749-6632.2012.06639.x
76. Baeta-Corral R, Giménez-Llort L. Persistent hyperactivity and distinctive strategy features in the morris water maze in 3xTg-AD mice at advanced stages of disease. *Behav Neurosci.* (2015) 129:129–37. doi: 10.1037/bne0000027
77. Cañete T, Blázquez G, Tobeña A, Giménez-Llort L, Fernández-Teruel A. Cognitive and emotional alterations in young Alzheimer's disease (3xTgAD) mice: Effects of neonatal handling stimulation and sexual dimorphism. *Behav Brain Res.* (2015) 281:156–71. doi: 10.1016/j.bbr.2014.11.004
78. Muntsant A, Shrivastava K, Recasens M, Giménez-Llort L. Severe perinatal hypoxic-ischemic brain injury induces long-term sensorimotor deficits, anxiety-like behaviors and cognitive impairment in a sex-, age- and task-selective manner in C57BL/6 mice but can be modulated by neonatal handling. *Front Behav Neurosci.* (2019) 13:7. doi: 10.3389/fnbeh.2019.00007
79. Huang HJ, Liang KC, Ke HC, Chang YY, Hsieh-Li HM. Long-term social isolation exacerbates the impairment of spatial working memory in APP/PS1 transgenic mice. *Brain Res.* (2011) 1371:150–60. doi: 10.1016/j.brainres.2010.11.043
80. Dong H, Wang S, Zeng Z, Li F, Montalvo-Ortiz J, Tucker C, et al. Effects of corticotrophin-releasing factor receptor 1 antagonists on amyloid-β and behavior in Tg2576 mice. *Psychopharmacology.* (2014) 231:4711–22. doi: 10.1007/s00213-014-3629-8
81. Torres-Lista V, López-Pousa S, Giménez-Llort L. Impact of chronic risperidone use on behavior and survival of 3xTg-AD mice model of Alzheimer's disease and mice with normal aging. *Front Pharmacol.* (2019) 10:1061. doi: 10.3389/fphar.2019.01061
82. Etters L, Goodall D, Harrison BE. Caregiver burden among dementia patient caregivers: a review of the literature. *J Am Acad Nurse Pract.* (2008) 20:423–8. doi: 10.1111/j.1745-7599.2008.00342.x
83. Okawa M, Mishima K, Hishikawa Y, Hozumi tS, Hori tHo, Takahashi K. *Clinical Research Circadian Rhythm Disorders in Sleep-Waking and Body Temperature in Elderly Patients with Dementia and Their Treatment*. (1991). Available online at: https://academic.oup.com/sleep/article-abstract/14/6/478/2742815 (accessed June 13, 2020)
84. Cordón-Barris L, Pascual-Guiral S, Yang S, Giménez-Llort L, Lope-Piedrafita S, Niemeyer C, et al. Mutation of the 3-phosphoinositide-dependent protein kinase 1 (pdk1) substrate-docking site in the developing brain causes microcephaly with abnormal brain morphogenesis independently of akt, leading to impaired cognition and disruptive behaviors. *Mol Cell Biol.* (2016) 36:2967–82. doi: 10.1128/MCB.00230-16
85. Lynch CB. Response to divergent selection for nesting behavior in mus musculus. *Genetics.* (1980) 96:757–65.
86. Knight EM, Brown TM, Gümüsgöz S, Smith JCM, Waters EJ, Allan SM, et al. Age-related changes in core body temperature and activity in triple-transgenic Alzheimer's disease (3xTgAD) mice. *DMM Dis Model Mech.* (2013) 6:160–170. doi: 10.1242/dmm.010173
87. Huitrón-Reséndiz S, Sánchez-Alavez M, Gallegos R, Berg G, Crawford E, Giacchino JL, et al. Age-independent and age-related deficits in visuospatial learning, sleep-wake states, thermoregulation and motor activity in PDAPP mice. *Brain Res.* (2002) 928:126–37. doi: 10.1016/S0006-8993(01)03373-X
88. Bult A, Lynch CB. Multiple selection responses in house mice bidirectionally selected for thermoregulatory nest-building behavior: crosses of replicate lines. *Behav Genet.* (1996) 26:439–46. doi: 10.1007/BF02359488
89. Carter PA, Swallow JG. Nesting behavior of house mice (Mus domesticus) selected for increased wheel-running activity. *Behav Genet.* (2000) 30:85–94. doi: 10.1023/A:1001967019229
90. Lacy RC, Lynch CB, Lynch GR. Developmental and adult acclimation effects of ambient temperature on temperature regulation of mice selected for high and low levels of nest-building. *J Comp Physiol B.* (1978) 123:185–92. doi: 10.1007/BF00687848
91. Van Leeuwen SD, Bonne OB, Avraham Y, Berry EM. Separation as a new animal model for self-induced weight loss. *Physiol Behav.* (1997) 62:77–81. doi: 10.1016/S0031-9384(97)00144-3
92. Guo M, Wu CF, Liu W, Yang JY, Chen D. Sex difference in psychological behavior changes induced by long-term social isolation in mice. *Prog NeuroPsychopharmacol Biol Psychiatry.* (2004) 28:115–21. doi: 10.1016/j.pnpbp.2003.09.027
93. De la Fuente? M, Manassra R, Mate I, Vida C, Hernanz A, Gimenez-Llort L. Early oxidation and inflammation state of the immune system in male and

female triple transgenic mice for Alzheimer's disease (3xTgAD). *Free Radic Biol Med.* (2012) 53:S165. doi: 10.1016/j.freeradbiomed.2012.08.346
94. Hernanz A, Vida C, Manassra R, Gimenez-Llort L, De la Fuente M. P2-063: early peripheral oxidative stress status in male and female triple-transgenic mice for alzheimer's disease. *Alzheimers Dement.* (2014) 10:P492–P493. doi: 10.1016/j.jalz.2014.05.737
95. Yang SH, Kim J, Lee MJ, Kim Y. Abnormalities of plasma cytokines and spleen in senile APP/PS1/Tau transgenic mouse model. *Sci Rep.* (2015) 5:15703. doi: 10.1038/srep15703
96. Marchese M, Cowan D, Head E, Ma D, Karimi K, Ashthorpe V, et al. Autoimmune manifestations in the 3xtg-ad model of alzheimer's disease. *J Alzheimers Dis.* (2014) 39:191–210. doi: 10.3233/JAD-131490
97. Esquerda-Canals G, Roda AR, Martí-Clúa J, Montoliu-Gaya L, Rivera-Hernández G, Villegas S. Treatment with scFv-h3D6 prevented neuronal loss and improved spatial memory in young 3xTg-AD mice by reducing the intracellular amyloid-β burden. *J Alzheimers Dis.* (2019) 70:1069–91. doi: 10.3233/JAD-190484
98. Nho K, Kueider-Paisley A, Ahmad S, MahmoudianDehkordi S, Arnold M, Risacher SL, et al. Association of altered liver enzymes with alzheimer disease diagnosis, cognition, neuroimaging measures, and cerebrospinal fluid biomarkers. *JAMA Netw open.* (2019) 2:e197978. doi: 10.1001/jamanetworkopen.2019.7978
99. Zheng KI, Gao F, Wang XB, Sun QF, Pan KH, Wang TY, et al. Obesity as a risk factor for greater severity of COVID-19 in patients with metabolic associated fatty liver disease. *Metabolism.* (2020) 108:154244. doi: 10.1016/j.metabol.2020.154244
100. Gimenez-Llort L, Torres-Lista V, Fuente M. Crosstalk between behavior and immune system during the prodromal stages of alzheimer's disease. *Curr Pharm Des.* (2014) 20:4723–32. doi: 10.2174/1381612820666140130205500
101. Maté I, Cruces J, Giménez-Llort L, De La Fuente M. Function and redox state of peritoneal leukocytes as preclinical and prodromic markers in a longitudinal study of triple-transgenic mice for Alzheimer's disease. *J Alzheimers Dis.* (2014) 43:213–26. doi: 10.3233/JAD-140861
102. Hara C, Manabe K, Ogawa N. Influence of activity-stress on thymus, spleen and adrenal weights of rats: possibility for an immunodeficiency model. *Physiol Behav.* (1981) 27:243–8. doi: 10.1016/0031-9384(81)90264-X
103. Batuman OA, Sajewski D, Ottenweller JE, Pitman DL, Natelson BH. Effects of repeated stress on T cell numbers and function in rats. *Brain Behav Immun.* (1990) 4:105–17. doi: 10.1016/0889-1591(90)90013-G
104. Tahimic CGT, Paul AM, Schreurs AS, Torres SM, Rubinstein L, Steczina S, et al. Influence of social isolation during prolonged simulated weightlessness by hindlimb unloading. *Front Physiol.* (2019) **10**:1147. doi: 10.3389/fphys.2019.01147
105. Chu KH, Tsang WK, Tang CS, Lam MF, Lai FM, To KF, et al. Acute renal impairment in coronavirus-associated severe acute respiratory syndrome. *Kidney Int.* (2005) 67:698–705. doi: 10.1111/j.1523-1755.2005.67130.x
106. Hall T, Galletly C, Clark C, Veltmeyer M, Metzger LJ, Gilbertson MW, et al. The relationship between hippocampal asymmetry and working memory processing in combat-related PTSD – a monozygotic twin study. *Biol Mood Anxiety Disord.* (2012) 2:21. doi: 10.1186/2045-5380-2-21
107. Boku S, Nakagawa S, Toda H, Hishimoto A. Neural basis of major depressive disorder: beyond monoamine hypothesis. *Psychiatry Clin Neurosci.* (2018) 72:3–12. doi: 10.1111/pcn.12604
108. Wingenfeld K, Wolf OT. Stress, memory, and the hippocampus. *Front Neurol Neurosci.* (2014) 34:109–20. doi: 10.1159/000356423
109. Woon FL, Sood S, Hedges DW. Hippocampal volume deficits associated with exposure to psychological trauma and posttraumatic stress disorder in adults: a meta-analysis. *Prog NeuroPsychopharmacol Biol Psychiatry.* (2010) 34:1181–8. doi: 10.1016/j.pnpbp.2010.06.016
110. Wachinger C, Salat DH, Weiner M, Reuter M. Alzheimer's Disease Neuroimaging I. Whole-brain analysis reveals increased neuroanatomical asymmetries in dementia for hippocampus and amygdala. *Brain.* (2016) 139:3253–66. doi: 10.1093/brain/aww243
111. Shimbo A, Kosaki Y, Ito I, Watanabe S. Mice lacking hippocampal left-right asymmetry show non-spatial learning deficits. *Behav Brain Res.* (2018) 336:156–65. doi: 10.1016/j.bbr.2017.08.043
112. Spasojevic N, Stanisavljevic D, Gavrilovic L, Jovanovic P, Cucakovic A, Dronjak S. Hippocampal asymmetry in expression of catecholamine synthesizing enzyme and transporters in socially isolated rats. *Neuroendocrinol Lett.* (2012) 33:631−5.
113. Goto K, Kurashima R, Gokan H, Inoue N, Ito I, Watanabe S. Left2right asymmetry defect in the hippocampal circuitry impairs spatial learning and working memory in IV mice. *PLoS ONE.* (2010) 5:e15468. doi: 10.1371/journal.pone.0015468
114. Hsiao YH, Chen PS, Chen SH, Gean PW. The involvement of Cdk5 activator p35 in social isolation-triggered onset of early alzheimers disease-related cognitive deficit in the transgenic mice. *Neuropsychopharmacology.* (2011) 36:1848–58. doi: 10.1038/npp.2011.69
115. Kales HC, Gitlin LN, Lyketsos CG. Assessment and management of behavioral and psychological symptoms of dementia. *BMJ.* (2015) 350:369. doi: 10.1136/bmj.h369
116. Gitlin LN, Winter L, Burke J, Chernett N, Dennis MP, Hauck WW. Tailored activities to manage neuropsychiatric behaviors in persons with dementia and reduce caregiver burden: a randomized pilot study. *Am J Geriatr Psychiatry.* (2008) 16:229–39. doi: 10.1097/01.JGP.0000300629.35408.94
117. Giménez-Llort L. The snail and turtle effects: reflections on health care management in geriatric medicine. *Eur Geriatr Med.* (2010) 1:372. doi: 10.1016/j.eurger.2010.10.001

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

REVIEW
published: 21 December 2020
doi: 10.3389/fpsyt.2020.626807

COVID-19 Suicide Survivors—A Hidden Grieving Population

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Present time has been dominated by the COVID-19 pandemic. People are grieving several non-death related situations: the loss of a job, of a status, of a role, of their life. Restrictive measures and uncertainty about the future makes individuals vulnerable to feelings of hopelessness and helplessness. Mental health support has been hindered and teams are reinventing themselves to reach people in need. Nevertheless, decompensation of previous psychiatric disorders, increasing levels of depression and anxiety, economical handicaps and fear of the infection, are prompting several cases of COVID-19 related suicides worldwide. Every suicide affects between 5 and 80 individuals, which are known as suicide survivors. Suicide grief is particularly challenging, with rates of complicated grief as high as 40%. Suicide survivors are at increased risk of developing depression, anxiety disorders and of suicidal behaviors. Moreover, feelings of guilt and shame, as well as social stigma, are major obstacles for them to reach form help. This article aims to review the existing literature on COVID-19 related suicides, complicated grief in suicide survivors and highlight modifiable risk factors for both conditions, as well as propose some public health measures to reduce the impact of the pandemic context on self-inflicted harm and its consequences on families, friends and the community. Obstacles to access to mental health support need to be overcome through the use of technology. Technicians should actively approach populations more vulnerable to develop suicidal ideation. Social media have the obligation to provide accurate an non-sensationalistic information. Families and friends should maintain social proximity, despite the need for physical distancing. When a suicide death occurs, police forces and health staff should be prepared to share the news with the family using an empathic and humane approach and providing psychological support. Funerals, memorials and other services should be held as much as possible. Closer contacts should be signalized and closely followed in order to detect the need for specific interventions. Help seeking behaviors should be promoted. Additionally, people should be educated on suicide and its impacts, in order to reduce stigma.

Keywords: complicated grief, suicide, suicide survivors, COVID-19, intervention, prevention

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Jin Pyo Hong, Sungkyunkwan University, South Korea
Kathleen Gilbert, Indiana University, United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *06 November 2020*
Accepted: *01 December 2020*
Published: *21 December 2020*

Citation:
Pinto S, Soares J, Silva A, Curral R and Coelho R (2020) COVID-19 Suicide Survivors—A Hidden Grieving Population. Front. Psychiatry 11:626807. doi: 10.3389/fpsyt.2020.626807

INTRODUCTION

The infection by Sars-CoV2 has been classified as pandemic by the World Health Organization on the 12th March 2020. Since its detection in the Chinese city of Wuhan up until the time of writing this manuscript (30th October 2020), COVID-19 has already affected more than 46 million people worldwide and caused more than 1,100,000 deaths. In Portugal, as off today, more than 141 thousand people were infected and COVID-19 was responsible for 2,507 deaths.

As the virus spread, governments urged to impose aggressive measures, in order to mitigate transmission and prevent the collapse of the health system structure. Compulsory confinement was applied, working from home implemented, schools closed, visits to hospitals, hospices and other healthcare facilities suspended, non-urgent health procedures suspended, and non-essential economical activities closed. Although necessary and urgent, such measures had a major impact in people's everyday routines, jobs, economic status, social connections, self-care and leisure activities.

In Portugal, about 877 thousand people were set into layoff from their work (1), while the unemployment rate increased 22.1% [comparing with April/2019 (2)]. A similar scenario was observed worldwide. This drop in individual and family incomes posed as a major factor of individual a relational stress. Requests for help regarding food and medical supplies dramatically increased.

Another important factor was the compulsory or recommended lockdown people were subjected to—during the month of April, about half of the world population (3.9 billion people) were confined to their homes and households (3). This forced confinement, initially promoted as "social distancing," led to a decrease in contacts and weakening of support networks. On the one hand, chronically ill patients, the elderly and the economically underprivileged people were deprived from their support and care structures, receiving help only for basic and instrumental daily needs (e.g., distribution of food and medical drugs, emergency medical assessment). Emotional and affective support was scarce, with a marked increase of feelings of loneliness and isolation. On the other hand, stress levels and conflicts increased among households, with families forced to interact on the same space, for 24 h a day, 7 days a week. Parents were both workers and teachers, as home schooling and remote working were implemented. A complete disruption of routines was observed in many cases, with longer working journeys and less quantity and quality of family and individual time. Despite living in a technological era, during periods of lockdown and promoted social distancing/isolation, it has been shown that artificial substitutes for social connection (such as video-calls, online group events) appear to exacerbate pre-existing feelings of disconnection. Furthermore, these substitutes will never manage to fulfill the role and status people have in their active daily living and live social events (4).

Alongside with social distancing and increased isolation, media coverage of the COVID crisis potentiated people's whole perception of risk, raising fear and anxiety (5).

In health care structures, professionals were dealing with an extreme reality—lack of individual protection material, insufficient technical support for severely ill patients, frequently working extra hours and being forced to postpone "non-urgent care." This need to direct all available means to face the pandemic crisis led to a conscious neglect of patients with other types of pathology.

Mental health care was significantly affected—both scheduled appointments and urgent assessments. There was already plenty of evidence that mental health disorders, such as anxiety, depression substance abuse, as well as suicide attempts/completed suicides, have been increasing in the last years (6). Even before the COVID-19 pandemic, mental health services could not reach and adequately answer to the population in need. Given the current reality, it is expected that mental health care demands will increase—anxiety, depression and substance abuse are common reactions to major crisis (7). This insufficient response from healthcare structures, may potentiate the growth of a "mental health need curve," that will last beyond the COVID-19 pandemic crisis (8, 9).

Extreme cases of social and economic overload, in a background of fragile mental health, bring together important risk factors for the appearance of suicidal ideation, suicide attempts and completed suicides. Suicide has long been considered a global public health problem, with about 800,000 people taking their lives each year (10). It is a complex and multidimensional phenomenon. However, nearly 90% of all suicides occur in individuals with a diagnosed mental health or substance-abuse disorder (11). Furthermore, suicide attempters frequently describe feelings of hopelessness, despair and social isolation as triggers for acting (12). According to WHO data, each suicide is accompanied by more than 20 suicide attempts (10).

It has been described that each suicide may affect between 5 nuclear family members and 80 relatives, friends and acquaintances (13). A meta-analysis by Andriessen et al. (14) found that 4.3% of people have experienced a suicide in the previous year, with 21,8% being exposed to suicide during their lifetime. This makes suicide a highly pervasive phenomenon, with the group of suicide survivors being one of the largest at risk communities for mental health disorders. Suicide survivors show increased risk of complicated grief, depressive and anxiety disorders, substance-abuse disorders and suicidal behavior (15).

Grieving suicide survivors are a particular group of individuals. Grief is the natural reaction to the loss of a significant one, comprehending emotional, psychological, physical and behavioral responses to the death (16). However, people grieving suicide also present an important component of shock and possible trauma, as well as feelings of abandonment, rejection, unacceptance and shame related to the circumstances of death (17, 18). The normative process of grief usually evolves from acute to integrated, being individuals able to return to their normal daily living and functional level. When some internal or external factor interferes with this process, complicated grief may occur. It has been shown that complicated grief is more frequent in suicide survivors than in people grieving other causes of death (19), affecting up to 40% of individuals in some samples (20). Besides all the common risk factors for

complicated grief, suicide survivors are subjected to high levels of stigma, especially present as social disapproval, isolation and shunning (21). People grieving suicide also present higher levels of physical comorbidities, much related to the lack of selfcare and adoption of unhealthy lifestyles observed in the course of bereavement (22).

Given the high risk of psychiatric and physical disorders, suicide survivors should be closely followed and intervention initiated as soon as possible—the concept of postvention, used by Erlangsen and Pitman (22) aims at an early professional intervention, in order to prevent deleterious outcomes. It is mandatory to facilitate the access of this community to mental healthcare facilities, as well as to individual and group therapies. Due to the current reality, characterized by physical distancing and fear of the Sars-CoV2 infection, it is important to reframe the psychotherapeutic setting and adapt it to the online world.

At a time when the world is fully entering the second wave of COVID-19, with the prevision of new lockdown periods, reinforced social isolation and a new drop in economic activities, it is imperative to focus on suicide prevention and follow up of suicide survivors.

The aim of this article is to review the existing literature on COVID-19 related suicides, complicated grief in suicide survivors and highlight modifiable risk factors for both conditions, as well as propose some public health measures to reduce the impact of the pandemic context on self-inflicted harm and its consequences on families, friends and the community.

THE COVID-19 WORLD AND INCREASED RISK FOR SUICIDE

As briefly exposed in the introduction section, the world as we knew it has significantly changed as a result of the restrictions imposed to contain the COVID-19 pandemic. The interpersonal theory of suicide tells us that suicide, as a multidimensional phenomenon, may be the result of hindered belongingness and perceived burdensomeness, associated with an acquired capability for suicide (23). Forced lockdowns, canceled medical appointments, lack of social support, unemployment and fear for the future make several populations prone to suicide. Various studies were published regarding the impact of previous pandemics in suicide rates worldwide. Deaths by suicide increased in the United States of America during the 1918–1919 influenza pandemic (24), as well as in Hong Kong during the 2003 severe acute respiratory syndrome (SARS) epidemic—this latter increase was specially observed in elder people (25, 26). During the SARS outbreak, local increases in suicides were seen in the context of forced quarantines (e.g., Taipei hospital) (27). Longer durations of quarantine, frustration, boredom, insufficient information, inadequate supplies and fear of infection were identified as important risk factors for the occurrence of negative outcomes (28). Another study validated that a disproportionate increase in rates of psychological distress was seen in areas that adopted longer periods of quarantine (29), and higher rates of post-traumatic stress disorder (PTSD) observed in residents of high SARS-prevalent areas (30).

One of the main factors associated with the increased rates of suicide in previous pandemics has been unemployment. Unemployment by itself is associated with a 2–3-fold increased risk of death by suicide (31). The Global Financial Crisis was responsible for the loss of 30 million jobs and unemployment were responsible for 10,000 "economic suicides" between 2008 and 2010 in Europe and North America (32)—many of them preceded the actual rise in unemployment (33).

Regarding the present crisis, the International Monetary Fund has predicted it will constitute the steepest economic downturn since the Great Recession (34). Developing and less developed countries are experiencing more extensive crises that developed ones—many small and medium sized businesses are being disrupted, going bankrupt and closing (35). Studies modeling the effect of present unemployment predictions on suicide increase point toward more 2,135 to 9,570 completed suicides in the context of COVID-19 crisis (36). Other authors target for a 3.3–8.4% increase in suicides in the US, over the period of 2020–2021, and to an increase of 27% in suicides in Canada (37, 38).

Besides the economic burden, many other factors contribute to increased risk of suicide in the COVID-19 world. As already mentioned, people have been highly exposed to information regarding the COVID-19 crisis through media, predominantly negative information—death statistics, cases increase, speculation about more restrictive measures, predictions and models about future unemployment and economic and sanitary crisis, among others. This unlimited exposure proves to be deleterious on many levels. People are presenting a distorted perceptions of risk, mostly of increased risk, which raises the levels of fear and apprehension (39). Furthermore, people are experiencing several non-bereavement related losses—namely loss of social connections, of their role in the professional and social milieus and of daily routines. This may trigger a grieving like reaction, particularly when these losses markedly impacts one's sense of identity (40). Additionally, social disconnection and physical distancing may induce feelings of loneliness and potentiate social isolation. All these factors lead to rumination about the current world situation and the future, placing people at risk for increased feelings of hopelessness and helplessness (4). As Beck et al. (41) reported, hopelessness is a better predictor of suicidal behavior (both fatal and non-fatal) than depression. Feelings of hopelessness, helplessness, and rumination, associated with the predisposition for negativity bias, makes individuals prone to depressive thinking (42). This may trigger the evolution from sadness to depression. While sadness is a normative emotional response to an unfavorable context, encompassing several personal losses and external stressors, depression is a pathological response. Depressed individuals perceive losses as irrevocable (e.g., there is no way the world is going to survive this pandemic, or the economy will never be restored), increasing the overwhelming feelings of lack of hope for the future and that no action and no one will be able to help them or change the current situation (4). An associated loss of purpose may ensue, since individuals find personal sources of reinforcement in activities such as work, social groups, family reunions and leading roles in daily routines (4). This feeling of meaninglessness in the context of uncontrollable

circumstances, with no end at sight, further aggravates situations of depression and suicidal thoughts.

Several authors tried to identify the main groups at risk for self-harm/suicide, having highlighted five specific populations: (1) older people (43); (2) individuals with previous mental health problems (44); (3) homeless (45); (4) migrant workers (46); and (5) healthcare workers (47).

Elder people are a population vulnerable to several environmental factors—from the increased healthcare needs (with frequent medical appointments, medication and possible dependence from a third person), to the lack of social and familiar support, low income, and fragile housing conditions. The pandemic context potentiates these vulnerabilities—with suspension of home support services, scheduled medical appointments and family reunions—promoting feelings of disconnectedness from society, devaluation and burdensomeness (48, 49). This constellation of factors and feelings largely potentiates symptoms of depression and anxiety, making elder people at risk of self-harm/suicide. People in this age group (>65 years old) are a special cause of concern, due to the fragile equilibrium between protecting them from the infection and possible clinical severity of COVID-19 consequences, and assuring the social, medical and emotional support they need to go over such difficult times.

Mental healthcare has been a worldwide concern for several years. Even before the pandemic, it is estimated that about 50% of people needing mental health services in developed countries lacked access, a figure that reaches 90% of cases in low income countries (50). Research done after the 2003 SARS outbreak has shown that, 1 year after the outbreak, survivors presented concerning levels of depression, anxiety, and stress, with about 64% reporting probable psychiatric disorders (51). The context of COVID-19 pandemic poses increased obstacles to mental healthcare provision: first, services are not equipped and prepared to face the expected increase in demand; second, due to recommendations of social distancing, mandatory lockdowns, diversion of healthcare resources to COVID-19 cases and fear of being infected, scheduled appointments are either being canceled or people not attending them. Furthermore, psychiatric decompensations and suicidal thoughts may be undervalued or not recommended to present to the Emergency Departments (52). Community mental health support has also been hampered by the pandemic context: face-to-face appointments canceled or replaced by phone or video calls, doctors overwhelmed by follow up of COVID-19 affected patients and tracking of contacts, patients unable to renew prescriptions and unable to contact medical support in cases of emergency. Regarding phone and video calls, many patients felt several restrains to fully expose their current status to the clinician—lockdowns, home quarantine and lack of a personal space, frequently with other family members being able to follow the consultation, hindered the quality and assertiveness of indirect follow up. This inability to adequately follow previously diagnosed patients adds to the expected increase in mental health problems.

Evidence from countries struck earlier by the COVID-19 breakout point toward a significant increase in mental health problems and needs. A study by Wang et al. (53) described that the population of 194 provinces in China presented high levels of moderate to severe anxiety (28.8%), moderate to severe depression (16.5%) and moderate to severe stress (8.1%), with females and students being the most affected. Another research article from Iran highlighted the increased levels of stress and mental morbidity, underlining the role of unpredictability, uncertainty, seriousness of the disease, misinformation and social isolation as the factors that most contributed to it (54). Shigemura et al. (47) described the high risk of maladaptive and disruptive behaviors, such as hoarding and stockpiling of resources, in the context of high levels of fear and panic.

Several authors raised concerns about the capability of the healthcare system to answer the increased needs of mental healthcare that will come after the pandemic. Marques et al. (8) transposed the need to flatten the infection curve to the reality of mental health—there is an imperative need to flatten the mental heath demand curve, because services will not have the means to provide the care needed.

Healthcare workers are another vulnerable group for the development of mental health disorders and increased suicide risk. As previously exposed, hospitals and clinics are overloaded with work, trying to care for COVID-19 patients while simultaneously attending non-COVID-19 disorders—many of which were let without any kind of healthcare services during the peak of the first pandemic wave. Due to the increased workload and the fear of infecting their loved ones, clinicians are isolating themselves from their families, neglecting their own selfcare, personal space and individual needs (55, 56). Moreover, clinicians are under intense ethical and moral dilemmas, since in many services they are entitled to decide who will have access to intensive care therapy and who does not (55). This awareness regarding the reality of the disease course and of the fragilities of clinical practice, boosts the fear of becoming severely ill and having to arrange who to provide for their families. A cross-sectional survey including 1,257 healthcare workers from China described that 50.4% of responders were experiencing high levels of depression, 44.6% increased levels of anxiety, 34% insomnia, and 71.5% impacting distress (57). Healthcare workers are at risk of a particular type of trauma, which is secondary traumatic stress—the stress response occurring as a result of helping someone who is experiencing trauma, characterized by excessive worry and fear, high alert levels, rumination and intrusive thoughts and physical signs of stress (58). In the present context, we can add moral stress to this equation—the physical or moral distress experienced when internal or external limitations prevent someone of acting the way he believes is right (59). It is intimately associated with burnout, which may bring about feelings of exhaustion, depersonalization and possibly a dehumanization from their action (60). All these personal a professional factors make healthcare workers at high risk for psychiatric disorders and suicide risk.

As a final note, it is important to highlight the increased risk survivors of COVID-19 have to suffer from mental health disorders and suicidal thoughts/consummated suicide (61) (see for review). Patients recovering from COVID-19 usually have had physical symptoms for a long time and face psychosocial difficulties such as professional and financial problems. As

already described in the literature, both physical symptoms and psychosocial factors contribute to suicidal behavior (62). In these individuals, the single most significant predictor of suicide is the presence of depression. Recovered COVID-19 patients should be followed-up and screened for both depression and suicidal ideation (61). In fact, many survivors of the new coronavirus disease will probably need long-term psychological interventions. Thus, there is an imminent need to implement specific strategies to ameliorate the psychological condition of COVID-19 survivors and to reduce the incidence of consummated suicide in this population.

COVID-19 SUICIDES

Since the beginning of the COVID-19 epidemic, posteriorly classified as pandemic, several case reports of suicide have been published. In Bangladesh, there have been at least eight COVID-19 suicide cases (63). Identified triggers for these cases were COVID-19 fear, xenophobia and economical related issues. In India, two suicides were reported: one of a man convinced of being infected with Sars-CoV2, who isolated himself in order to protect his loved ones and later commited suicide; another of a man admitted to the isolation ward of the Safdarjung Hospital, from where he jumped off the window, ending his life (64). In the USA, there was the report of a murder-suicide in Chicago, where a man killed himself after killing a woman due to the conviction that both of them were infected (65). In Germany, the Hesse State Finance Minister committed suicide due to the concerns about the future, uncertainty, feelings of hopelessness and worthlessness (66). In England, a nurse working at the King's College Hospital in London ended her life while treating COVID-19 patients (67). In Italy, one of Europe's countries most hardly struck by the first pandemic wave, national media described at least five suicides during the period from February to April 2020 (68).

Another kind of suicide described in the literature is suicide pacts between couples. Griffiths el al. (69) described the self-inflicted death of 6 couples from four countries, in the context of the COVID-19 pandemic.

Thakur and Jain (70) reviewed published suicide reports, having organized suicide triggers in four categories: (1) social isolation/distancing; (2) worldwide lockdown creating economic recession; (3) stress, anxiety and pressure in medical healthcare professionals; (4) social boycott and discrimination.

COMPLICATED GRIEF IN SUICIDE SURVIVORS THE PANDEMIC CONTEXT

Grief is an adaptive process that occurs after a significant loss and comprehends emotional, cognitive, physical an behavioral responses (71). Although mostly associated with the loss of a affectively close person due to death, people are subjected to multiple significant losses in their daily living, particularly in the pandemic context—loss of their health, of financial security, loss of social and affective connections, loss of freedom to move and to plan their close future (55).

Nowadays, grief is described as a two stage process, comprehending acute and integrated grief (72) (see for review). Acute grief is characterized by an intense emotional expression and predominance of negative affects, with disbelief, sadness, anxiety, disturbed sleep, excessive preoccupation and intrusive images of the deceased person, as well as an intense felling on longing and desire to be close to the lost loved one. This acute phase also encompasses a decrease in functionality in all areas of daily living—personal, social and professional. As the grieving process evolves, the individual progressively adapts to the new reality, restructuring his daily routine, social life and future projects, with negative affect and thoughts regarding the deceased diminishing in intensity and impact. This transition period usually lasts for 6–12 months. However, in the presence of internal or external disturbances, the evolution to integrated grief and the functional recovery may not occur. This persistence of acute grief manifestations has been designated complicated grief. Symptoms of complicated grief occur in up to 10% of grievers in the general population and are associated with significant psychiatric and medical morbidity (73). Complicated grief increases the risk for cancer, cardiac events, sleep disturbances, alcohol and substance abuse, major depression, anxiety disorders and self-harm behaviors, including suicide (74).

There are several identified risk factors for the development of complicated grief, including how intimate the relationship was, the degree of kinship, the type of death (for example, traumatic or sudden death), inability to say goodbye or to perform culturally approved mourning traditions, among others (75). In the world of COVID-19, many of these risk factors are affecting people worldwide. People are dying alone (either due to physical distancing or due to hospital admission) and unable to communicate with their loved ones; death and mourning rituals have been suspended and burials are being performed in mass graves and by military forces in many countries (49, 68). Dying in the pandemic context has been compared to death in the context of natural disasters, due to the elevated number of deceased people, marked unpredictability and high impact of collateral damage observed. Establishing a parallel with natural disasters, people grieving in the setting of COVID-19 pandemic, present increased baseline worry and fear due to the risk of losing their own health an, possibly, their own life (76). People grieving loved ones who lost their lives to natural disasters also present significantly higher levels of complicated grief (77).

Suicide is, by itself, a risk factor for the development of complicated grief—a sudden death, usually traumatic, many times discovered by a close contact. In fact, it has been described that more than 60% of people grieving suicide present complicated grief symptoms (74). Mitchell et al. (20) described that closer relationships to the deceased are related to higher incidence of complicated grief in suicide survivors—particularly spouses, parents and children. This should be a topic of concern to the healthcare staff, in order to provide close follow-up and adequate support this vulnerable group.

High levels of pathological grief symptoms may even persist several years after the death and be associated with comorbid post-traumatic stress disorder—an item particular to suicide

related grief (78). The risk of developing PTSD symptoms increases if death occurred by violent methods or if the family member witnessed it or found the body (12). Complicated grief in the population of suicide survivors has also been associated with increasing levels of depression and hopelessness, fewer positive future perspectives, lower perceived life satisfaction and higher suicidality risk (74, 79). Shear and Prigerson concluded that suicide survivors presenting complicated grief presented twice the rate of recurrent and current depression, when compared to individuals presenting complicated grief by other types of death (80). In a study by Latham and Prigerson suicidality remained increased during a 4 month follow up period, adding to the abovementioned risk factors for the development of psychiatric disorders in suicide survivors (79). Individuals grieving suicide are, in fact, at increased risk to attempt and complete suicide (18).

Regarding the cognitive and emotional reactions of people grieving suicide, they usually present intense shock or disbelief, greater levels of guilt, shame, anger, as well as feelings of rejection and abandonment (81). Additionally, most of them persistently experience the "agonizing questioning" about why the death occurred, why the person did not found other solution, and why they were not able to predict or help (82). One of the major obstacles for people bereaving suicide to overcome it, and if necessary ask for help, is the objective and perceived stigma. Stigma against suicide survivors comprehends the inclusion into stereotypes, the prejudice and discrimination (83), being considered pervasive and persistent (84). The internalized dimension of stigma poses a major hurdle to accede specialized help: it triggers feelings of devaluation, shame, need of secrecy, and tendency to apply negative stereotypes to oneself (85, 86). Perceived stigma is particularly harmful to people with high levels of interpersonal sensitivity, hostility and paranoid ideation, since it potentiates increased levels of psychological distress that intensifies along time (87).

Suicide amidst a pandemic poses as a double traumatic event for suicide survivors. People are trying to adjust to the contingencies of this new reality, already prone to psychological challenges, managing to maintain the healthiest routine possible and support their friends and family. Being struck by the suicide of a loved one may raise the levels of confusion, doubt, non-acceptance, hopelessness and helplessness to unbearable levels, making people mentally ill. At the present time, stigma is an important factor to be addressed. People are yet trying to handle the stigma of Sars-CoV2 infection—due to the tight sanitary measures and focus on individual responsibility, infected people are seen as uneducated and careless. Besides putting a hard toll on those diagnosed with the infection, this increases the feelings of guilt and shame, that may potentiate psychological distress. In this context, the death of a loved one to suicide may be handled as a double loss and a double picture of stigma—first, the loss of security and health, then a loss by death. This potentiates the appearance of negative outcomes and intensifies the urge to educate society about suicide and promote the adequate follow up of suicide survivors.

INTERVENTIONS

Regarding the theme of preventing complications and intervening in the grieving process of suicide survivors, first it is important to approach some strategies to prevent suicide. In terms of direct suicide prevention interventions, there is increasing evidence for multi-level systemic approaches—using components ranging from individual post-traumatic care (for example, assertive post-traumatic care, psychosocial interventions) to public health interventions (e.g., targeting general risk factors, population education on suicide, general practitioners training) (88). While the increase in telehealth services is critical, it is unlikely that the health professionals available to support them will increase to meet the needs, and services that include automated digital components may be a more efficient solution (89). As described above, people at increased risk for suicide present a number of cognitive and perceptual distortions, that can be addressed through psychotherapy. In the presence of an increased risk perception, the therapeutic objective is to help an individual to develop an accurate risk perception so that their fear is proportional to the threat. The primary strategy to be used is cognitive restructuring (39)—to identify, examine and, where appropriate, reassess the situation. Controlling stimuli to combat feelings of despair is also recommended. Although not helpful, paying attention to negative news in the media is in our nature and checking the news often can add to despair, even in the hope of more positive adds (4). Regarding non-grief losses, expressive writing in the sense of identifying and naming the loss experienced can help individuals to increase awareness of associated emotions and recognize previous strategies that have been effective in dealing with that emotion in the past. After naming losses, outlining ways to advance or change these areas of loss can help individuals to accept their loss and work to reproduce what has been lost. Useful strategies that can be used to think about current regulations in a more balanced way include: re-marking the current guidelines from "social distance" to "physical distance," remembering that individuals are now separated so that they can be together later; and reshape the situation as a time to focus, build and / or create meaningful relationships (4).

Although there is a dearth of treatment studies in suicide survivors, experts agree that: (1) initial attention should be focused on traumatic distress; (2) self-help support groups can be beneficial; and (3) there is a role for both pharmacotherapy and psychotherapy in those who already show adverse effects on mental health or at high risk for serious and persistent difficulties (90). With regard to the symptoms present in suicide survivors, some longitudinal studies have shown that women are at greater risk of depression, but not of complicated grief, after a loss by suicide than men (91). Prigerson et al. (73) showed that the symptoms of complicated grief can also be debilitating in the absence of a depressive component, although the two commonly coexist.

Pharmacotherapy has played an important role in dealing with the presence of different symptomatic expressions and different gender variations. However, it still lacks a consistent amount of empirical studies, thus leaving doubt about its

effectiveness. Contrary to the symptoms of reactive depression in grief, the symptoms of complicated grief may persist after treatment with tricyclic antidepressants (74). Pharmacotherapy can reduce depressive or anxious symptoms during bereavement, but psychotropic drugs cannot help a bereaved person in difficulty as to the personalized meaning of their loss (92–95). Focusing on individual antidepressant drugs, the literature suggests a preliminary promise for the use of bupropion (93) and escitalopram (96). In conclusion, given that there is some evidence that the use of psychiatric drugs can be beneficial in complicated grief in situations not related to suicide, pharmacotherapy can also be useful for survivors of suicide with complicated grief.

More than four decades ago, Shneidman (97) identified the provision of adequate support for suicide as a major public and mental health challenge. Postvention has become available in an increasing number of countries, and has been recognized as an important early intervention strategy in the mourners for suicide, designed to promote active follow-up and to avoid the development of psychopathological complications (98). As for the role of psychotherapy in addressing this issue, psychotherapeutic interventions to date have been designed to reduce the symptoms of complicated bereavement disorder since its inception. The treatment modalities that have proven effective include structured writing tasks (99) interpersonal psychotherapy (100), therapy for complicated grief (101, 102), and cognitive behavioral approaches transmitted face to face or via the Internet (103, 104), all of which rely on professional intervention.

Although self-help groups or counseling services for suicide survivors in the voluntary sector are steadily increasing, only a few psychotherapeutic interventions for survivors after suicide have been developed and scientifically validated. A recent systematic review included a total of 11 studies on treatment of suicide grief; however, only few of the included studies have shown evidence of efficacy in helping people suffering from uncomplicated bereavement, and empirical evidence is still lacking for interventions aimed at complicated grief disorder after suicide [for review see (105)]. Despite not being specific to grief suicide, studies support the use of cognitive behavioral therapy (CBT) (106), limited interpretive group therapy in time (107), and complicated grief therapy. Complicated grief therapy (CGT) is a modification of interpersonal psychotherapy, adding elements of cognitive behavioral therapy, exposure, gestalt and motivational interviewing. The basic principle underlying CGT is that acute grief will instinctively transition to integrated grief if the complications of pain are addressed and the natural grieving process is supported. Each session includes grief work focused on losses, as well as attention focused on restoration. Studies support the robust efficacy of CGT for the treatment of complicated grief, even in severe and chronic situations, as well as in the presence of comorbidity (108). When complicated grief occurs in the context of grief suicide, the psychiatric and psychological literature provides few, if any, empirical guidelines based (109). It is not unlikely that the abovementioned CGT may be beneficial for many CG suicide survivors, but therapy may need to be modified to give more emphasis to the recurrent themes of suicide grief: the quest to understand why, the feelings of guilt, rejection, shame, anger and the stigma.

It has also been explored whether a telephone intervention providing education and support from trained volunteers could be a cost-effective intervention to prevent complications—such as major depressive disorder or complicated grief—in the first year post suicide. During the first 6 months, the grief-related investigation did not value the scores on the grief severity scale, since they fluctuate as the acute process evolves. Authors speculate that it is precisely during this period that the complications of grief can be more effectively prevented with a supportive intervention. The primary result for this pilot proof-of-concept study shows that recently suicide grieving subjects could be recruited and retained for up to 13 months after the loss using this approach (110). These results point toward a possible alternative for an initial contact approach, given the restrictions imposed by the pandemic context. A committed, humanistic and compassionate approach would be preferable to overly directive or passive approaches. Other studies showed that an assessment addressing grief reactions and the creation of suicide narratives were crucial therapeutic aspects (111). For most suicide survivors, participation in support groups is a way of feeling understood, a place where feelings are accepted—providing a mean for catharsis. Successful support groups have common components, which include accurate information, permission for suffering, normalization of effects and behaviors that are not in line with the individual's normal state and above all, support in the process. Observing the suffering of other people who go through the same process, can be useful in helping others.

Schleider et al. (112, 113) developed and tested brief and accessible interventions, provided in non-traditional environments. They found that a single session of a solution-centered consultation was associated with a reduction in psychological distress in adults seeking psychotherapy.

Considering the growing need to prevent suicide in the context of a pandemic, on the one hand, as well as to act on suicide survivors, on the other, it is necessary to improve the access to mental healthcare, given the expected shortage of providers care (8). When organizing psychological assistance within and at various stages of the pandemic, Inchausti et al. highlight four main challenges (114): (1) deficiencies in healthcare systems—health structures are lacking both technicians and material, including mental health professionals specialized in the psychological approach to crises and emergencies (most health professionals are not trained neither in crisis and catastrophe intervention, nor in grief support for bereaved individuals); (2) the lack of knowledge of the general population, and even of health care technicians, regarding both short and long term psychological consequences of pandemics and, consequently, limited effort to provide resources to deal with them. (3) lack of structure, team hierarchy and planning of psychological interventions, particularly if applied at different levels and by professionals from different classes (from primary care services to specialized mental health

professionals)—a correct articulation is essential for an assertive treatment and adequate continuity of care, even after the acute phase of the pandemic; (4) in emergency contexts, there is always a risk associated with initial unstructured responses to the crisis, related to rapidly implemented interventions and structures associated with an excessive supply of well-intentioned but potentially not evidence-based psychological assistance (114).

In a world full of restrains, support lines and teleconsultations are an effective and necessary alternative, especially in times of crisis. Helplines were created to resolve, or minimize a crisis situation, in a time of crisis, and not to resolve a long-term situation, providing advice, referral and follow-up. In a study published by Oliveira et al. (115) it is said that assistance in the emergency line is an asset in several ways, in that it helps to save lives in the negotiation of suicide and acceptance of help, and provides emotional stabilization and counseling to many requests for psychiatric help (116).

A review of recent studies focused on the effectiveness of "telepsychological" interventions in clinical populations of adults with emotional disorders has shown that these interventions are promising. Different types of interventions using communication technologies have been reported in the literature, evidencing their effectiveness in providing mental health services in general and in epidemic situations in particular (117).

Internet-based interventions for symptoms of grief proved to be effective, with moderate to high impact that could be maintained over more than 1.5 year follow-up, with the largest effect being noticed in symptoms of PTSD (118). Despite being a population with high risk for psychiatric complications, as already mentioned, suicide survivors do not often look for professional help (119). Thus, the anonymity provided by the online environment may facilitate their access to treatment, decreasing aspects such as negative psychosocial attention or fear of stigmatization, and promoting an earlier intervention. In the context of home lockdown, as well as in countries with scarce access to specialized health care, Internet-based interventions also allow for a wider access to treatment, regardless of geographic location or transportation means. In a progressively more online society, internet-based psychotherapeutic interventions present as a captivating and flexible approach.

Most internet-based grief interventions were based on an individual setting and usually include several types of writing tasks—from more extensive and structured writing tasks. Classical grief group interventions provide many advantages to the participants, bringing to the setting important therapeutic elements—e.g., universality of suffering, group cohesion, behavioral model learning and interpersonal learning (120, 121). Regarding the online setting, studies of group interventions have been performed mainly through videoconferencing. Wagner et al. (105) studied the applicability and efficacy of an online group intervention based on CBT in individuals grieving by suicide, using webinars. Webinars and videoconferencing are the online interventions that show results more similar to traditional group interventions for people bereaved by suicide (122). The webinar intervention format was chosen to allow for simultaneous real-time interaction between the therapists and participants groups. Furthermore, webinars have the added advantages of allowing the display of videos and psychoeducational presentations in PowerPoint, as is usual in e-learning environments, and participants can remain largely anonymous, which can diminish the restrains to seek professional help. This intervention strategy led to clinical results similar to the ones of face-to-face interventions, posing as a psychotherapeutic alternative in the COVID-19 pandemic context (122).

CONCLUSION

Our world has been overwhelmed by the COVID-19 pandemic. Most of the information regarding the possible impact on populations of the pandemic on populations were discussed and assemble at the peak or toward the end of the first wave of the COVID-19 pandemic. At the time of the writing of this article, Europe and the United States of America are already under the second wave. High organizations estimate that restrictive measures might be necessary for at least 6 months to 1 year more. The economy is on decline and not having the time or opportunity to recover. The health care system is still rebuilding itself from the first wave, while trying to have better conditions to face the new surge of COVID-19 cases, as well as to answer people with other diseases, namely mental health disorders. The high risk groups mentioned above are progressively more vulnerable to the social, economic and personal constrains of the current times. Light should be shed over these populations in order to prevent further development of mental disorders and the loss of more lives. It is mandatory that mental healthcare structures are reinforced, psychological helplines restructured and multidisciplinary teams assembled and hierarchically organized. Online support and psychotherapeutic intervention is an available and effective approach. Thus, health technicians have to adapt to the reality of distant intervention and application of new technologies, in order to reach those in need in the COVID-19 world. Suicide survivors have to be actively reached for and it starts with healthcare personnel—those who contact with the suicide victim should actively signalize close contacts to psychological support teams, in order for them to feel adequately supported and to enable early intervention whenever needed.

AUTHOR CONTRIBUTIONS

All authors contributed to the bibliographic review, structuring, writing, and revision of the manuscript.

REFERENCES

1. Penela R. *Layoff simplificado chegou a 877 mil pessoas, 1 milhão e 300 mil pessoas abrangidas pelas medidas do Governo para fazer face à Covid-19*. Observador (2020). Available online at: https://observador.pt/2020/07/14/layoff-simplificado-chegou-a-877-mil-pessoas-1-milhao-e-300-mil-pessoas-abrangidas-pelas-medidas-do-governo-para-fazer-face-a-covid-19/ (accessed November 3, 2020).
2. Covid-19. *Mais 48 mil desempregados em abril. São já mais 77 mil desde o início da pandemia*. Jornal Expresso (2020). Available online at: https://expresso.pt/economia/2020-05-20-Covid-19.-Mais-48-mil-desempregados-em-abril.-Sao-ja-mais-77-mil-desde-o-inicio-da-pandemia (accessed November 3, 2020).
3. euronews. *Coronavirus: Half of Humanity on Lockdown in 90 Countries*. (2020). Available online at: https://www.euronews.com/2020/04/02/coronavirus-in-europe-spain-s-death-toll-hits-10-000-after-record-950-new-deaths-in-24-hou (accessed November 3, 2020).
4. Sanderson W, Arunagiri V, Funk A, Ginsburg K, Krychiw J, Limowski A, et al. The nature and treatment of pandemic-related psychological distress. *J. Contemp. Psychother*. (2020) 50:251–63. doi: 10.1007/s10879-020-09463-7
5. Ropeik D. *How Risky Is It, Really?: Why Our Fears Don't Always Match the Facts*. New York, NY: McGraw-Hill (2010).
6. Substance Abuse and Mental Health Services Administration. *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health (HHS Publication No. PEP19-5068, NSDUH Series H-54)*. Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration (2019). Available online at: https://www.samhs~a.gov/data/ (accessed October 30, 2020).
7. Rajkumar R. COVID-19 and mental health: a review of the existing literature. *Asian J. Psychiatry*. (2020) 52:102066. doi: 10.1016/j.ajp.2020.102066
8. Marques L, Bartuska A, Cohen J, Youn S. Three steps to flatten the mental health need curve amid the COVID-19 pandemic. *Depress. Anxiety*. (2020) 37:405–6. doi: 10.1002/da.23031
9. Fiorillo A, Gorwood P. The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. *Eur. Psychiatry*. (2020) 63:e32. doi: 10.1192/j.eurpsy.2020.35
10. World Health Organization. *Suicide*. Who.int (2019). Available online at: https://www.who.int/news-room/fact-sheets/detail/suicide (accessed November 3, 2020).
11. Feigelman B, Feigelman W. Surviving after suicide loss: the healing potential of suicide survivor support groups. *Illn. Crisis Loss*. (2008) 16:285–304. doi: 10.2190/IL.16.4.b
12. Young IT, Iglewicz A, Glorioso D, Lanouette N, Seay K, Ilapakurti M, et al. Suicide bereavement and complicated grief. *Dialogues Clin. Neurosci*. (2012) 14:177–86. doi: 10.31887/DCNS.2012.14.2
13. Berman A. Estimating the population of survivors of suicide: seeking an evidence base. *Suicide Life-Threat. Behav*. (2011) 41:110–6. doi: 10.1111/j.1943-278X.2010.00009.x
14. Andriessen K, Rahman B, Draper B, Dudley M, Mitchell P. Prevalence of exposure to suicide: a meta-analysis of population-based studies. *J. Psychiatr. Res*. (2017) 88:113–20. doi: 10.1016/j.jpsychires.2017.01.017
15. Andriessen K, Krysinska K, Grad O. Current understandings of suicide bereavement. In: Andriessen K, Krysinska K, Grad O, editors. *Postvention in Action*. Göttingen; Boston: Hogrefe (2017). p. 3–16.
16. Stroebe M, Hansson R, Schut H, Stroebe W. Bereavement research: contemporary perspectives. In: Stroebe M, Hansson R, Schut H, Stroebe W, editors. *Handbook of Bereavement Research and Practice: Advances in Theory and Intervention*. Washington, DC: American Psychological Association (2008). p. 3–25. doi: 10.1037/14498-001
17. Jordan JR. McIntosh JL. Is suicide bereavement different? A framework for rethinking the question. In: Jordan JR, McIntosh JL, editors. *Grief After Suicide: Understanding the Consequences and Caring for the Survivors*. New York, NY: Routledge (2011). p. 19–42. doi: 10.4324/9780203886045
18. Pitman A, Rantell K, Moran P, Sireling L, Marston L, King M et al. Support received after bereavement by suicide and other sudden deaths: a cross-sectional UK study of 3432 young bereaved adults. *BMJ Open*. (2017) 7:e014487. doi: 10.1136/bmjopen-2016-014487
19. Lobb E, Kristjanson L, Aoun S, Monterosso L, Halkett G, Davies A. Predictors of complicated grief: a systematic review of empirical studies. *Death Stud*. (2010) 34:673–98. doi: 10.1080/07481187.2010.496686
20. Mitchell A, Kim Y, Prigerson H, Mortimer-Stephens M. Complicated grief in survivors of suicide. *Crisis*. (2004) 25:12–8. doi: 10.1027/0227-5910.25.1.12
21. Scocco P, Castriotta C, Toffol E, Preti A. Stigma of suicide attempt (STOSA) scale and stigma of suicide and suicide survivor (STOSASS) scale: two new assessment tools. *Psychiatry Res*. (2012) 200:872–8. doi: 10.1016/j.psychres.2012.06.033
22. Erlangsen A, Pitman A. Effects of suicide bereavement on mental and physical health. In: Andriessen K, Krysinska K, Grad O, editors. *Postvention in Action*. Göttingen; Boston: Hogrefe (2017). p. 17–26.
23. Van Orden KA, Witte TK, Cukrowicz KC, Braithwaite SR, Selby EA, Joiner TE Jr. The interpersonal theory of suicide. *Psychol. Rev*. (2010) 117:575–600. doi: 10.1037/a0018697
24. Wasserman IM. The impact of epidemic, war, prohibition and media on suicide: United States, 1910–1920. *Suicide Life Threat. Behav*. (1992) 22:240–54.
25. Cheung YT, Chau PH, Yip PS. A revisit on older adults suicides and severe acute respiratory syndrome (SARS) epidemic in Hong Kong. *Int. J. Geriatr. Psychiatry*. (2008) 23:1231–38. doi: 10.1002/gps.2056
26. Chan S, Chiu F, Lam C, Leung P, Conwell Y. Elderly suicide and the 2003 SARS epidemic in Hong Kong. *Int. J. Geriatr. Psychiatry*. (2006) 21:113–8. doi: 10.1002/gps.1432
27. Barbisch D, Koenig K, Shih F. Is there a case for quarantine? perspectives from SARS to Ebola. *Disaster Med. Public Health Preparedness*. (2015) 9:547–53. doi: 10.1017/dmp.2015.38
28. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. (2020) 395:912–20. doi: 10.1016/S0140-6736(20)30460-8
29. Hawryluck L, Gold W, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infect. Dis*. (2004) 10:1206–12. doi: 10.3201/eid1007.030703
30. Lee T, Chi I, Chung L, Chou K. Ageing and psychological response during the post-SARS period. *Aging Mental Health*. (2006) 10:303–11. doi: 10.1080/13607860600638545
31. Milner A, Page A, LaMontagne AD. Long-term unemployment and suicide: a systematic review and meta-analysis. *PLoS ONE*. (2013) 8:e51333. doi: 10.1371/journal.pone.0051333
32. Reeves A, McKee M, Stuckler D. Economic suicides in the great recession in Europe and North America. *Br. J. Psychiatry*. (2014) 205:246–7. doi: 10.1192/bjp.bp.114.144766
33. Nordt C, Warnke I, Seifritz E, Kawohl W. Modelling suicide and unemployment: a longitudinal analysis covering 63 countries, 2000–11. *Lancet Psychiatry*. (2015) 2:239–45. doi: 10.1016/S2215-0366(14)00118-7
34. International Monetary Fund. *World Economic Outlook, April 2020: Chapter 1*. Washington, DC: International Monetary Fund (2020).
35. Fernandes N. *Economic Effects of Coronavirus Outbreak (COVID-19) on the World Economy*. IESE Business School Working Paper No. WP-1240-E (2020) p. 33. doi: 10.2139/ssrn.3557504
36. Kawohl W, Nordt C. COVID-19, unemployment, and suicide. *Lancet Psychiatry*. (2020) 7:389–90. doi: 10.1016/S2215-0366(20)30141-3
37. Mcintyre RS, Lee Y. Preventing suicide in the context of the COVID-19 pandemic. *World Psychiatry*. (2020) 19:250–1. doi: 10.1002/wps.20767
38. McIntyre RS, Lee Y. Projected increases in suicide in Canada as a consequence of COVID-19. *Psychiatry Res*. (2020) 290:113104. doi: 10.1016/j.psychres.2020.113104
39. Gross JJ, John OP. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *J. Pers. Soc. Psychol*. (2003) 85:348–62. doi: 10.1037/0022-3514.85.2.348
40. Papa A, Lancaster NG, Kahler J. Commonalities in grief responding across bereavement and non-bereavement losses. *J. Affect. Disord*. (2014) 161:136–43. doi: 10.1016/j.jad.2014.03.018
41. Beck AT, Steer RA, Brown GK. Manual for the beck depression inventory-II. San Antonio, TX: Psychological Corporation (1996). doi: 10.1037/t00742-000

42. Ito TA, Larsen JT, Smith NK, Cacioppo JT. Negative information weighs more heavily on the brain: the negativity bias in evaluative categorizations. *J. Pers. Soc. Psychol.* (1998) 75:887–900. doi: 10.1037/0022-3514.75.4.887
43. Armitage R, Nellums LB. COVID-19 and the consequences of isolating the elderly. *Lancet Public Health*. (2020) 5:e256. doi: 10.1016/S2468-2667(20)30061-X
44. Yao H, Chen J-H, Xu Y-F. Rethinking online mental health services in China during the COVID-19 epidemic. *Asian J. Psychiatry*. (2020) 51:102015. doi: 10.1016/j.ajp.2020.102015
45. Tsai J, Wilson M. COVID-19: a potential public health problem for homeless populations. *Lancet Public Health*. (2020) 5:e186–7. doi: 10.1016/S2468-2667(20)30053-0
46. Liem A, Wang C, Wariyanti Y, Latkin CA, Hall BJ. The neglected health of international migrant workers in the COVID-19 epidemic. *Lancet Psychiatry*. (2020) 7:E20. doi: 10.1016/S2215-0366(20)30076-6
47. Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: mental health consequences and target populations. *Psychiatry Clin. Neurosci.* (2020) 74:281–2. doi: 10.1111/pcn.12988
48. Santini ZI, Jose PE, York Cornwell E, Koyanagi A, Nielsen L, Hinrichsen C, et al. Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. *Lancet Public Health*. (2020) 5:e62–e70. doi: 10.1016/S2468-2667(19)30230-0
49. Rosenbaum L. Facing Covid-19 in Italy - Ethics, logistics, and therapeutics on the epidemic's front line. *N. Engl. J. Med.* (2020). 382:1873–5. doi: 10.1056/NEJMp2005492
50. Demyttenaere K, Bruffaerts R, Posada-Villa J, Gasquet I, Kovess V, Lepine JP, et al. WHO World Mental Health Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *J. Am. Med. Assoc.* (2004) 291:258190. doi: 10.1001/jama.291.21.2581
51. Lee AM, Wong JG, McAlonan GM, Cheung V, Cheung C, Sham PC, et al. Stress and psychological distress among SARS survivors 1 year after the outbreak. *Can. J. Psychiatry*. (2007) 52:233–40. doi: 10.1177/070674370705200405
52. Reger MA, Stanley IH, Joiner TE. Suicide mortality and coronavirus disease 2019 - a perfect storm? *JAMA Psychiatry*. (2020) 77:1093–4. doi: 10.1001/jamapsychiatry.2020.1060
53. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 Coronavirus Disease (COVID-19) epidemic among the general population in China. *IJERPH*. (2020) 17:1729. doi: 10.3390/ijerph1705 1729
54. Zandifar A, Badrfam R. Iranian mental health during the COVID-19 epidemic. *Asian J. Psychiatry*. (2020) 51:101990. doi: 10.1016/j.ajp.2020.101990
55. Wallace CL, Wladkowski SP, Gibson A, White P. Grief during the COVID-19 pandemic: considerations for palliative care providers. *J. Pain Symptom Manage.* (2020) 60:e70–6. doi: 10.1016/j.jpainsymman.2020.04.012
56. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry*. (2020) 7:e14. doi: 10.1016/S2215-0366(20)30 047-X
57. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw. Open*. (2020) 3:e203976. doi: 10.1001/jamanetworkopen.2020. 3976
58. Centers for Disease Control and Prevention. *Emergency Responders: Tips for Taking Care of Yourself*. (2018). Available online at: https://emergency.cdc.gov/coping/responders.asp (accessed October 15, 2020).
59. Pendry PS. Moral distress: recognizing it to retain nurses. *Nurs. Econ.* (2007) 25:217 21. Available online at: https://europepmc.org/article/med/17847657.
60. Fumis RRL, Amarante GAJ, de Fatima Nascimento A, Junior JMV. Moral distress and its contribution to the development of burnout syndrome among critical care providers. *Ann. Intensive Care.* (2017) 7:71. doi: 10.1186/s13613-017-0293-2
61. Sher L. Are COVID-19 survivors at increased risk for suicide? *Acta Neuropsychiatrica.* (2020) 32:270. doi: 10.1017/neu.2020.21
62. Sher L. Resilience as a focus of suicide research and prevention. *Acta Psychiatr. Scand.* (2019) 140:169–80. doi: 10.1111/acps.13059
63. Mamun MA, Griffiths MD. Young teenage suicides in Bangladesh - are mandatory junior school certificate exams to blame? *Int J Ment Health Addict.* (2020). doi: 10.1007/s11469-020-00275-3
64. Goyal K, Chauhan P, Chhikara K, Gupta P, Singh MP. Fear of COVID 2019: first suicidal case in India! *Asian J. Psychiatry*. (2020) 49:101989. doi: 10.1016/j.ajp.2020.101989
65. News ABC. *Authorities: Man's COVID-19 Worries Prompt Murder-Suicide*. ABC News (2020). Available online at: https://abcnews.go.com/US/wireStory/authorities-mans-covid-19-worries-promptmurder-suicide-69997314 (accessed September 25, 2020).
66. TODAYonline. *Covid-19: German Minister Commits Suicide After "Virus Crisis Worries"*. TODAYonline (2020). Available online at: https://www.todayonline.com/world/covid-19-german-minister-commits-suicide-after-virus-crisis-worries (accessed September 10, 2020).
67. WZZM13. *Suicide Dangers Grow During COVID-19 Pandemic*. WZZM13.com (2020). Available online at: https://www.paho.org/en/news/10-9-2020-covid-19-pandemic-exacerbates-suicide-risk-factors (accessed September 20, 2020).
68. Wand APF, Zhong B-L, Chiu HFK, Draper B, De Leo D. Covid-19: the implications for suicide in older adults. *Int. Psychogeriatr.* (2020) 32:1–16. doi: 10.1017/S1041610220000770
69. Griffiths MD, Mamun MA. COVID-19 suicidal behavior among couples and suicide pacts: case study evidence from press reports. *Psychiatry Res.* (2020) 289:113105. doi: 10.1016/j.psychres.2020.113105
70. Thakur V, Jain A. COVID 2019-suicides: a global psychological pandemic. *Brain, Behav. Immun.* (2020) 88:952–3. doi: 10.1016/j.bbi.2020.04.062
71. Worden JW. Grief counseling and grief therapy : a handbook for the mental health practitioner. New York, NY: Springer Publishing Company, LLC (2018). doi: 10.1891/9780826134752
72. ZiSooK S, Shear K. Grief and bereavement: what psychiatrists need to know. *World Psychiatry*. (2009) 8:67–74. doi: 10.1002/j.2051-5545.2009.tb00217.x
73. Prigerson HG, Frank E, Kasl SV, Reynolds 3rd CF, Anderson B, Zubenko GS, et al. Complicated grief and bereavement related depression as distinct disorders: preliminary empirical validation in elderly bereaved spouses. *Am J Psychiatry*. (1995) 152:22–30. doi: 10.1176/ajp.152.1.22
74. Bellini S, Erbuto D, Andriessen K, Milelli M, Innamorati M, Lester D, et al. Depression, hopelessness, and complicated grief in survivors of suicide. *Front. Psychol.* (2018) 8:198. doi: 10.3389/fpsyg.2018.00198
75. Castle J, Phillips WL. Grief rituals: aspects that facilitate adjustment to bereavement. *J. Loss Trauma.* (2003) 8:41–71. doi: 10.1080/15325020305876
76. Kristensen P, Lars W, Trond H. Predictors of complicated grief after a natural disaster: a population study two years after the 2004 South-East Asian tsunami. *Death Stud.* (2010) 34:137–50. doi: 10.1080/07481180903492455
77. Eisma MC, Lenferink LIM, Chow AYM, Chan CLW, Li J. Complicated grief and post-traumatic stress symptom profiles in bereaved earthquake survivors: a latent class analysis. *Eur. J. Psychotraumatol.* (2019) 10:1558707. doi: 10.1080/20008198.2018.1558707
78. Maciejewski PK, Zhang B, Block SD, Prigerson HG. An empirical examination of the stage theory of grief. *JAMA*. (2007) 297:716. doi: 10.1001/jama.297.7.716
79. Latham AE, Prigerson HG. Suicidality and bereavement: complicated grief as psychiatric disorder presenting greatest risk for suicidality. *Suicide Life Threat. Behav.* (2004) 34:350–62. doi: 10.1521/suli.34.4.350.53737
80. Shear K, Skritskaya N, Wang Y, Duan N, Mauro C, Ghesquiere A. Suicide bereavement and complicated grief. In: *Poster Presented at: 49th Annual Meeting of the American College of Neuropsychopharmacology*. Waikoloa, HI (2011).
81. Jordan JR. Bereavement after suicide. *Psychiatric Ann.* (2008) 38:679–85. doi: 10.3928/00485713-20081001-05
82. Van Dongen CJ. Agonizing questioning. *Nurs. Res.* (1990) 39:224–9. doi: 10.1097/00006199-199007000-00011

83. Corrigan PW, Sheehan L, Al-Khouja MA, Lewy S, Major DR, Mead J, et al. Insight into the stigma of suicide loss survivors: factor analyses of family stereotypes, prejudices, and discriminations. *Arch. Suicide Res*. (2017) 22:57–66. doi: 10.1080/13811118.2016.1275993
84. Tadros G, Jolley D. The stigma of suicide. *Br. J. Psychiatry*. (2001) 179:178. doi: 10.1192/bjp.179.2.178
85. Corrigan PW. The impact of stigma on severe mental illness. *Cogn. Behav. Pract*. (1998) 5:201–22. doi: 10.1016/S1077-7229(98)80006-0
86. Link BG, Phelan JC. Stigma and its public health implications. *Lancet*. (2006) 367:528–9. doi: 10.1016/S0140-6736(06)68184-1
87. Scocco P, Toffol E, Totaro S, Castriotta C, Ferrari A. Postvention initiatives in Italy. In: Andriessen K, Krysinska K, Grad O, editors. *Postvention in Action*. Boston: Hogrefe (2017). p. 335–40.
88. Krysinska K, Batterham PJ, Tye M, Shand F, Calear AL, Cockayne N, et al. Best strategies for reducing the suicide rate in Australia. *Aust. N. Z. J. Psychiatry*. (2016) 50:115–8. doi: 10.1177/0004867415620024
89. Deady M, Tan L, Kugenthiran N, Collins D, Christensen H, Harvey SB. Unemployment, suicide and COVID-19: using the evidence to plan for prevention. *Med. J. Aust*. (2020) 213:153–4.e1. doi: 10.5694/mja2.50715
90. Sakinofsky I. The aftermath of suicide: managing survivors' bereavement. *Can. J. Psychiatry*. (2007) 52(Suppl 1):129S−136S.
91. de Groot M, Kollen BJ. Course of bereavement over 8-10 years in first degree relatives and spouses of people who committed suicide: longitudinal community based cohort study. *Br. Med. J*. (2013) 347:f5519. doi: 10.1136/bmj.f5519
92. Reynolds 3rd CF, Miller MD, Pasternak RE, Frank E, Perel JM, Cornes C, et al. Treatment of bereavement related major depressive episodes in later life: a controlled study of acute and continuation treatment with nortriptyline and interpersonal psychotherapy. *Am. J. Psychiatry*. (1999) 156:202–8.
93. Zisook S, Shuchter SR, Pedrelli P, Sable J, Deaciuc SC. Bupropion sustained release for bereavement: results of an open trial. *J. Clin. Psychiatry*. (2001) 62:227–30. doi: 10.4088/JCP.v62n0403
94. Zygmont M, Prigerson HG, Houck PR, Miller MD, Shear MK, Jacobs S, et al. A *post hoc* comparison of paroxetine and nortriptyline for symptoms of traumatic grief. *J. Clin. Psychiatry*. (1998) 59:241–5. doi: 10.4088/JCP.v59n0507
95. Pasternak RE, Reynolds CF, Schlernitzauer M, Hoch CC, Buysse DJ, Houck PR, et al. Acute open-trial nortriptyline therapy of bereavement-related depression in late life. *J. Clin. Psychiatry*. (1991) 52:307–10.
96. Simon NM, Thompson EH, Pollack MH, Shear MK. Complicated grief: a case series using escitalopram. *Am. J. Psychiatry*. (2007) 164:1760–1. doi: 10.1176/appi.ajp.2007.07050800
97. Shneidman ES. *Deaths of Man*. New York, NY: Aronson (1973).
98. World Health Organization. *Preventing Suicide: A Global Imperative*. Geneva: World Health Organization.
99. Peri T, Hasson-Ohayon I, Garber S, Tuval-Mashiach R, Boelen PA. Narrative reconstruction therapy for prolonged grief disorder-rationale and case study. *Eur. J. Psychotraumatol*. (2016) 7:30687. doi: 10.3402/ejpt.v7.30687
100. Shear K, Frank E, Houck PR, Reynolds CF. Treatment of complicated grief: a randomized controlled trial. *JAMA*. (2005) 293:2601–8. doi: 10.1001/jama.293.21.2601
101. Doering BK, Eisma MC. Treatment for complicated grief: state of the science and ways forward. *Curr. Opin. Psychiatry*. (2016) 29:286–91. doi: 10.1097/YCO.0000000000000263
102. Wetherell JL. Complicated grief therapy as a new treatment approach. *Dialogues Clin. Neurosci*. (2012) 14:159–66. doi: 10.31887/DCNS.2012.14.2/jwetherell
103. Litz BT, Schorr Y, Delaney E. A randomized controlled trial of an Internet-based therapist-assisted indicated preventive intervention for prolonged grief disorder. *Behav. Res. Ther*. (2004) 61:23–34. doi: 10.1016/j.brat.2014.07.005
104. Weissman MM, Markowitz JC, Klerman GL. *Comprehensive Guide to Interpersonal Psychotherapy*. New York, NY: Basic Books, Cop (2000).
105. Wagner B, Hofmann L, Maaß U. Online-group intervention after suicide bereavement through the use of webinars: study protocol for a randomized controlled trial. *Trials*. (2020) 21:45. doi: 10.1186/s13063-019-3891-5
106. Boelen PA, Prigerson HG. The influence of symptoms of prolonged grief disorder, depression, and anxiety on quality of life among bereaved adults. *Eur. Arch. Psychiatr. Clin. Neurosci*. (2007) 257:444–52. doi: 10.1007/s00406-007-0744-0
107. Piper WE, McCallum M, Joyce AS, Rosie JS, Ogrodniczuk JS. Patient personality and time-limited group psychotherapy for complicated grief. *Int. J. Group Psychother*. (2001) 51:525–52. doi: 10.1521/ijgp.51.4.525.51307
108. Wittouck C, Van Autreve S, De Jaegere E, Portzky G, van Heeringen K. The prevention and treatment of complicated grief: a meta-analysis. *Clin. Psychol. Rev*. (2011) 31:69–78. doi: 10.1016/j.cpr.2010.09.005
109. Jordan JR, McMenamy J. Interventions for suicide survivors: a review of the literature. *Suicide Life Threat. Behav*. (2004) 34:337–49. doi: 10.1521/suli.34.4.337.53742
110. Miller MD, Stack J, Reynolds III CF. A two-tiered strategy for preventing complications of bereavement in the first thirteen months post-loss: a pilot study using peer supports with professional therapist back-up. *Am. J. Geriatr. Psychiatry*. (2018) 26:350–7. doi: 10.1016/j.jagp.2017.05.011
111. Andriessen K, Krysinska K. A psycho-educational perspective on family involvement in suicide prevention and postvention. In: D. Wasserman, editor. *Suicide: An Unnecessary Death*, *2nd Edn*. Oxford: Oxford University Press (2016). p. 333–44. doi: 10.1093/med/9780198717393.003.0032
112. Schleider JL. Single-session consultation for emotional and behavioral health. *PsyArXiv* (2020). doi: 10.17605/OSF.IO/XNZ2T
113. Schleider JL, Sung J, Bianco A, Gonzalez A, Vivian D, Mullarkey MC. *Open Pilot Trial of a Single Session Consultation Service for Clients on Psychotherapy Waitlists*. (2020). Available online at: https://psyarxiv.com/fdwqk (accessed October 15, 2020).
114. Inchausti F, MacBeth A, Hasson-Ohayon I, Dimaggio G. Psychological intervention and COVID-19: what we know so far and what we can do. *J. Contemp. Psychother*. (2020) 1–8. doi: 10.31234/osf.io/8svfa. [Epub ahead of print].
115. Oliveira V, Rosado T, Salazar S, Gonçalves G, Pereira J, Cunha M, Faria J. A intervenção Psicológica Em Situações De Crise Numa Central de Emergência Médica: 9 Meses de Experiência. *Rev. Psicologia Militar*. (2009) 18:339–58.
116. Serra CM, Pires D, Faria J, Pereira M, Ângelo RP, Guerreiro VO. Intervenção em Crise por Telefone, in Intervenção Psicológica em Crise e Catástrofe. Ordem dos Psicólogos Portugueses. (2015) 115–123.
117. Ribeiro E, Sampaio A, Gonçalves MM, Taveira MDC, Cunha J, Maia Â, et al. Telephone-based psychological crisis intervention: the Portuguese experience with COVID-19. *Couns. Psychol. Q*. (2020). doi: 10.1080/09515070.2020.1772200
118. Wagner B, Maercker A. A 1.5-year follow-up of an internet-based intervention for complicated grief. *J. Trauma Stress*. (2007) 20:625–9. doi: 10.1002/jts.20230
119. Pitman A, Osborn DP, Rantell K, King MB. Bereavement by suicide as a risk factor for suicide attempt: a cross-sectional national UK-wide study of 3432 young bereaved adults. *BMJ Open*. (2016) 6:e009948. doi: 10.1136/bmjopen-2015-009948
120. Dyregrov K, Dyregrov A, Johnsen I. Participants' recommendations for the ideal grief group: a qualitative study. *Omega*. (2013) 67:363–77. doi: 10.2190/OM.67.4.b
121. Lieberman MA, Yalom I. Brief group psychotherapy for the spousally bereaved: a controlled study. *Int. J. Group Psychother*. (1992) 42:117–32. doi: 10.1080/00207284.1992.11732583
122. Backhaus A, Agha Z, Maglione ML, Repp A, Ross B, Zuest D, et al. Videoconferencing psychotherapy: a systematic review. *Psychol. Serv*. (2012) 9:111. doi: 10.1037/a0027924

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

OPINION
published: 26 January 2021
doi: 10.3389/fpsyt.2021.638866

"In the Same Storm, but Not on the Same Boat": Children Grief During the COVID-19 Pandemic

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Keywords: COVID-19, grief, death, children, childhood, bereavement

INTRODUCTION

COVID-19 has profoundly shaken the world and changed the lives of children and families. People around the world are mourning a sense of freedom, normalcy, and routine. However, although in the same "storm," children are not on the same boat as adults. Children may be at a higher risk for mental health effects, given their limited capacity to understand their surroundings, cope with stressors, and control their environments. In fact, research already demonstrates that COVID-19-related rates of depression and anxiety are prevalent among children and adolescents (1).

Research has shown that victims of the virus will likely leave behind a large number of grieving children and grandchildren, with rates of 2.2 children and 4.1 grandchildren bereaved for each person who dies (2). There is evidence on the failure of addressing the needs of bereaved children proactively and on an ongoing basis (3), which may result in poor mental and physical health (4). Also, it is estimated that 5 to 10% of children and adolescents who suffer the loss of a loved one develop clinically significant psychiatric difficulties (5); this number may be higher given the specificities of loss in the context of COVID-19. Finally, the evidence on childhood trauma and loss as a risk factor for adult psychopathology (6), highlights the need for early identification and intervention.

The development of specific knowledge about children grief under the COVID-19 circumstance is therefore urgent. This opinion paper aimed at highlighting the challenges and needs of grieving children.

CHILDREN'S PARTICULAR VULNERABILITY

Children may experience various stressors related to COVID-19, such as disruptions to their routines, worrying about friendships changing, not being able to catch up academically, while also grieving the loss of childhood rites of passage, such as school ceremonies and events or organized sports. Other factors pertain to the experience of an intensive fear of themselves or a loved one contracting the virus and exposure to disturbing media content or distressing adult conversations. Also, children might be more distant from those who might support them—friends, teachers, wider family–and some, especially those which parents are essential workers or first responders, might be physically distant from their caregivers. Similarly, economic instability, job loss, or disrupted access to healthcare or other support services might be present. All of this can increase family stress and conflict, abuse and domestic violence (7). If, in the context of these already challenging stressors a death in the family occurs, the impact is undoubtedly paramount.

OPEN ACCESS

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *07 December 2020*
Accepted: *04 January 2021*
Published: *26 January 2021*

Citation:
Albuquerque S and Santos AR (2021) "In the Same Storm, but Not on the Same Boat": Children Grief During the COVID-19 Pandemic. Front. Psychiatry 12:638866. doi: 10.3389/fpsyt.2021.638866

The particular circumstances associated with COVID-19 deaths may constitute a significant risk factor for children's grief process, as studies have shown that unexpected and sudden losses or contexts of multiples deaths in the family are particularly impactful, even in the absence of previous psychological vulnerability (8). In the current context, people may sicken and die quite swiftly and a sense of unpredictability and shock may prevail, even if the person that died had already a frail physical health. Also, children won't be able to spend time with their dying relative or possibly attend the funeral due to sanitary restrictions.

In addition, children may be dealing with this for the first time, and therefore have less knowledge on life and death issues. They are more prone to misinterpret the available information and, personally, have no roadmap regarding expected feelings, reactions and possible coping strategies. Also, the tendency that younger children have to live more in the present, with moments of expression of suffering being more transitory, might contribute to underestimate the impact of the loss (9).

Other aspects that may contribute to this underestimation are the misperception that the loss was somewhat expected (e.g., due to the advance age or pre-existing illness of the deceased), the social stigma against the COVID-19 patients and their families (10) and the dehumanization of death as it is simply presented as statistics.

EMOTIONAL REGULATION CHALLENGES IN GRIEVING CHILDREN

Children are observed to express their sadness and anger in a sporadic manner, interspersed with long periods of normal behavior and activity such as play (11). These transitions between bursts of sadness and normal behavior resemble the concept of oscillation in the Dual Process Model (12), defined as a back and forth in focusing feelings of grief and loss (Loss coping orientation–LO) and coping with everyday life stressors and taking a "time off" from grieving (Restoration coping orientation–RO).

The circumstances of death and dying in the current context may pose particular challenges to this important self-regulatory strategy. Firstly, children are in nature more restorative but access to activities (e.g., play dates with friends, sports, extra-curricular activities) that might contribute to respite from the sadness and loss, are currently more limited. On the other hand, the death-related cues (masks, stories of people affected by COVID, media exposure) may compromise RO coping as children are constantly being reminded of the death (7).

To make this context even more complex, not only has the child suffered a significant loss, but the person they would usually turn to—their parents–may be too distressed to provide adequate support. Parents may be experiencing an overload of RO stressors (13), as some may be faced with job or financial uncertainties; and juggling multiple roles and needs at the same time (e.g., working from home and having to care for the children at the same time). Parents may also be grieving a significant loss themselves (e.g., loss of partner or loss of their mother or father). Children rely deeply on the functioning of the parent, who is vital in modeling, supporting and giving permission for the child's grieving (14). The perception of vulnerability in the parents and the will to protect them may stop children from talking about their reactions (15), which may compromise the focus in LO coping strategies. Similarly, missing final moments with the loved one, not having the chance to say goodbye and participating in the funeral may contribute to feelings that the person's death doesn't feel real and that something is unfinished or unresolved (16).

CHALLENGES IN IDENTIFYING CHILDREN AT GREATER RISK

Early and accurate identification of mental health problems is key to early intervention. However, identifying children's maladaptive grief is challenging. Firstly, there may be symptoms and behaviors with significant impact but that they do not recognize as being related to the loss (9). Typically, these reactions take the form of physical symptoms or maladaptive behaviors that can mimic other mental health issues; for example, it can manifest as aggressive or oppositional behavior and be mislabeled with oppositional defiant disorder.

Also, predictions of delayed grief—suppressed, postponed or inhibited grief responses—have been proposed (17) and this may be a particular risk for children. A mediating factor in this type of reaction is the lack of social support at the time of loss (9), which may be exacerbated due to current social restrictions and depletion of emotional resources in the caregivers (e.g., parents).

Finally, loss in childhood should be examined in the context of a child's cognitive, emotional, and social development (18). As children's development is ongoing, so is their grief. Feelings of loss are often continually processed as children gain more understanding of their loss (19). Therefore, children grief can manifest in different ways throughout their development and lifespan, adding complexity to its adequate evaluation.

THE VALUE OF INFORMATION AND COMMUNICATION

Research had shown that children want to receive more information about the death from their parents as they went through the grieving process (20). Having access to information, with the due cautions, in the context of the pandemic, is especially important as the scenarios are often unpredictable and constantly changing. Therefore, it is important to reflect on the potential obstacles to this communication. Adults may believe that by not speaking, they are protecting the child, as if this protection relieved the pain and changed the reality of the loss (16, 21). Also, it might be helpful for adults to gain awareness of their patterns of coping strategies with their own suffering and death and how these may impede connecting and communicating with the child. Children of all ages often know more about what is happening than adults realize (21); they might overhear conversations or phone calls; they can be given information—not always accurate—by others; and very often they intuitively pick up on changes in their family's mood and emotions. Children

depend on their parents or significant adults to acquire their information about the world, to learn about what to do with their emotional pain and to access the truth. However, balancing truth with reassurance is critical (9). In the current context it is important to provide information about the virus, its different effects on the body and stages of the loved one's illness, and on the death, always in line with the needs and questions of the child.

Also, school can serve as a safe haven, especially under the current circumstance as parental support might be less available. Schools should therefore have information on grief symptoms and impact on school behavior. Also, the needs of bereaved children should be addressed proactively and on an ongoing basis, with respect for autonomy and freedom in students' emotional expression (16). In addition, school-based interventions focusing on improving children's well-being are important. A systematic review highlighted promising results in this area of school-based randomized controlled trials focusing on enhancing youth's emotional and social skills (22). Examples of recognizable features of positive youth development consist of bonding, social, emotional, cognitive, behavioral, and moral competence; resilience, self-determination, spirituality, self-efficacy, clear and positive identity, belief in the future, prosocial norms (healthy standards for behavior); recognition of positive behavior and opportunities for prosocial involvement (23). With grieving children, it is important to also acknowledge a more positive view of mental health.

CONCLUSION

When facing grief in the context of COVID-19, children and adults are not in the same boat, as they use different ways to sailing, stop or survive. The recognition of these differences is essential to adequately attend to the child's needs. Nevertheless, grieving in the current context can be a great equalizer between children and adults. The COVID-19 pandemic has altered the perception of security and predictability essential for all when looking at the world and relationships. Both adults and children experience changes in their routine, social limitations and the pain of not saying goodbye. Enhanced empathy and connectedness through this shared experience is possible but only if the culture of silence surrounding death is not perpetuated. In this opinion paper we aimed at increasing awareness for grieving children needs and challenges in the current context in the hope that it may inform not only intervention but also prevention strategies of bereavement complexities.

AUTHOR CONTRIBUTIONS

SA and AS contributed to the development of the idea and the literature research and the writing of the manuscript. All authors contributed to the article and approved the submitted version.

REFERENCES

1. Loades ME, Chatburn E, Higson-Sweeney N, Reynolds S, Shafran R, Brigden A, et al. Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *J Am Acad Child Adolescent Psychiatry*. (2020) 59:1218–39.e3. doi: 10.1016/j.jaac.2020.05.009
2. Verdery AM, Smith-Greenaway E, Margolis R, Daw J. Tracking the reach of COVID-19 kin loss with a bereavement multiplier applied to the United States. *Proc Natl Acad Sci USA*. (2020) 117:17695–701. doi: 10.1073/pnas.2007476117
3. Holland J. How schools can support children who experience loss and death. *British J Special Educ*. (2008) 36:411–24. doi: 10.1080/03069880802364569
4. Zhai Y, Du X. Loss and grief amidst COVID-19: a path to adaptation and resilience. *Brain Behavior Immunity*. (2020) 87:80–1. doi: 10.1016/j.bbi.2020.04.053
5. Spuij M, Prinzie P, Dekovic M, van den Bout J, Boelen PA. The effectiveness of Grief-Help, a cognitive behavioural treatment for prolonged grief in children: study protocol for a randomised controlled trial. *Trials*. (2013) 14:395. doi: 10.1186/1745-6215-14-395
6. Jacobs JR, Bovasso GB. Re-examining the long-term effects of experiencing parental death in childhood on adult psychopathology. *J Nervous Mental Dis*. (2009) 197:24–7. doi: 10.1097/NMD.0b013e3181927723
7. Stroebe M, Schut H. Bereavement in times of COVID-19: a review and theoretical framework. *OMEGA J Death Dying*. (2020) 82:500–22. doi: 10.1177/0030222820966928
8. Weinberg N. Self-blame, other blame, and desire for revenge: factors in recovery from bereavement. *Death Stud*. (1994) 18:583–93. doi: 10.1080/07481189408252702
9. Worden J. *Grief Counseling and Grief Therapy: A Handbook for the Mental Health Practitioner (3rd ed.)*. New York, NY: Routledge. (2001).
10. Eisma MC, Boelen PA, Lenferink L. Prolonged grief disorder following the Coronavirus (COVID-19) pandemic. *Psychiatry Res*. (2020) 288:113031. doi: 10.1016/j.psychres.2020.113031
11. Webb NB. *Helping Bereaved Children, third Edition - A Handbook for Practitioners*. New York, NY: Guilford.
12. Stroebe MS, Schut H. The dual process model of coping with bereavement: rationale and description. *Death Stud*. (1999) 23:197–224. doi: 10.1080/074811899201046
13. Stroebe M, Schut H. Overload: a missing link in the dual process model? *OMEGA J Death Dying*. (2016) 74:96–109. doi: 10.1177/0030222816666540
14. Biank NM, Werner-Lin A. Growing up with grief: revisiting the death of a parent over the life course. *OMEGA J Death Dying*. (2011) 63:271–90. doi: 10.2190/OM.63.3.e
15. Dyregrov K, Dyregrov A. Siblings after suicide - "the forgotten bereaved". *Suicide Life Threat. Behav*. (2005) 35:714–24. doi: 10.1521/suli.2005.35.6.714
16. Trozzi M, Missimini K. *Talking with Children about Loss: Words, Strategies, and Wisdom to Help Children Cope with Death, Divorce and Other Difficult Times*. London: Penguin Group (1999).
17. Inchausti F, MacBeth A, Hasson-Ohayon I, Dimaggio G. Psychological intervention and COVID-19: what we know so far and what we can do. *J Contemp. Psychother*. (2020) 50:243–50. doi: 10.1007/s10879-020-09460-w
18. Paris MM, Carter BL, Day SX, Armsworth MW. Grief and trauma in children after the death of a sibling. *J Child Adolescent Trauma*. (2009) 2:71–80 doi: 10.1080/19361520902861913
19. Oltjenbruns KA. Developmental context of childhood: grief and regrief phenomena. In: Stroebe MS, Hansson RO, Stroebe W, and Schut H, editors. *Handbook of Bereavement Research: Consequences, Coping and Care*. Washington, DC: American Psychological Association (2001). p. 169–197. doi: 10.1037/10436-007
20. Martinčeková L, Jiang MJ, Adams JD, Menendez D, Hernandez IG, Barber G, et al. Do you remember being told what happened to grandma? The role of early socialization on later coping with death. *Death Stud*. (2018) 44:78–88. doi: 10.1080/07481187.2018.1522386
21. Goldman L. *Great Answers to Difficult Questions About Death – What Children Need to Know*. London: Jessica Kingsley Publishers (2009).

22. Sancassiani F, Pintus E, Holte A, Paulus P, Moro MF, Cossu G, et al. Enhancing the emotional and social skills of the youth to promote their wellbeing and positive development: a systematic review of universal school-based randomized controlled trials. *Clin Pract Epidemiol Mental Health.* (2015) 11:21–40. doi: 10.2174/1745017901511010021
23. Catalano RF, Berglund ML, Ryan JAM, Lonczak HS, Hawkins JD. Positive youth development in the united states: research findings on evaluations of positive youth development programs. *Ann Am Acad Pol Soc Sci.* (2004) 591:98–124. doi: 10.1177/0002716203260102

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

PERSPECTIVE
published: 28 January 2021
doi: 10.3389/fpsyt.2021.626648

First Person Account COVID 19 Delirium in a Doctor: When Death Stalks the Mind

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Previous studies reported that 20–30% of COVID-19 patients will develop delirium during the hospitalization, achieving 70% in cases of severe illness. The risks factors and the consequences of delirium are well-documented in the literature; however, little is known about the personal experience of delirium. Delirium burden is common and tends to be distressing even after the delirium episode has resolved. Taking this in mind, the present work provides a first-person account of a doctor who acquired Covid-19 and developed bilateral pneumonia and had delirium and a complicate course of illness. During the course of his delirium, the patient recalled experiences of reality and unreality, complete disorientation, lack of control, strong emotions, and intense fear of dying which was significantly distressing. We anticipate that delirium burden will be common on these patients and family members and clinicians should be aware of this phenomenon in order to evaluate the neuropsychiatric consequences of this condition.

Keywords: COVID 19, delirium, fear, confusion, delirium experience, delirium burden

OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *06 November 2020*
Accepted: *05 January 2021*
Published: *28 January 2021*

Citation:
Arumi A, Bulbena-Cabre A and Bulbena A (2021) First Person Account COVID 19 Delirium in a Doctor: When Death Stalks the Mind. Front. Psychiatry 12:626648. doi: 10.3389/fpsyt.2021.626648

Delirium, defined as an acute decline of global cognitive functioning, is a common, serious, and costly complication of hospitalization for older adults (1). Early studies indicate that 20–30% of patients with the novel coronavirus 2019 (SARS-CoV-2 or "COVID 19") will develop delirium during the course of their hospitalization, with rates reaching 70% (2, 3). Mounting evidence supports the high occurrence of delirium and other neuropsychiatric manifestations with COVID-19, and a recent study reported delirium as a common presenting symptom in older adults without any other typical COVID 19 symptoms (4). Although sometimes neglected, delirium may have severe complications, such as permanent cognitive damage or increased mortality (5–7). However, an overlooked phenomenon in delirium is the dreadful subjective experience of the person who suffers with it, which is often a distressing event. In this paper, we provide a first-hand experience of a physician who developed an acute encephalopathy secondary to COVID 19 related pneumonia.

I remember that on March 18, three days after being on lock-down, I developed high fever and dyspnea. The oxygen saturation started to drop, and the muscle pain and headache were terrible. The days that followed were even more challenging as the condition worsened rapidly. My lungs were hurting. By that time, many news outlets in were starting to report several COVID 19 cases in Spain and two fellow internists recommended me to get a chest x-ray (CXR) to rule out pneumonia, but I thought it was unlikely as I was in the mid-fifties with no medical comorbidities. However, as the days passed by, more alarming news about COVID 19 were being published and I decided to go to the hospital, mostly to reassure my family that I was fine.

In the morning on March 23rd, I went to the emergency room alone, no companions were allowed. The city looked ghostly, there was no one on the streets. The CXR confirmed I had COVID 19 and bilateral pneumonia and was told I needed hospitalization. It was extremely shocking at first, but the following days were a bit confusing, as my mental status was slowly deteriorating, I had strong feelings of loneliness and helplessness. A couple of days later, my condition worsened, and I was transferred to the ICU.

At that point I was receiving aggressive treatment and the memories of my conscious life disappear for over two months. A flat, sad, monotonous, real life was facing another "unreal life" that was rich, intense, unpredictable, and terrifying at times. I spent multiple weeks connected to the ventilator showing no signs of improvement, which was particularly distressing for my family. It was not until May 31, on my 57th birthday, when I was able to wake up and breathe spontaneously.

My "other life" in the ICU was surprisingly vigorous. That dying man, without movement, with hardly any response to stimuli, had a cerebral life, like he never had before. In my other life, I did not get COVID 19 in Barcelona, I got sick on a trip to Miami, where I stayed with Ukrainian refugees. I was not hospitalized in Barcelona, I was in Miami, Mallorca, and in Tarragona. I travelled all over Europe and the United States. I resided in spas, luxury hotels, apartments, hospitals, clinics, psychiatric units, and drug addiction centers. I was buried alive in the grave of an uncle of mine who died ten years ago, I drowned in a pool that the hospital nurses threw me into. I remember perfectly and clearly the feeling of lack of air. The constant feeling of dying. Possibly, it coincided with a respiratory crisis. I went through times when I couldn't move my legs, I crawled when walking on my arms. I was speechless, I tried to speak, and they did not understand me. I also remember being taken for a walk with a wheelchair. Other memories include the relegation of my soccer team, RCD Espanyol de Barcelona, to the second tier of Spanish soccer league "La Liga" (in fact, it happened shortly after) or an intense fear that a good friend was killed in a car accident by his wife.

Fears, thoughts, dreams, imaginary realities, and hopes, face to face with real life situations, like drowning, impotence, or immobility, to form a barrage of dreams and nightmares that I lived with an intensity that I never experienced before. Sometimes I felt I was at home, but I was never fully aware of where I was. Everything was lived in a dream. For example, if they cut my hair, they did it on a flight returning from Mallorca with my father. I remember airports in all those trips, with a futuristic aspect all of them and many other vibrant experiences. The most curious thing about all that delirious time is the tremendously clear memories that I have of dreams, that I lived as if they were reality, compared to the null memory of reality, which for me was like a dream.

I hardly remember anything about the last fifteen days of ICU. I woke up thinking that what I experienced was completely real. And little by little, I became aware that I was coming out of a delirium. I remember how they explained to me that LaLiga was not over yet, that I had not gotten sick in Miami, and so on. I must confess that, at that time, I refused to believe them and took me days to comprehend the difference between dream and reality. I feel that I regained my sanity after I was able to understand the subtle difference between these two worlds.

Accepting the situation after a period of over two months on a ventilator is not easy. You cannot speak because of the tracheostomy, you cannot eat, you cannot move your legs or just your arms, you cannot hold your sphincters, and in my case, I could not even see because I am nearsighted, and I could not use my glasses. You can only think, be alone, and talk to yourself. Without knowing where you are, what you are doing there, or what happened. Without understanding how you got in the situation in which you find yourself. The outside world is like a dream, unreal, ethereal, fluid and in contrast, your inner world is powerful, dynamic, solid, vibrant. Fortunately, I fully recovered from COVID 19 and returned to my "old life" but I still struggle with the memories of that period. Personally, I felt very distressed about my inability to communicate, the lack control, along with the intense feeling of dying that accompanied through "all my trips."

Most research in delirium has focused on physiological aspects of prevention, treatment, and prognosis, but the psychological consequences and its human toll on patients and their families are gaining recognition (8). This is in line with the NICE guidelines (9) that have highlighted the need for more research into the delirium experience. Delirium burden is defined as the subjective experience of delirium for patients and family members, includes awareness of delirium symptoms, situational stress, and emotional response (10). Between 25 and 35% of patients recall the experience, which in most cases, is distressing (11–13), and the psychological distress may continue to affect emotional, psychological, and physical well-being long after the delirium episode resolves (14). In the case of our patient, we hypothesize that he had an increased recollection of the events because he was high functioning prior to acquiring COVID19 and did not have any cognitive problems. In particular, patients recalled experiences of reality and unreality, day–night disorientation, clouding of thought, lack of control, strong emotions, misperceptions, hallucinations, and delusions (15). Despite the literature on this phenomenon remaining scarce, some tools are being developed which may provide a key first step toward measuring and improving the subjective experience of delirium for patients and their families (8).

Given the great prevalence of delirium in COVID 19 patients (16, 17), we anticipate that delirium burden will be common on these patients and family members. Clinicians should be aware of this phenomenon in order to evaluate neuropsychiatric symptoms, as this condition may have significant impact on the mental health of the patient and their family members.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical approval was not provided for this study on human participants because it is a first-person account. The

patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

REFERENCES

1. Marcantonio ER. Delirium in hospitalized older adults. *N Engl J Med.* (2017) 377:1456–66. doi: 10.1056/NEJMcp1605501
2. Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, et al. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. *JAMA Neurol.* (2020) 77:683–90. doi: 10.1001/jamaneurol.2020.1127
3. Helms J, Kremer S, Merdji H, Clere-Jehl R, Schenck M, Kummerlen C, et al. Neurologic features in severe SARS-CoV-2 infection. *N Engl J Med.* (2020) 382:2268–70. doi: 10.1056/NEJMc2008597
4. Kennedy M, Helfand BK, Gou RY, Gartaganis SL, Webb M, Moccia JM, et al. Delirium in older patients with COVID-19 presenting to the emergency department. *JAMA Netw Open.* (2020) 3:e2029540. doi: 10.1001/jamanetworkopen.2020.29540
5. Ticinesi A, Cerundolo N, Parise A, Nouvenne A, Prati B, Guerra A, et al. Delirium in COVID-19: epidemiology and clinical correlations in a large group of patients admitted to an academic hospital. *Aging Clin Exp Res.* (2020) 32:2159–66. doi: 10.1007/s40520-020-01699-6
6. Garcez FB, Aliberti MJ, Poco PC, Hiratsuka M, Takahashi SDF, Coelho VA, et al. Delirium and adverse outcomes in hospitalized patients with COVID-19. *J Am Geriatr Soc.* (2020) 68:2440–6. doi: 10.1111/jgs.16803
7. Canevelli M, Valletta M, Toccaceli Blasi M, Remoli G, Sarti G, Nuti F, et al. Facing dementia during the COVID-19 outbreak. *J Am Geriatr Soc.* (2020) 68:1673–6. doi: 10.1111/jgs.16644
8. Racine AM, D'Aquila M, Schmitt EM, Gallagher J, Marcantonio ER, Jones RN, et al. Delirium burden in patients and family caregivers: development and testing of new instruments. *Gerontologist.* (2019) 59:e393–402. doi: 10.1093/geront/gny041
9. National Institute for Health and Clinical Excellence. *Delirium: Diagnosis, Prevention and Management (Clinical Guideline 103).* (2011). Available online at: www.nice.org.uk/nicemedia/live/13060/49909/49909.pdf (accessed March 14, 2019).
10. Morandi A, Lucchi E, Turco R, Morghen S, Guerini F, Santi R, et al. Delirium superimposed on dementia: a quantitative and qualitative evaluation of patient experience. *J. Psychosom. Res.* (2015) 79:281–7. doi: 10.1016/j.jpsychores.2015.07.010
11. Breitbart W, Gibson C, Tremblay A. The delirium experience: delirium recall and delirium-related distress in hospitalized patients with cancer, their spouses/caregivers, and their nurses. *Psychosomatics.* (2002) 43:183–94. doi: 10.1176/appi.psy.43.3.183
12. Grover S, Ghosh A, Ghormode D. Experience in delirium: is it distressing? *J Neuropsychiatry Clin Neurosci.* (2015) 27:139–46. doi: 10.1176/appi.neuropsych.13110329
13. O'Malley G, Leonard M, Meagher D, O'Keeffe ST. The delirium experience: a review. *J Psychosom Res.* (2008) 65:223–8. doi: 10.1016/j.jpsychores.2008.05.017
14. Ortega DG, Papathanassoglou E, Norris CM. The lived experience of delirium in intensive care unit patients: a meta-ethnography. *Aust Crit Care.* (2020) 33:193–202. doi: 10.1016/j.aucc.2019.01.003
15. Finucane AM, Lugton J, Kennedy C, Spiller JA. The experiences of caregivers of patients with delirium, and their role in its management in palliative care settings: an integrative literature review. *Psychooncology.* (2017) 26:291–300. doi: 10.1002/pon.4140
16. O'Hanlon S, Inouye SK. Delirium: a missing piece in the COVID-19 pandemic puzzle. *Age Ageing.* (2020) 49:497–8. doi: 10.1093/ageing/afaa094
17. Cipriani G, Danti S, Nuti A, Carlesi C, Lucetti C, Di Fiorino M. A complication of coronavirus disease 2019: delirium. *Acta Neurol Belg.* (2020) 120:1–6. doi: 10.1007/s13760-020-01401-7

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

COMMUNITY CASE STUDY
published: 02 February 2021
doi: 10.3389/fpubh.2021.625691

A Phone-Based Early Psychological Intervention for Supporting Bereaved Families in the Time of COVID-19

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The exceptional circumstances of the Coronavirus disease (COVID-19) pandemic are making the grief processes challenging for families who are losing a relative for COVID-19. This community case study aimed to describe a phone-based primary preventive psychological intervention that has been delivered to these families by the Clinical Psychology unit of an Italian hospital. In particular, the article reports how the intervention has been organized within the overall hospital care pathway for families, the specific contents and components of the intervention, and the seven-phase structure of the intervention. The unique features and related challenges of the intervention, along with the implications for clinical practice, are discussed.

Keywords: bereavement, clinical psychology, COVID-19, family, hospital psychology, phone follow-up care, preventive primary intervention, psychological intervention

OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Public Health

Received: *03 November 2020*
Accepted: *06 January 2021*
Published: *02 February 2021*

Citation:
Borghi L, Menichetti J, Vegni E and The Early Bereavement Psychological Intervention working group (2021) A Phone-Based Early Psychological Intervention for Supporting Bereaved Families in the Time of COVID-19. Front. Public Health 9:625691. doi: 10.3389/fpubh.2021.625691

INTRODUCTION

The Coronavirus disease-19 (COVID-19) pandemic has been generating a global health crisis, with overall death rates surpassing 1.1 million people worldwide and continuously increasing, as of 28th October 2020 (1). The threats of the pandemic to the health of the worldwide population, the safety measures that require physical distancing, and the rate of the contagion that burdens the healthcare systems have been creating extraordinary, extremely challenging circumstances for how people affected by COVID-19 die and how families can come to terms with the loss.

Experiencing a loss, and unfortunately in this pandemic sometimes also multiple losses, in a condition of isolation can be extremely difficult for family members. The last goodbye, the closeness and support of the family and of the social group, and the funeral rituals have always been a crucial part of the process of realizing and coming to terms with the loss of a loved one. All these aspects have built, over time, the metaphorical road that allows processing and separating from the deceased, and that allows moving through grief, loss and transition. The COVID-19 pandemic can affect some of these basilar stones that enable and support the grieving process. The physical distancing can, indeed, limit the possibility to receive social support. Moreover, especially in the emergency phases of the pandemic, the regular grieving rituals have been frequently limited or even banned. For example, during the emergency phase of the first pandemic wave in Italy, all funeral ceremonies were banned for about 2 months, restricting family members from seeing the body of the deceased, from attending the cremation or the burial, or from going to the cemetery. Especially for families who have experienced a COVID-19 related loss in the hospital, the mourning can be particularly at risk, as there may have been no one in the family who has been able to

testify the last days of life of the loved one and his/her death. Furthermore, such deaths are often quick and unexpected, as hospitalized patients are those most severely affected by the virus. The unexpectedness of the loss has been proved to explain stronger grief reactions among family members who have lived a COVID-19 related loss than among those who have lived a natural loss, similarly to what happens after unnatural losses (2) Finally, the families experiencing a loss in an intensive care unit can particularly be affected by the loss: end of life care can proceed fast and this can challenge the possibility to obtain timely, consistent, and clear information (3).

For all these reasons, bereaved families dealing with a COVID-related loss at the hospital can be particularly in need of support from the hospital team. A recent study from our group (4) has pointed out the nature of these needs: to give meaning to the lived experience; to express emotions; to say the last goodbye; to remember the loved one; and to solve practical issues. However, it is unclear how hospitals should reorganize their services to meet these multiple needs, together with the challenge of managing COVID-19 patients and providing at the same time the usual care to all the other patients.

Supporting families of patients who are dying and died in the hospital should be an on-going task of the healthcare system, going beyond the care provided to the patient and continuing also during the days after the loss (5, 6). However, the scarcity of time, the lack of resources, and the safety restrictions, which especially featured the emergency phases of the pandemic, can limit the possibility to support bereaved families (7).

During the emergency phases of the COVID-19 pandemic, and especially in the most affected areas, hospitals had to reorganize their services and healthcare professionals' tasks to face the COVID-19 related challenges (i.e., a large number of patients who needed hospitalization and intensive care treatments, high rate of simultaneous deaths). In these periods, several clinicians had to reorient their professionality to address the emergent needs of the pandemic (e.g., the non-essential care like routine follow-ups was limited, some clinicians working in other units had to move to COVID-19 units, clinicians with specific vulnerabilities for COVID-19 were limited from direct patient care, or, in some countries, retired doctors were invited to volunteer in the hospitals) (8). This reorganization involved also the clinical psychology units. For example, in China, some authors during the beginning of the COVID-19 outbreak claimed the need for prompt mental health care for people affected by COVID-19 and suggested to implement online services, as non-essential healthcare personnel such as psychologists, psychiatrists, and mental health workers were often limited from providing direct patient care and/or from accessing isolation wards or rooms for patients affected by COVID-19 (9). Other authors followed this suggestion by proposing, even if without evidence of their effectiveness for COVID-19 patients and families, the use of eHealth/remote care (e.g., telephones or internet platforms) as a feasible way for psychologists to deal with the urgent psychological challenges related to the pandemic and to provide psychological support to patients, families, and the medical staff (10–12). In Lombardy, Italy, the activities of the clinical psychologists were maintained and delivered also to hospitalized patients with COVID-19 (13), and, when possible, they were provided remotely. Moreover, recent contributes have proposed literature-based recommendations for specifically supporting COVID-19 bereaved families and preventing dysfunctional grief (14–16). Among the many recommendations, all these contributions suggested (but without empirical evidence supporting the claim) the importance of phone follow-up to families after the loss, as a mean to assess more serious symptoms that may require additional support.

However, to our knowledge, there are no studies describing in detail psychological interventions that have been delivered to specifically address the early needs of bereaved families who lost a loved one for COVID-19 at the hospital.

The purpose of the present community case study is to describe the local experience of the Clinical Psychology Unit of a large public healthcare organization in Milan (Lombardy, Italy) in delivering a phone-based early psychological intervention to families of hospitalized patients who died for COVID-19 during the first-wave of the pandemic. In particular, we describe how the intervention is organized within the hospital care pathway for families, the specific contents, components and structure of the intervention, and discuss the implications for clinical practice and for further research studies.

CONTEXT

The Azienda Socio Sanitaria Territoriale (ASST) Santi Paolo and Carlo is a large public healthcare organization in Milan covering hospital and community care services (it provides more than 150,000 emergency services/year, with a daily flow of 40/50 emergency patients). It is composed of two main hospital facilities connected to the University of Milan. A clinical psychology unit within the hospital offers psychological assessment, psychological support and psychotherapy to adults with psycho-emotional or psychopathological sufferance related to medical conditions (17). The psychologists' theoretical models of reference are various (e.g., cognitive-behavioral, psychodynamic, systemic, person-centered) but they all share an expertise in providing psychological support to hospitalized patients (and their families) affected by a medical condition.

Since the beginning of March, when the pandemic started spreading consistently in Milan, and particularly during the emergency phases of the pandemic, the clinical psychology unit of the ASST reoriented part of its activities to address the emerging psychological needs of the hospital caused by the COVID-19 pandemic. This reorganization has been structured by a constant dialogue with the hospital managers, clinicians, patients and their families. One of the first areas in need of a psychological intervention emerged by this dialogue has been the management of the COVID-19 deaths, for its two-fold impact on the hospital care pathway and on families' support needs. Indeed, clinicians, patients, and their families were all in urgent need of managing the emotional difficulties of experiencing a high

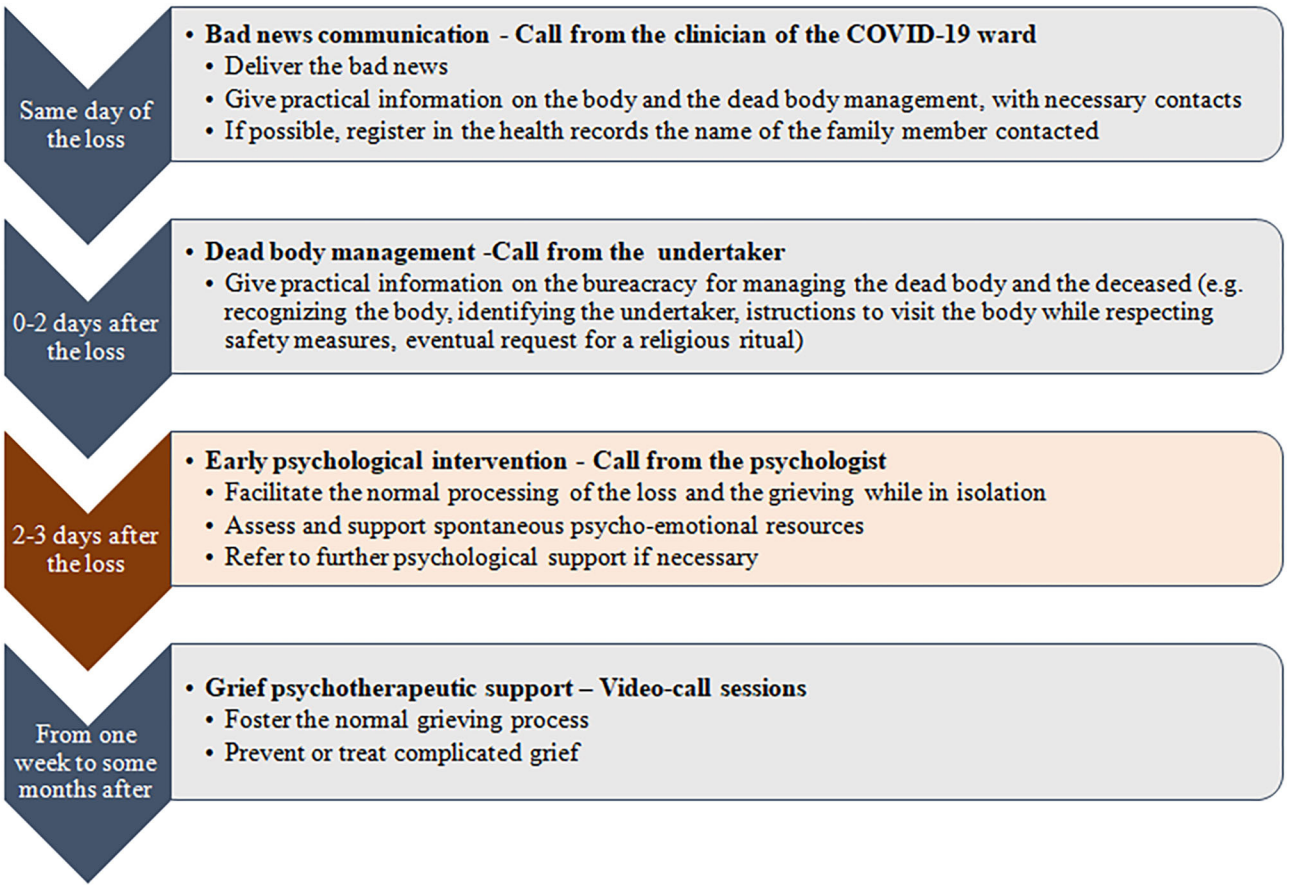

FIGURE 1 | The process of care to families of COVID-19 deceased patients at the hospital.

number of simultaneous deaths and of living the safety measures in place against the virus.

To face this double need of early assessing and supporting bereaved families and lightening the workload of clinicians, the clinical psychology unit decided to deliver a phone-based early psychological intervention to all the families of COVID-19 deceased patients, about 48–72 h after the family received notification of the death of the loved one from the hospital clinician. In the period between March 19th and June 15th, 284 families were called and 246 family members received the intervention (38 family members were unreachable). From what the psychologists performing the calls reported in their written reports after each call, the majority of family members felt grateful for the call and for the support.

OVERVIEW

The Hospital Care Process for Bereaved Families of COVID-19 Victims

The phone-based early psychological intervention was part of a multidisciplinary and integrated-care process to support the families who lived the loss of a loved one for COVID-19. Indeed, the phone call served as the closure of the hospital care pathway and as a link, eventually, to other community-based support services. Therefore, it may be positioned as a primary preventive intervention within a stepped care model, where different professionals were involved in different bereavement care phases: (1) the communication of the death, (2) the management of practical aspects related to the death, (3) the primary preventive phone-based psychological intervention, and, eventually, (4) the community-based psychotherapeutic intervention. The psychologists delivering it were not involved in the support of the dying patients affected by COVID-19. **Figure 1** exemplifies the process of care to the families who lived the loss of a family member for COVID-19 at the hospital.

As a first step, the clinician who was taking care of the patient called the designated family member (meaning the family member chosen by the patient to receive communication about his/her care and health status) to communicate the bad news. The family member also received contact from the undertaker to dispose the burial, manage the dead body, and formalize the death. Then, the hospital management notified the Clinical Psychology Unit of the ASST of the death. A group of 14 clinical psychologists of the ASST with an expertise in conducting

psychological consultations with hospitalized patients and their families (e.g., managing the emotional or behavioral reactions to a diagnosis, to treatment options, or to an unfavorable prognosis, or to end-of-life care) performed the phone follow-ups to families. In detail, after 2–3 days from the communication of the loss and after having checked with the mortuary that the previous steps were accomplished, the clinical psychologists obtained information on the designated relative from the electronic health records and called the family member. The designated family member was the relative previously selected by the patient to receive notifications by the hospital staff, and she/he usually was the closest person to the patient. When the psychologists made the call, they asked about the relationship with the deceased (e.g., partner, son/daughter, brother/sister, and nephew) and about other relatives in need of psychological support. In this case, they made another phone call to the indicated relative. In average, the call lasted 30–40 min (with a range from 10 to 60 min). Such call served as a psychological intervention to support all families, and in particular to foster and sustain spontaneous strategies and resources, but also to assess psycho-emotional difficulties and risk factors that may have required further specialized support. For example, the psychologists assessed, during an open dialogue with the family member and/or with focused screening questions, the relative's emotional response to the loss, the previous presence of physical and/or psychiatric disorders or other personality traits predisposing to psychological vulnerability, the coping strategies and defense mechanisms in play, and the availability of social resources. After this assessment, the psychologist offered to the family member who was evaluated to be at risk for grieving difficulties the possibility to be referred to further psychological support by a team of community-based psychologists. Such a team provided individual psychotherapeutic grief sessions by video-calls, with a flexible duration based on the family member's needs and recovery trajectory.

Unique Features of the Phone-Based Early Psychological Intervention

Several aspects characterized the psychological intervention offered by the Clinical Psychology unit to all families of hospitalized patients who died for COVID-19, and made it unique (and unusual for psychologists): (a) no prior referral or self-referral, (b) multiple purposes, (c) critical timing (i.e., a single conversation in proximity of the loss) (d) lack of face-to-face contact, and (e) virtual setting.

First, as the call was part of the hospital care and was aimed to intercept eventual needs for information and/or further support, the intervention was delivered to all families of the deceased patients. In delivering the call, the psychologists "knocked at the patients' door," rather than the opposite. This is uncommon for psychological interventions, where usually the patient is self-referred or referred by others and is willing to contact a psychologist. This was challenging for psychologists and activated feelings of anxiety, worry, invasiveness, doubt, or unsafety. A useful strategy adopted by the psychologists to manage these feelings was to find verbal formulas to show caution, to clarify the purpose of the contact from the very beginning, and to be open to accept a wide range of reactions from the family member.

Second, apart from the previously explained relief of clinicians, this intervention covered multiple purposes, which changed from call to call depending on the family member's needs that emerged at each call. For example, some calls mostly had the function of collecting and solving doubts related to practical/procedural/bureaucratic issues; other calls worked as a space for the relative/family to express the loss-related emotions, facilitating grief reactions while in physical isolation or quarantine; other calls again mostly verified and sustained spontaneous psycho-emotional resources, by facilitating alternative death rituals and reassuring the family member that the loved one was not alone in the process of death; finally, in some cases, if the psychologist observed highly-complex/at-risk situations, the calls had the function to refer the family member to further psychological support.

Then, the intervention was delivered in a specific timeframe: 48–72 h after the death notification. This timeframe was chosen to allow the family to deal with the preliminary logistic aspects of the burial and to have time to emotionally connect with the loss. The same timeframe, quite close to the loss, would have also allowed to early intercept relatives in need and to cover the previously described purposes. This is an unusual timeframe for psychologists for providing psychological support to families. Indeed, such a follow-up is usually delivered by healthcare professionals, and psychologists take care of the grief support that eventually follows after it.

Moreover, the intervention had to be delivered by phone due to safety restrictions. Psychologists could not rely on the family member's facial expressions, gestures, and use of space to fine tune their action, nor on their own ones to fully convey their messages. The tone of voice, both of the family member and of the psychologist, was invested by an extremely important role to collect and provide all the additional information usually conveyed by the body when in physical presence. The same modality also affected the setting, which was unclear and aleatory. The psychologists were thus deprived of an important resource/tool. At the same time, hospital psychologists are used to deal with unusual settings (e.g., when providing psychological support at the patient's bed). The psychologists involved in the calls had particularly to find ways to re-create a psychological setting and a psychological role in their mind, and to find the "right distance" from the relative. Indeed, they felt both too distant (e.g., because of the phone, because they did not know and were not able to see the respondent, because they acted as part of the hospital care, because they had only one single conversation with the family member) and too close to the relative (e.g., because they were involved in the COVID-19 situation themselves, because they were "knocking at the other's door"). The psychologists used different strategies to empathize/go closer to the respondent (e.g., by paying attention on the tone of voice, rhythm, and warmness in their voice, by slowing the speaking rate) or to take distance (e.g., by referring to other resources, by stressing the purpose of the call, by introducing some pauses in dialogue).

TABLE 1 | The structure of the phone-based psychological intervention for COVID-19 bereaved families.

Phases	Objectives and strategies	Skills and techniques
Opening	Check the respondent's identity, introduction with name and role (i.e., psychologist employed in the hospital), consent to proceed	Accurate presentation Use of verbal formulas to show caution Attention to the respondent's tone of voice to fine tune the intervention Question to check the willingness of the relative to proceed in the call
Proactive offer	Reason of the call: offer a free space to talk	Clear focus on the reason of the call Use of pauses
Active listening	Active listening of family member experiences, thoughts and emotions	Attentive silence Use of para-verbal signals to facilitate the spontaneous communication flow
Assessment	Assessing psycho-emotional needs, psycho-social resources and risk factors	Open- and close-ended focused screening questions
Need-based psychological actions	Information giving, education on stages of grief, emotional validation, small therapeutic actions like cognitive reframing and relaxation pills	Various, ranging from portioning, organizing and prioritizing education and information based on respondent's needs to supportive statements and reframing arguments under new angles
Referral and connection	Indications about the resources offered by the hospital and the community-based services, eventual referral to further psychological support	Give information in small bits Check the family member's understanding
Closure	Say goodbye	Use of tone of voice and verbal formulas to emphasize closeness/warmness

TABLE 2 | Very early risk and protective factors assessed by psychologists during the call.

Risk factors	Protective factors
* Individual factors (personality traits, psychiatric history, and previous traumas) * Type of death (e.g., rapid, unexpected, and untimely) * Death in the intensive care unit * Uncertainty, lack of information, and poor communication with the hospital staff * Lack of emotional and social support due to lack of social networking and/or social distancing * Physical distancing (not having had the chance to stay with the relative in the last period of life and to say the last goodbye)	* Resilience * Creativity and flexibility: to be able to find new ways to cope and to adapt to the grief under the extraordinary circumstances of COVID-19 * Gratefulness and good communication with the hospital staff * Faith, spirituality, and religious beliefs

A Structured Model of the Intervention

Before delivering the intervention, it was decided that the clinical psychologist performing the call had to present him/herself as psychologist and member of the hospital and that she/he had to clearly state that the call was part of the hospital care. Thus, during the setup of the intervention, a brief speech outline was shared among the clinical psychologists: introducing him/herself with name and role (i.e., psychologist employed in the hospital); asking for a confirmation of the interlocutor's identity as the designated relative of the deceased patient; presenting the call as part of the hospital care; and asking the consent to proceed in the talk. This preliminary intervention structure was refined during the clinical practice with 246 families and based on families' emerging needs (4). As **Table 1** resumes, the final result was a structured intervention model, with seven main phases each with specific objectives, strategies and verbal and para-verbal communication skills.

In particular, for the sixth phase (referring to further psychological support), the psychologists based their evaluation on a punctual assessment of very early protective and risk factors that might have facilitated the development of complicated grief in the future. The main very early risk and protective factors assessed by the psychologists are summarized in **Table 2**, which were based on literature evidence about generic risk/protective factors for dysfunctional grief (18, 19) and the experience of clinical psychologists with each family member contacted in the first days after the loss. In particular, the assessment of risk and protective factors was focused not only on checking the presence/absence of well-known evidence-based factors affecting the grief, but also on eliciting and sustaining spontaneous coping strategies and resources of family members (see also Borghi and Menichetti, under review), and, finally, evaluating how much the complex interplay of very early risk and protective factors may have potentially affected the normal bereavement process in each family member.

DISCUSSION

The existing literature on grief therapy is mostly focused on how to provide psychological support to treat complicated grief (18) or how to support bereaved persons, for example through the reconstruction of meaning (20). Differently, the phone-based early psychological intervention that emerged from the hospital work with COVID-19 patients and bereaved families appears to be more close, due to its timing, functions, and format, to a bereavement follow-up as part of the hospital care. Bereavement follow-ups are usually provided by nurses, volunteers, social workers, and the type of support can range from giving a booklet or condolence letter to providing individual/group support (21). In this case, it was structured as a brief psychologist-led intervention due to the complexity of grieving during COVID-19 and to the limited hospital resources during the emergency. It also presented characteristics similar to the early psychological interventions that are usually provided in situations of emergency, which usually provide prompt assessment of individuals at risk, debriefing and

promotion of coping skills and resilience (22). Furthermore, the intervention was aligned with recent literature-based recommendations for supporting COVID-19 bereaved families and preventing dysfunctional grief (14–16). Among the many recommendations, these studies highlighted the importance of an organized action with multidisciplinary healthcare staff, of using e-devices and telephone above the others, and of providing early follow-ups after the loss as a mean to assess more serious symptoms that may require additional support. Therefore, the phone-based early psychological intervention that has been delivered to address the specific needs of bereaved families who lost a loved one for COVID-19 at the hospital can be conceived as at an interface between bereavement follow-ups and emergency psychological interventions, aligned with emerging recommendations for specifically supporting this target group. Even if it requires further evaluation, it might represent a helpful and feasible support for families to cope with the very early moments of the bereavement process and prevent further distress and risks of complicated grief. Indeed, recent studies have showed that COVID-19 bereavement yields much higher grief disorders than natural bereavement, similar to bereavement after an unnatural loss (e.g., suicide, homicide) (2). This intervention, if delivered by psychologists working at the hospital, could play both the function of closing the hospital care pathway (i.e., as hospital bereavement follow-up) and of eventually supporting families and preventing further psychological distress and grief disorders (by identifying individuals at risk and referring them to community-based services) (i.e., as psychological first aid). Further research should explore the potential impact of this one-shot intervention on families' psychological and psychopathological outcomes. The description of how the intervention was organized within the hospital care pathway and of its contents, components and structure can potentially provide indications to hospital organizations dealing with COVID-19 deaths about how to organize the support to bereaved families in the special circumstances of the pandemic and prevent later psychological issues. It can also provide detailed indications for psychologists delivering similar services about the specific challenges and actions that such an intervention may require to their profession.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

LB and JM conceived the idea, collected the data, analyzed the data, and wrote the first draft of the manuscript. EV conceived the idea, revised the draft of the manuscript critically, contributed to the data interpretation, and gave the agreement for the final approval of the manuscript. The Early Bereavement Psychological Intervention working group performed the phone follow-up interventions, revised the draft of the manuscript critically, contributed to the data interpretation, and gave the agreement for the final approval of the manuscript. All authors contributed to the article and approved the submitted version.

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REFERENCES

1. Coronavirus Resource Centre. *COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University*. (2020). Retrieved from: https://coronavirus.jhu.edu/map.html (accessed october 28, 2020).
2. Eisma MC, Tamminga A, Smid GE, Boelen PA. Acute grief after deaths due to COVID-19, natural causes and unnatural causes: an empirical comparison. *J Affect Disord*. (2020) 278:54–6. doi: 10.1016/j.jad.2020.09.049
3. Coombs M. A scoping review of family experience and need during end of life care in intensive care. *Nursing Open*. (2015) 2:24–35. doi: 10.1002/nop2.14
4. Menichetti J, Borghi L, Cao di San Marco E, Fossati I, Vegni E. Phone follow up to families of COVID-19 patients who died at the hospital: families' grief reactions and clinical psychologists' roles. *Int. J. Psychol.* (2021). doi: 10.1002/IJOP.12742
5. Hudson P, Remedios C, Zordan R, Thomas K, Clifton D, Crewdson M, et al. Guidelines for the psychosocial and bereavement support of family caregivers of palliative care patients. *J Palliat Med*. (2012) 15:696–702. doi: 10.1089/jpm.2011.0466
6. Virdun C, Luckett T, Lorenz K, Davidson PM, Phillips J. Dying in the hospital setting: a meta-synthesis identifying the elements of end-of-life care that patients and their families describe as being important. *Palliat Med.* (2017) 31:587–601. doi: 10.1177/0269216316673547
7. Gesi C, Carmassi C, Cerveri G, Carpita B, Cremone IM, Dell'Osso L. Complicated grief: what to expect after the coronavirus pandemic. *Front Psychiatry*. (2020) 11:489. doi: 10.3389/fpsyt.2020.00489
8. Buerhaus PI, Auerbach DI, Staiger DO. Older Clinicians and the Surge in Novel Coronavirus Disease 2019 (COVID-19). *JAMA*. (2020) 323:1777–8. doi: 10.1001/jama.2020.4978
9. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry*. (2020) 7:300–2. doi: 10.1016/S2215-0366(20)30073-0
10. Jiang X, Deng L, Zhu Y, Ji H, Tao L, Liu L, et al. Psychological crisis intervention during the outbreak period of new coronavirus pneumonia from experience in Shanghai. *Psychiatry Res*. (2020) 286:112903. doi: 10.1016/j.psychres.2020.112903

11. Zhang J, Wu W, Zhao X, Zhang W. Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia outbreak in China: a model of West China Hospital. *Precision Clin Med*. (2020) 3:3–8. doi: 10.1093/pcmedi/pbaa006
12. Orrù G, Ciacchini R, Gemignani A, Conversano C. Psychological intervention measures during the COVID-19 pandemic. *Clin Neuropsychiatry*. (2020) 17, 76–9. doi: 10.36131/CN20200208
13. Leone D, Borghi L, Bonazza F, Abrami MA, Barcellini G, Benlodi A, et al. Psychological interventions in hospital during the first-wave of CoViD-19: an overview of the experiences of the Units of Clinical Psychology in Lombardy, Italy. [Interventi psicologici in ospedale ai tempi del COVID-19: una panoramica delle realtà proposte dalle Unità Operative di Psicologia (UOPSI) della Lombardia]. *Recenti Prog Med*. (2020) 111:593–601.
14. Wallace CL, Wladkowski SP, Gibson A, White P. Grief During the COVID-19 Pandemic: considerations for palliative care providers. *J Pain Symptom Manage*. (2020) 60:e70–6. doi: 10.1016/j.jpainsymman.2020.04.012
15. Selman LE, Chao D, Sowden R, Marshall S, Chamberlain C, Koffman J. Bereavement Support on the Frontline of COVID-19: recommendations for hospital clinicians. *J Pain Symptom Manage*. (2020) 60:e81–6. doi: 10.1016/j.jpainsymman.2020.04.024
16. Carr D, Boerner K, Moorman S. Bereavement in the time of coronavirus: unprecedented challenges demand novel interventions. *J Aging Soc Policy*. (2020) 32:425–31. doi: 10.1080/08959420.2020.1764320
17. Borghi L, Vegni EAM, Raisi S, Cardani E, de Stasio M, Leone D, et al. The psychological consultation in hospital setting: a model of intervention through the clinical practice. [La visita e parere psicologico in ambito ospedaliero un modello di intervento attraverso la pratica clinica]. *Psicol della Salute*. (2020) 20:55–67. doi: 10.3280/PDS2020-001005
18. Mason TM, Tofthagen CS, Buck HG. Complicated grief: risk factors, protective factors, and interventions. *J Soc Work End Life Palliat Care*. (2020) 16:151–74. doi: 10.1080/15524256.2020.1745726
19. Stroebe M, Schut H, Stroebe W. Health outcomes of bereavement. *Lancet*. (2007) 370:1960–73. doi: 10.1016/S0140-6736(07)61816-9
20. Neimeyer RA, Burke LA, Mackay MM, van Dyke Stringer JG. Grief therapy and the reconstruction of meaning: from principles to practice. *J Contemp Psychother*. (2010) 40:73–83. doi: 10.1007/s10879-009-9135-3
21. Agnew A, Manktelow R, Haynes T, Jones L. Bereavement assessment practice in hospice settings: challenges for palliative care social workers. *Br J Soc Work*. (2011) 41:111–30. doi: 10.1093/bjsw/bcq055
22. Cunha S, Soares-Oliveira M, Pereira N. Early psychological intervention in prehospital emergency care systems. *J Emerg Med*. (2009) 36:404–6. doi: 10.1016/j.jemermed.2007.10.031

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 04 February 2021
doi: 10.3389/fpsyt.2021.627018

Personality and Attitudes Confronting Death Awareness During the COVID-19 Outbreak in Italy and Spain

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Italy and Spain are two representative examples on strict lockdown last March 2020, also suffering a high rate of mortality in Europe. The aim of this study is to examine their attitudes confronting death awareness during the Covid-19 outbreak. Moreover, Personality was also considered. Different sociodemographic, *in situ* questions related to attitudes and the brief Big Five of Personality were employed in a cross-sectional design. The main results suggested that Personality traits were stable across countries. A relationship was found between Fear to contagious diseases and Neuroticism and other attitudes during the Covid-19 outbreak, and two different clusters were identified with regards to attitudes, however these did not differ on Personality. Finally, a Cluster group, Neuroticism, Age and Sense of belonging to the Country did predict Fear to contagious diseases. Of note, no differences were found across countries during grief.

Keywords: COVID-19, death awareness, cluster analysis, COVID-19 outbreak, pandemic, personality, fear, death

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Alfredo Zamora Mur, Universidad San Jorge, Spain
Francisco Collazos Sánchez, Vall d'Hebron University Hospital, Spain

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *09 November 2020*
Accepted: *14 January 2021*
Published: *04 February 2021*

Citation:
Murphy M and Moret-Tatay C (2021) Personality and Attitudes Confronting Death Awareness During the COVID-19 Outbreak in Italy and Spain. Front. Psychiatry 12:627018. doi: 10.3389/fpsyt.2021.627018

INTRODUCTION

Humans are an adaptable species. However, natural disasters such as the current Covid-19 outbreak might cause people to see their normalcy completely altered by not being able to socialize as we are used to, as well as, losing contact with our relatives or, even in extremes cases, losing someone they love (1, 2). In this way, it seems important to remark that people have been exposed to death at close quarters during the Covid-19 outbreak, whether it be from a family member, a neighbor, an acquaintance, including children who may not understand what happens to those people or health workers suffering from post-traumatic stress disorders (3). Given that different or common country measures were applied worldwide, studies across different nations allow, not only the understanding of our own nation externally, but also other internal processes, where, to some extent, the country in which they are born (4) and therefore the human expression of pain is influenced by the product of culture, customs or symbols among others (5, 6).

Resolving grief often involves cultivating bonds of emotion and meaning with death (7). Cross-cultural studies of grief can be applied to many levels of human life: from a biological level (8) to a linguistic ones (9), into of a vast range of possibilities that involve the meanings and the use of words that West countries use as grief and mourning. However, the current situation might be

surely accompanied by other variables, most of them attitudes and fears into a scenario full of uncertainties. First, the fear on an economic crisis of greater impact than the one occurred in 2008 (10). Other variables such as social media misinformation, political polarization, country measures, and social inequities or vulnerabilities, among others, are of interest to shed light on both internal and external anxiety states (11–13). Not surprisingly, the pandemic has raised many issues of debate that involves a large body of disciplines in our society.

As expected, recent studies have also report that this situation will have an important psychological impact on people (14, 15). However, little is known in relation to the attitudes developed in those who has directly suffered the loss of a loved one and close to them, during the pandemic onset. According to the literature (16), circumstances surrounding death in the era of Covid-19 outbreak incorporate multiple and indirect traumatic characteristics, such as multiple deaths in families, social restrictions that prohibit visiting relatives in hospitals or intensive care units causing feelings of guilt, feelings of isolation and precarious socio-economic and living conditions as a result of the pandemic which will in turn be linked to mourning complications.

How personality affects health behaviors is well-recognized in the literature through a large body of research on the Big Five model (17–19). Moreover, a mediational study was carried out on Personality and fear of death among young adults, being neuroticism positively correlated to death anxiety (20). However, authors did not report if participants were if they had been closed to someone's death because of Covid-19 virus. In this way, the aim of this study is to focus in this profile, in order to examine their attitudes confronting death awareness during the Covid-19 outbreak. Moreover, to examine different profiles according to country of origin and residence, attitudes confronting mourning processes, and Personality. Focusing on mortality rates in Europe, two representative examples, who have also suffered strict lockdown last March 2020, are Italy and Spain (21, 22). For this reason, these populations were selected. We hypothesis that Personality is stable across countries in the mourning process. For previous results, we expect that Neuroticism predict fear to contagious diseases in participants who have experienced a loss. Lastly, we hypothesized that different profiles can be identified regarding attitudes during grief, and these are independent to country of origin and residence.

METHODS

Participants

Inclusion criteria are described as follows: (i) the participants had to be over 18 years old, (ii) to have experienced the loss of someone's close because of Covid-19 virus, (iii) be a resident of one of the three selected countries, and in addition to showing their consent according to the Declaration of Helsinki. If this consent was not accepted, the process did not continue. Participation was completely voluntary and could be withdrawn at any time. In addition, there was also the option of not answering some demographic questions if they did not wish to do so. The information provided by the participants was completely anonymous, where neither the name nor the IP address is recorded so that it cannot be traced in any case.

Procedure

Data collection was collected online through Qualtrics software, which was distributed by different communication applications. This study was approved by the ethics committee of the UCC School of Applied Psychology Ethics Committee on April 6, 2020. The study was carried out in April 2020, were the Italian measures were well-established, and the Spanish one almost started after middle Mach. During April and May 2020, when data was recruited, citizens should only leave their homes for necessities.

Materials

Sociodemographic data, as well as list of questions developed for the Covid19 outbreak situation, and specific questioners were employed for the current research, which were listed as follows:

In situ questions related to Covid19 outbreak, developed for the propose of the current study, and answered in a 5 likert point scale:

i. I fear people with contagious diseases

TABLE 1 | Descriptive analysis across the Spanish and the Italian samples.

	Group	Mean	SD	*p*
Age	Italy	29.88	10.70	0.045
	Spain	34.97	14.21	
People I live with	Italy	3.24	3.97	>0.05
	Spain	2.64	2.58	
Fear contagious diseases	Italy	5.38	2.76	>0.05
	Spain	5.43	2.84	
Sense of belonging	Italy	4.93	2.96	>0.05
	Spain	4.43	2.80	
Economic impact	Italy	8.40	1.60	>0.05
	Spain	8.96	1.60	
Correctly informed	Italy	7.81	1.73	>0.05
	Spain	7.32	1.97	
Self-quarantine (others)	Italy	8.52	2.07	>0.05
	Spain	8.85	1.74	
Self-quarantine (myself)	Italy	8.21	2.09	>0.05
	Spain	8.44	1.99	
Openness	Italy	7.62	1.99	>0.05
	Spain	7.60	1.82	
Extraversion	Italy	6.81	1.64	>0.05
	Spain	6.63	2.06	
Agreeableness	Italy	6.50	1.80	>0.05
	Spain	6.45	1.67	
Conscientiousness	Italy	6.17	1.83	<0.001[a]
	Spain	7.40	1.75	
Neuroticism	Italy	6.40	1.98	>0.05
	Spain	6.08	2.23	

[a] *Levene's test was statistically significant ($p < 0.05$), suggesting a violation of the equal variances assumption.*

TABLE 2 | Paired Pearson correlations across the variables of interest (whole data).

	Pearson's *r*		Lower 95% CI	Upper 95% CI
Fear contagious diseases-Sense of belonging	0.46	***	0.306	0.594
Fear contagious diseases-Economic impact	0.24	**	0.059	0.402
Fear contagious diseases-Correctly informed	0.03		−0.153	0.210
Fear contagious diseases-Self-quarantine (others)	0.21	*	0.030	0.378
Fear contagious diseases-Self-quarantine (myself)	0.28	**	0.107	0.442
Fear contagious diseases-Openness	−0.18		−0.348	0.004
Fear contagious diseases-Extraversion	−0.15		−0.320	0.036
Fear contagious diseases-Agreeableness	0.07		−0.110	0.251
Fear contagious diseases-Conscientiousness	−0.03		−0.208	0.154
Fear contagious diseases-Neuroticism	0.25	**	0.073	0.414
Sense of belonging-Economic impact	0.20	*	0.024	0.372
Sense of belonging-correctly informed	0.00		−0.177	0.186
Sense of belonging-Self-quarantine (others)	0.13		−0.057	0.301
Sense of belonging-Self-quarantine (myself)	0.16		−0.019	0.335
Sense of belonging-Openness	−0.18	*	−0.354	−0.002
Sense of belonging-Extraversion	−0.16		−0.331	0.023
Sense of belonging-Agreeableness	0.15		−0.031	0.324
Sense of belonging-Conscientiousness	−0.05		−0.234	0.128
Sense of belonging-Neuroticism	0.03		−0.147	0.216
Economic impact-correctly informed	0.21	*	0.031	0.379
Economic impact-Self-quarantine (others)	0.31	***	0.134	0.464
Economic impact-Self-quarantine (myself)	0.21	*	0.029	0.376
Economic impact-Openness	−0.03		−0.206	0.157
Economic impact-Extraversion	−0.08		−0.263	0.098
Economic impact-Agreeableness	0.07		−0.114	0.248
Economic impact-Conscientiousness	0.03		−0.152	0.211
Economic impact-Neuroticism	0.03		−0.151	0.212
Correctly informed-Self-quarantine (others)	0.19	*	0.005	0.356
Correctly informed-Self-quarantine (myself)	0.01		−0.168	0.195
Correctly informed-Openness	0.09		−0.096	0.264
Correctly informed-Extraversion	0.09		−0.088	0.272
Correctly informed-Agreeableness	0.11		−0.069	0.289
Correctly informed-Conscientiousness	−0.01		−0.187	0.176
Correctly informed-Neuroticism	−0.13		−0.309	0.048
Self-quarantine (others)-Self-quarantine (myself)	0.73	***	0.638	0.808
Self-quarantine (others)-Openness	0.05		−0.132	0.231
Self-quarantine (others)-Extraversion	−0.02		−0.197	0.166
Self-quarantine (others)-Agreeableness	0.01		−0.180	0.183
Self-quarantine (others)-Conscientiousness	0.13		−0.055	0.302
Self-quarantine (others)-Neuroticism	0.03		−0.154	0.209
Self-quarantine (myself)-Openness	−0.15		−0.324	0.031
Self-quarantine (myself)-Extraversion	−0.06		−0.235	0.127
Self-quarantine (myself)-Agreeableness	0.05		−0.135	0.228
Self-quarantine (myself)-Conscientiousness	0.14		−0.037	0.318
Self-quarantine (myself)-Neuroticism	0.07		−0.114	0.248
Openness-Extraversion	0.67	***	0.551	0.756
Openness-Agreeableness	0.10		−0.087	0.273
Openness-Conscientiousness	0.19	*	0.013	0.363
Openness-Neuroticism	−0.02		−0.198	0.165
Extraversion-Agreeableness	0.09		−0.089	0.271

(Continued)

TABLE 2 | Continued

		Pearson's *r*		Lower 95% CI	Upper 95% CI
Extraversion-Conscientiousness	0.19		*	0.014	0.364
Extraversion-Neuroticism	−0.01			−0.196	0.167
Agreeableness-Conscientiousness	0.13			−0.055	0.302
Agreeableness-Neuroticism	−0.21		*	−0.379	−0.031
Conscientiousness-Neuroticism	−0.05			−0.231	0.131

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

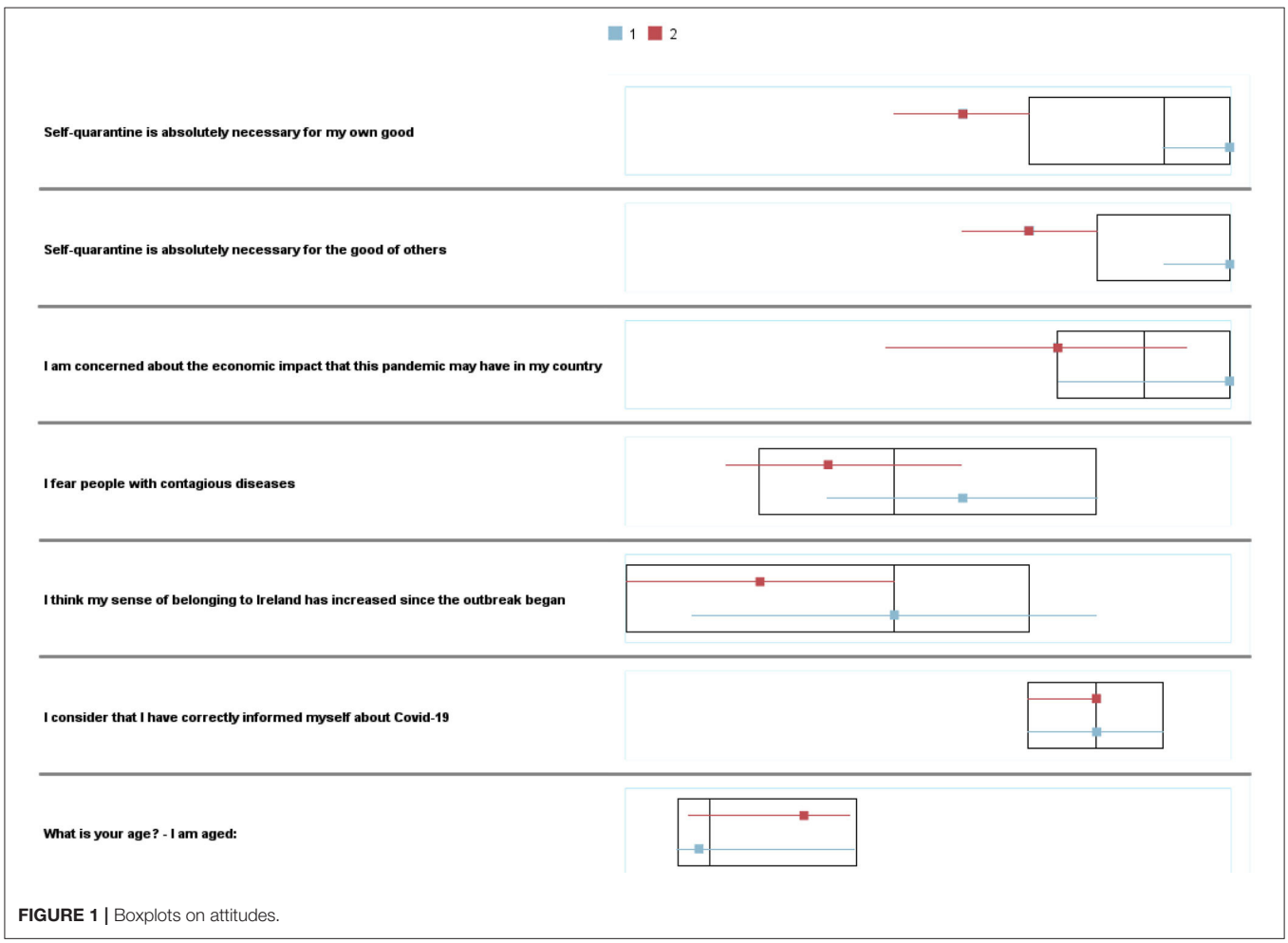

FIGURE 1 | Boxplots on attitudes.

ii. I think my sense of belonging to Italy/Spain has increased since the outbreak began
iii. I am concerned about the economic impact that this pandemic may have in my country
iv. I consider that I have correctly informed myself about Covid-19
v. Self-quarantine is necessary for the good of others
vi. Self-quarantine is necessary for my own good.

The Big 5 personality inventory was used to assess personality (BFI-10) developed for several countries, such as the Italian and the Spanish one (23). It consists of 10 reagents with a Likert type scale of five values ranging from 5 = complete agreement, 4 = agreement, 3 = neither agreement nor disagreement, 2 = disagree, 1 = strongly disagree, this version is an abbreviated version of the Inventory of the Five Major personality factors (24). The value of Cronbach's Alpha average in the literature was 0.75.

Design and Analysis

This is a cross-cultural study conducted on an incidental sample. Cases with more than 10% missing were not considered. We imputed missing values through the SPSS method for multiple

imputations to produce a new data set without missing data. First, a descriptive approach was carried out. Normality and homogeneity analyses of data were developed, prior to the analyses. Secondly, a relational analysis was carried out, a cluster analysis and a linear regression was performed, in order to make predictions about the variables of interest.

RESULTS

As can be seen in **Table 4**, both Sense of Belonging and Neuroticism were significant unique predictors of Fear of contagious diseases. According to the specific inclusion criteria, "to have experienced the loss of someone's close because of Covid-19 virus" a total of 75 Spanish resident respondents over 371 (20.2%) were selected in the current study, while a total 42 over 324 (13%) for the Italian sample. However, to better address any bias related to culture in the sample, 5 participants were excluded from the previous number because their nationality was different from the country of residence. The final sample was composed by 72 Spanish respondents living in Spain, and 40 Italian respondents, living in Italy.

For the Spanish sample, 26.4% were men and 73.6% women, while the Italian 30% men and 70% women. With regards to Education the Spanish sample referred a 23.6 of some Primary and complementary School, 41.7 for Secondary School and 34.7% for Higher or further Education, while the Italian Sample was divided into a 17.5% for Secondary School an 82.5% for Higher or further Education. In terms of occupation, the Spanish sample reported the following percentages: (i) 26.7% were self-employed or an employee in an essential service, (ii) 25.3% were working from home, (iii) 8 % remained employed but could not carry out their work, (iv) 4 % were retired, (v) 2.7 % were homemaker, (vi) 26.7 % were full-time student, (vii) 2.7% were unemployed (beginning before the Covid-19 outbreak), (viii) 4 % were unemployed (beginning during the Covid-19 outbreak). The Italian sample was also described as follows: (i) 16.7% were self-employed or an employee in an essential service, ii) 16.7% were working from home, (iii) 11.9 % remained employed but could not carry out their work, (iv) 2.4 % were homemaker, (v) 45.2 % were full-time student, (vi) 4.8 % were unemployed (beginning before the Covid-19 outbreak), (vii) 2.4% were unemployed (beginning during the Covid-19 outbreak). Other descriptive analyses were carried out in the variable of interest and depicted in **Table 1** across countries. Moreover, a student's *t*-test was carried out for independent groups. Conscientiousness showed higher scores for Spain than Italy reaching the statistical level: ($p < 0.001$; Cohen's $d' = 0.69$).

Secondly, a correlation analysis was carried out under Pearson coefficient employing the whole data (Italy and Spanish samples, **Table 2**). This procedure was carried out this way, as no differences were found in the previous analysis, except for the Conscientiousness trait of personality.

A two-step cluster analysis was carried out. Variables of interest, except country and Personality were included in the analysis, and were reanalyzed according to the clusters obtained. Likewise, the Schwarz–Bayesian Inference Criterion (BIC) was employed by using it to select the lowest BIC value in the different estimated models, in this case for two clusters: $G_1 = 81$ (72.3%)

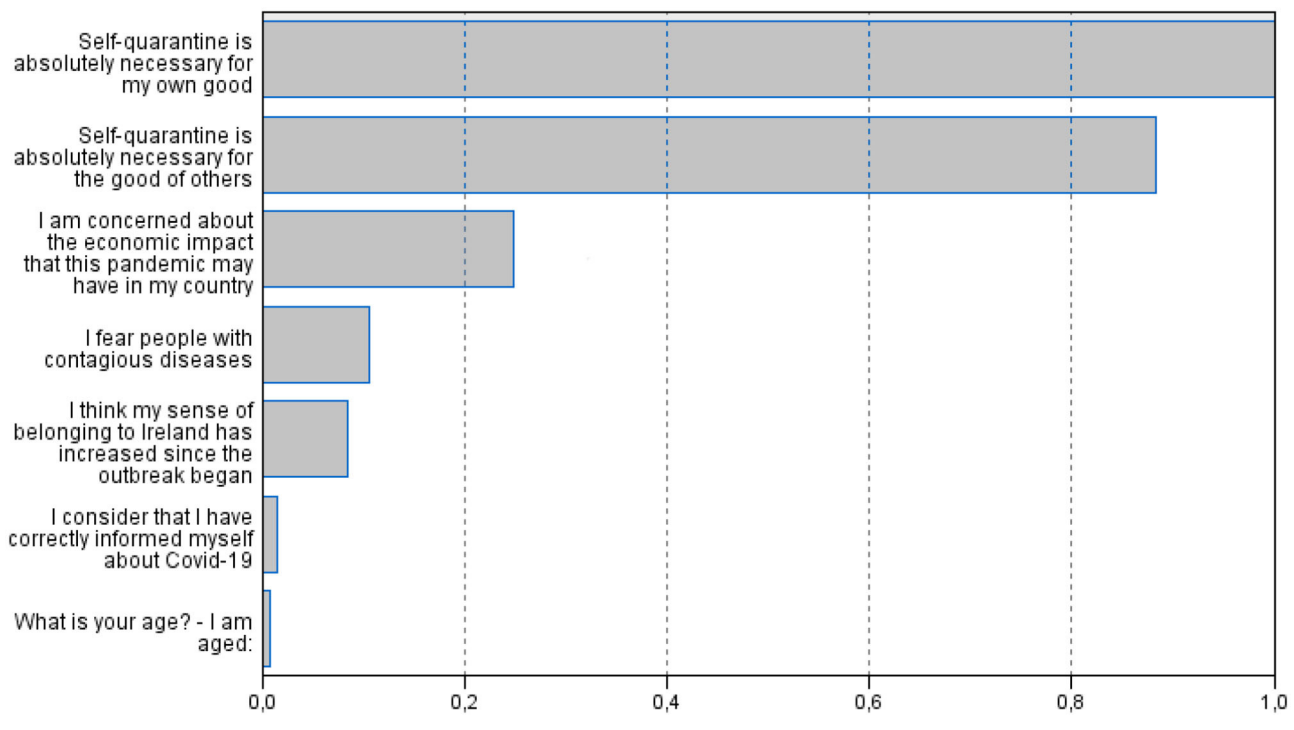

FIGURE 2 | Importance of predictors for the cluster analysis.

TABLE 3 | Independent samples *t*-test after cluster analysis on personality.

	G_1	G_2	*t*	*p*
Extraversion	6.58 (SD = 1.97)	7.06 (SD = 1.63)	−1.21	0.23
Agreeableness	6.46 (SD = 1.83)	6.41 (SD = 1.47)	0.13	0.89
Conscientiousness	7.22 (SD = 1.89)	6.35 (SD = 1.72)	2.22	0.02
Neuroticism	6.23 (SD = 2.11)	6.09 (SD = 2.27)	0.30	0.76
Openness	7.49 (SD = 1.85)	8.03 (SD = 1.79)	−1.38	0.17

participants and $G_2 = 31$ (27.7%) with a ratio of sizes equal to 2.61. Boxplots in **Figure 1** depict de differences between the variables of interest to develop the clusters. **Figure 2** remarks the relevance of country measures, in this case self-quarantine, as main predictors. As can be seen in **Table 3**, the clusters differed on only the Neuroticism dimension of personality.

Even if restriction measures were similar among countries, a χ^2 test was carried out to test the independence between clusters and Countries ($p = 0.39$), and they were classified as follows: 27 Italians plus 54 Spanish participants for G_1 and 13 Italians plus 18 Spanish participants for G_2. A *t*-test was employed to examine differences between Clusters in Personality, as depicted in **Table 4**. Nevertheless, country and clusters reconsidered for a linear regression analysis (**Table 4**). Thus, a regression linear regression analysis was carried out on the prediction of *Fear Contagious diseases,* which was statistical significant: $F_{(14,\ 111)} = 3.83$; MSE = 22.30; $p < 0.001$; $R^2 = 0.356$.

TABLE 4 | Coefficients of the predictive model for Fear Contagious diseases after cluster analysis.

Model		B	Standard Error	β	*p*
1	(Intercept)	−1.42	3.88		0.71
	People I live with	−0.08	0.09	−0.08	0.33
	Sense of belonging	0.37	0.08	0.39	**<0.0005**
	Economic impact	0.13	0.13	0.08	0.40
	Correctly informed	0.12	0.13	0.08	0.37
	Self-quarantine (others)	−0.04	0.22	−0.03	0.85
	Self-quarantine (myself)	0.18	0.20	0.13	0.36
	Openness	−0.05	0.18	−0.03	0.77
	Extraversion	−0.11	0.16	−0.71	0.48
	Agreeableness	0.10	0.14	0.06	0.49
	Conscientiousness	−0.06	0.15	−0.04	0.77
	Neuroticism	0.29	0.11	0.22	**0.01**
	Age	0.03	0.02	0.18	0.17
	Cluster	−0.27	0.91	−0.30	0.76
	Country	0.246	0.495	0.042	0.61

CONCLUSIONS AND DISCUSSION

The aim of this study was to examine the role of personality, country of origin and residence, as well as attitudes confronting death awareness in the Covid-19. For this reason, two samples, from Italy and Spain from participants who have suffer the loss of someone close, were selected. The main results can be described as follows: (i) Personality traits were stable across countries, (ii) A relationship was found between Fear to contagious diseases and Neuroticism and other attitudes during the Covid-19 outbreak, (iii) Two different clusters were identified with regards to attitudes, however these did not differ on Personality, (iv) Cluster group, Neuroticism, Age and Sense of belonging to the Country did predict Fear to contagious diseases.

As expected from previous literature (20), Neuroticism predict Fear in the current samples. This is a robust effect which was also replicated for the current research. Moreover, results seems to support that personality is stable across cluster groups, supporting the idea that invariance across groups occurs, and even in different cultures (25). Nor differences were found for other traits of personality. For this reason, these results also highlight the special psychological attention that people with higher scores in Neuroticism might need during grief.

Of note, no differences were found across countries. One should bear in mind that the type of country restrictions could be comparative in Italy and Spain between March and April, when the study took place. However, it was possible to identify two different profiles across participants, in a homogeneous way across countries. This is an alternative and analytical strategy to traditional analysis (26), that might shed light on common processes across country measures.

On the other hand, attitudes are of interest to understand the effects of Covid-19 outbreak. First, sense of belonging to the country of reference seems to be related and directly predict Fear. This result might support the terror management theory (TMT). In other words, this theory tries to explain how, in times of were death awareness emerge, individuals tend to strengthen their self-esteem to reduce anxiety against death (27). This can also lead to a seek for cohesion between people who share similar world views and hostility toward those with alternative world views (28). Thus, even during process of grief, participants would be susceptible to this effect.

Another variable of interest was to consider yourself well-informed about the Covid-19 virus. Even if the spread of misinformation has been one of the main challenges of the current Covid-19 era (29), no effect were found over this variable. As described in the literature, ambiguous information is related to fear (30). In this population, higher scores were found over their perception, which was correlated with self-quarantine for the others good. This might reflect a special sensibility for the others health. One main limitation over this attitude is related to a self-perception, as the real exposure to media coverage of the Covid-19 crisis was not measured. Future lines of research should examine this perception across real habits and exposures. Nevertheless, we considered it is important to avoid sensational media, which may enhance negative affect, particularly for the grief processes.

Lastly, one might expect this is also related to future situations, such as the Economic impact. However, this variable seems to be related to how well-informed participants perceived themselves, as well as self-quarantine measures. Although quarantine is intended to protect people's health against infectious diseases,

restriction of movement can be associated with a variety of psychological problems such as depression, anxiety, fear, loneliness, resentment and confusion (31–33). However, in a population that has suffered a loss of a loved one or close friend, it may also reflect fear of illness, or even have psychological effects beneficial to self-care. In the latter case, remember that it could effectively reduce a person's risk of infection, thus relieving the infectious pressure on the person (34).

We would like to remark some limitations of the current research. First, the sample was selected through a convenience sampling, which can introduce distortions in data though a high component of self (as how well-participants considered they are informed). Secondly, there is a significantly higher number of women than men, which means the results may vary in populations with a greater parity sample, especially considering that this phase of retirement is experienced differently according to gender variable.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by UCC School of Applied Psychology Ethics Committee on April 6, 2020. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MM and CM-T equally contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

REFERENCES

1. Bermejo JC. Acompaniment in grief. Times of coronavirus. *Front Psychol.* (2020) 11:583233. doi: 10.3389/fpsyg.2020.583233
2. Cohen MS, Hellmann N, Levy JA, DeCock K, Lange J. The spread, treatment, and prevention of HIV-1: evolution of a global pandemic. *J Clin Invest.* (2008) 118:1244–54. doi: 10.1172/JCI34706
3. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *BMJ.* (2020) 368:m1211. doi: 10.1136/bmj.m1211
4. Tsai PL, Chen MC, Huang YT, Lin KC. Effects of listening to pleasant music on chronic unilateral neglect: a single-subject study. *NeuroRehabilitation.* (2013) 32:33–42. doi: 10.3233/NRE-130821
5. Gonçalves Júnior J, Moreira MM, Rolim Neto ML. Silent cries, intensify the pain of the life that is ending: the COVID-19 is robbing families of the chance to say a final goodbye. *Front Psychiatry*. (2020) 11:570773. doi: 10.3389/fpsyt.2020.570773
6. Rothe A. Popular trauma culture: the pain of others between holocaust tropes and kitsch-sentimental melodrama. In: Ataria Y, Gurevitz D, Pedaya H, and Neria Y editors. *Interdisciplinary Handbook of Trauma and Culture*. Switzerland: Springer International Publishing (2016). p. 51–66.
7. Gonçalves Júnior J, Sales JP, de Moreira MM, de Lima CKT, Rolim Neto ML. Spiritual beliefs, mental health and the 2019 coronavirus (2019-nCoV) outbreak: what does literature have to tell us? *Front Psychiatry*. (2020) 11:570439. doi: 10.3389/fpsyt.2020.570439
8. Muntsant-Soria A, Gimenez-Llort L. Impact of social isolation on the behavioral and functional profiles and hippocampal atrophy asymmetry in dementia in times of coronavirus pandemic (COVID-19): a translational neuroscience approach. *Front Psychiatry*. (2020) 11:572583. doi: 10.3389/fpsyt.2020.572583
9. O'Dea B, Larsen ME, Batterham PJ, Calear AL, Christensen H. A Linguistic analysis of suicide-related twitter posts. *Crisis*. (2017) 38:319–29. doi: 10.1027/0227-5910/a000443
10. Binder C. Coronavirus Fears And Macroeconomic Expectations. *Rev Econ Stat*. (2020) 102:721–30. doi: 10.1162/rest_a_00931
11. Bavel JJV, Baicker K, Boggio PS, Capraro V, Cichocka A, Cikara M, et al. Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav.* (2020) 4:460–71. doi: 10.1038/s41562-020-0884-z
12. Di Crosta A, Palumbo R, Marchetti D, Ceccato I, La Malva P, Maiella R, et al. Individual differences, economic stability, and fear of contagion as risk factors for PTSD symptoms in the COVID-19 emergency. *Front Psychol.* (2020) 11:567367. doi: 10.3389/fpsyg.2020.567367
13. Mertens G, Gerritsen L, Duijndam S, Salemink E, Engelhard IM. Fear of the coronavirus (COVID-19): predictors in an online study conducted in march 2020. *J Anxiety Disord*. (2020) 74:102258. doi: 10.1016/j.janxdis.2020.102258
14. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry*. (2020) 7:300–2. doi: 10.1016/S2215-0366(20)30073-0
15. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health*. (2020) 17:1729. doi: 10.3390/ijerph17051729
16. Kokou-Kpolou CK, Fernández-Alcántara M, Cénat JM. Prolonged grief related to COVID-19 deaths: do we have to fear a steep rise in traumatic and disenfranchised griefs? *Psychol Trauma.* (2020) 12:S94–5. doi: 10.1037/tra0000798
17. Bacon AM, Corr PJ. Coronavirus (COVID-19) in the United Kingdom: a personality-based perspective on concerns and intention to self-isolate. *Br J Health Psychol*. (2020) 25:839–48. doi: 10.1111/bjhp.12423
18. Kövi Z, Odler V, Gacsályi S, Hittner JB, Hevesi K, Hübner A, et al. Sense of coherence as a mediator between personality and depression. *Pers Individ Dif*. (2017) 114:119–24. doi: 10.1016/j.paid.2017.03.064
19. Strickhouser JE, Zell E, Krizan Z. Does personality predict health and well-being? A metasynthesis. *Health Psychol.* (2017) 36:797–810. doi: 10.1037/hea0000475
20. Pradhan M, Chettri A, Maheshwari S. Fear of death in the shadow of COVID-19: The mediating role of perceived stress in the relationship between neuroticism and death anxiety. *Death Stud.* (2020). doi: 10.1080/07481187.2020.1833384. [Epub ahead of print].
21. Omori R, Matsuyama R, Nakata Y. The age distribution of mortality from novel coronavirus disease (COVID-19) suggests no large difference of susceptibility by age. *Sci Rep.* (2020) 10:16642. doi: 10.1038/s41598-020-73777-8
22. World Health Organization. *Situation report−130, Coronavirus Disease 2019 (COVID-2019).* WHO (2020). Avaialable online at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports
23. Rammstedt B, Kemper CJ, Borg I. Correcting big five personality measurements for acquiescence: an 18-country cross-cultural study: correcting big five measurements for acquiescence. *Eur J Pers*. (2013) 27:71–81. doi: 10.1002/per.1894
24. Rammstedt B, John OP. Measuring personality in one minute or less: A 10-item short version of the big five inventory in English and German. *J Res Pers*. (2007) 41:203–12. doi: 10.1016/j.jrp.2006.02.001

25. Jankowsky K, Olaru G, Schroeders U. Compiling measurement invariant short scales in cross-cultural personality assessment using ant colony optimization. *Eur J Pers*. (2020) 34:470–85. doi: 10.1002/per.2260
26. Moret-Tatay C, Baixauli-Fortea I, Grau-Sevilla MD. Profiles on the orientation discrimination processing of human faces. *Int J Environ Res Public Health*. (2020) 17:5772. doi: 10.3390/ijerph17165772
27. Pyszczynski T, Greenberg J, Solomon S. A dual-process model of defense against conscious and unconscious death-related thoughts: an extension of terror management theory. *Psychol Rev*. (1999) 106:835–45. doi: 10.1037/0033-295X.106.4.835
28. Su R, Shen W. Is nationalism rising in times of the COVID-19 pandemic? Individual-level evidence from the United States. *J Chin Polit Sci*. (2020). doi: 10.1007/s11366-020-09696-2. [Epub ahead of print].
29. Mian A, Khan S. Coronavirus: the spread of misinformation. *BMC Med*. (2020) 18:89. doi: 10.1186/s12916-020-01556-3
30. Lissek S, Pine DS, Grillon C. The strong situation: a potential impediment to studying the psychobiology and pharmacology of anxiety disorders. *Biol Psychol*. (2006) 72:265–70. doi: 10.1016/j.biopsycho.2005.11.004
31. Lin ECL, Peng YC, Hung Tsai JC. Lessons learned from the anti-SARS quarantine experience in a hospital-based fever screening station in Taiwan. *Am J Infect Control*. (2010) 38:302–7. doi: 10.1016/j.ajic.2009.09.008
32. Lu H, Nie P, Qian L. Do quarantine experiences and attitudes towards COVID-19 affect the distribution of mental health in China? A quantile regression analysis. *Appl Res Qual Life*. (2020). doi: 10.1007/s11482-020-09851-0. [Epub ahead of print].
33. Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R. Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect*. (2008) 136:997–1007. doi: 10.1017/S0950268807009156
34. Locke B, Low M, Forsgren E. An integrated management strategy to prevent outbreaks and eliminate infection pressure of American foulbrood disease in a commercial beekeeping operation. *Prev Vet Med*. (2019) 167:48–52. doi: 10.1016/j.prevetmed.2019.03.023

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

OPINION
published: 09 February 2021
doi: 10.3389/fpsyt.2021.624665

Caring for End-of-Life Patients and Their Families, During Life, and Mourning, in the COVID-19 Era—The Experience of a Palliative Care Team in Portugal

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Keywords: end-of-life, mourning, COVID-19, terminally ill patients, prolonged grief, mental health disorders

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Alfredo Zamora Mur, Universidad San Jorge, Spain
Maarten C. Eisma, University of Groningen, Netherlands

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *31 October 2020*
Accepted: *04 January 2021*
Published: *09 February 2021*

Citation:
Carvalheiro AM, Faria C, Semeão I and Martinho SM (2021) Caring for End-of-Life Patients and Their Families, During Life, and Mourning, in the COVID-19 Era—The Experience of a Palliative Care Team in Portugal. Front. Psychiatry 12:624665. doi: 10.3389/fpsyt.2021.624665

Throughout history, humankind has survived several epidemics that have caused a high number of deaths and suffering (1). Those events have had profound economic, social, political, cultural, medical, and psychological impacts on humanity (2).

More recently, in December 2019, in Wuhan city in China, a previously unknown coronavirus was identified in humans (3). The new Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) causes a highly contagious and infectious disease, which has been designated Coronavirus Disease 2019 (COVID-19) (4). People with COVID-19 can present a wide variety of symptoms, ranging from mild, or even asymptomatic carriers, to fatal cases, with about one in six infected becoming seriously ill (5). SARS-CoV-2 affects mainly the respiratory tract, resulting in difficulty in breathing, shortness of breath (6), or pneumonia, but can also affect the gastrointestinal, nervous, cardiovascular, dermatologic, or ophthalmic systems (7).

At the time of writing, the number of deaths by coronavirus in the world already exceeds 1,815,518 and continues to increase (8). Experts have warned about the possibility of a new wave during winter 2020 (9), which is already happening in Portugal. Given the high number of deaths, the coronavirus pandemic will leave behind many more to grieve their lives (10). Studies indicate that each COVID-19 death corresponds with approximately nine bereaved people (11).

Faced with this threat in public health, the Directorate-General of Health, which is a division of the Portuguese public administration concerned with public health, prepared the National Preparedness and Response Plan for the Disease Caused by a New Coronavirus, which is a strategic tool to mitigate the impact of the SARS-CoV-2 outbreak (12). This document contains appropriate measures for each phase of the pandemic, focusing on interrupting transmission chains, preventing the spread, reducing the intensity, and decreasing the number of cases (13).

On March 26, 2020, Portugal entered the highest alert and response level against coronavirus—the mitigation phase—and here remains. At that time, one of the measures put in place in Portuguese hospitals advocated that all people with an acute respiratory condition (cough, dyspnea, or breathing difficulty) should be managed as a suspect case (14). However, studies indicate that dyspnea, apart from being one of the hallmark symptoms of COVID-19, can arise from many different underlying conditions (15). Dyspnea is even one of the most frequent and prevalent symptoms in advanced illness of any etiology, whether oncological or non-oncological. It is present in 75% of patients (15), and its prevalence and severity increase with the approach of death—about 70% in the last 6 weeks of life (16). This implies that, even though COVID-19 is not the cause of dyspnea of some patients who resort to the hospital emergency room, including terminally ill

patients, they are referred to a dedicated COVID-19 area, tested for SARS-CoV-2, and considered "suspect cases" (15).

According to Portuguese norms, when facing a "suspect case," family members cannot visit their relatives at the hospital (17, 18). For this reason and on the basis of our experience at the Leiria Hospital Center, we have noticed that most families have tried to keep their terminally ill loved ones at home as long as possible. This situation can lead to caregiver exhaustion and more frequent interventions by the hospital-based palliative care team (HBPCT), with the subsequent overload of the service.

We have also observed that, in most cases, when these patients are brought to the hospital, they are already facing their last days of life and, due to the severity of their clinical condition, end up staying in the COVID-19 area (until they get a negative COVID-19 test result), to later be admitted to a ward.

Regarding patients who remain in the COVID-19 area, difficulties have been identified at various levels. On one hand, the patient has to spend several hours in an area with suspected cases, which substantially increases the risk of contagion. At this point, it is important to mention that this group is, by itself, one of the most vulnerable, having the highest coronavirus death rate (19). On the other hand, HBPCT is not called for symptom management until the patient presents a negative test result for COVID-19. Studies indicate that, in emergency and humanitarian crises, measures to alleviate suffering may be neglected, due to the need to save lives, yet palliative care is also paramount (20). According to several national and international palliative care associations, palliative care should be offered in conjunction with standard treatment for any disease that threatens the continuity of life and should never be associated with omission or exclusion, even during a pandemic (21, 22). For its growing importance, future funding for care and research should not focus only on acute patients and the emergency department but also on palliative care. To add to the previous problems, visits are forbidden in the COVID-19 area (18). Notably, in a normal situation, the law recognizes the right to family support for people with an incurable disease at an advanced stage and in the final state of life (23). However, the COVID-19 pandemic led to an exception regime in which visits are prohibited. All of these constraints lead to increased anxiety and uncertainty in family members and patients.

Regarding patients who are admitted to the wards, the difficulties are not less. Since visits are also suspended here (18), the HBPCT has been trying to circumvent this limitation by allowing virtual visits between the family and the patient, using new technologies, namely, video calls. These calls are organized by a nurse from the HBPCT, and the frequency of contacts is negotiated with the family. In this context, the principles of therapeutic communication and active listening should not be neglected, as they facilitate dialogue with families and patients (20). To facilitate virtual visits, it was necessary to make efforts to obtain financing for the purchase of equipment. Unfortunately, we are aware that there is a small part of the population that will not be able to make use of these services, as they do not have access to the Internet or appropriate electronic equipment. To help patients cope with social isolation, actions that do not jeopardize safety measures, such as providing moments of music or reading, could be attempted (21). In all cases, we face the dilemma between the measures recommended by public health and the understanding of what should be the dignification of the end of life (24). Still regarding inpatients, we have noticed a great difficulty in care responses of the existing palliative care units when facing COVID-19-positive patients with conditions for hospital discharge. According to the technical guidelines issued by the Directorate-General of Health of Portugal, patients can only be admitted to these units after obtaining a negative result (despite being considered clinically cured) (25). This implies that COVID-19-positive patients will receive prolonged support from the HBPCT, with the consequent overload of the team. Regarding the families' reaction to a referral proposal of their loved ones to these units, we have been noticing that many of them accept this possibility only in an extreme situation. This includes situations in which the patient suffers intensely, is agonized, and experiences problems and needs that are difficult to address and that require specific, organized, and interdisciplinary support or situations where caregivers are exhausted. This reaction of families is justified by the fact that patients have to fulfill an isolation period of not $<$14 days (26), and after this period, visits are restricted to one or two times a week and always after making an appointment. This situation highlights the urgent need for investment in home or community teams, which do not yet exist in our region (26). Currently, there are only a few integrated continuous care teams, which are unable to meet all needs or are less dedicated to the management of palliative patients. When patients are in their last days of life, we offer the opportunity to one of the family members to meet with the patient face to face to say goodbye, using appropriate protective equipment, according to a procedure prepared by the team. While not the ideal situation, this is the only way we can meet the safety conditions. It is important to try to balance ethical procedures, comfort, and patients' life quality with the provided services (20).

In short, despite the fact that many of the terminally ill patients are not infected with the virus, they ended up dying away from family, without being seen by them again, and without being able to say goodbye (27). The natural response of human beings to death, regardless of their culture or religion, is expressed by grief and mourning (28).

Before the pandemic, anticipatory grief would be experienced in the dying process of terminal patients, involving farewell rituals that created opportunities for family communication, solving of unresolved issues, and sharing of good times and opportunities for relational-based conversation on topics such as gratitude, love, and forgiveness (29). In this process, both verbal and nonverbal communication is essential (29). In fact, nonverbal communication seems important in situations where words are insufficient to express what is desired or what cannot be said (29). According to the studies, farewell rituals are promoters of quality of death for patients and quality of life for family members and may favor the resolution of grief (29).

Additionally, during the pandemic mitigation phase and similar to what happened in other countries, the Directorate-General of Health of Portugal created post-death measures (postmortem care, autopsy, and mortuary care), for individuals with suspected or confirmed infection by SARS-CoV-2 (30). As

already mentioned, this may include some terminally ill patients with respiratory complaints due to their advanced disease, and not due to the virus. In these cases, as already described by Aguiar et al. (30), the corpses are removed after death and never seen by the family again; identification of the bodies is carried out remotely and through digital photographs of the face; corpses are kept in a bag without the attire usually chosen by the family; caskets are closed and kept closed during the funeral; and funerals and burials are postponed or held remotely or with the presence of a maximum of 10 people (30). These measures have deprived many terminally ill patients and the families of the mourning rituals they have been planning throughout the course of their illness (28). This can make family members feel that they did not say goodbye the way they wished for (31) and that the deceased did not receive the funeral he or she deserved, was victim of negligence, or has undergone inhumane treatment. Notably, in the past, communicating bad news to the family over the telephone was considered an unethical practice (22). In the COVID-19 era, this practice has been important to avoid contact and comply with physical distancing requirements.

What has been happening during the pandemic is that all actions that promote quality mourning, such as religious activities, social support (32–35), and the fulfillment of last wishes, have been limited or postponed indefinitely (22). This may increase the risk of mental health problems, including persistent, severe, and disabling grief, also termed prolonged grief disorder, among both those bereaved due to COVID-19 and those bereaved due to other causes (28, 29, 32–34, 36). Indeed, pioneering quantitative and qualitative studies have suggested that prolonged grief disorder may become a major public health concern following the pandemic (32–34, 36, 37). For this reason, it seems essential to increase accessibility to evidence-based interventions, which include cognitive-behavioral therapy, and to stimulate the development and dissemination of these therapies, in both face-to-face and online formats, if the pandemic is to last for a long period of time (36, 37).

Appropriate aftercare and support may be required to prevent a peak in the prevalence of mental health problems due to loss of a loved one (38). It is important that all healthcare professionals in contact with a mourner are aware of the importance of detecting the risk of prolonged grief and providing appropriate referrals. For bereaved people, there are three levels of intervention which must be activated if necessary, and these include social support or monitoring, counseling and therapy, or specialized intervention (with a grieving support group or individual consultation with a psychologist or psychiatrist) (39). In Portugal, only a few palliative care teams (around 60%) have a formal structured grieving support program to accompany the family/caregivers who have lost a family member (40). This program includes actions and activities such as letters or text messages of condolences, home visits, consultations, telephone calls, family conferences, and group consultations (40). There is no consensus on the ideal time horizon between death and the first contact with the family, but in practice, this occurs between 72 h and 8 weeks (39, 40).

Mourning related to terminal illness is a dimension to reinvent in the current context and should include innovative ways to promote connection with people (before and after death) (41). Mourning rituals and practices must be adapted, using real or virtual alternatives for remembrance and commemoration (42), in order to provide comfort to families, maintaining infection control rules (43). The use of modern technology, such as smartphones or tablets, can help maintain some pseudo-social connectedness, which may minimize the grief experienced because of the separation (44).

However, before death, there are still details that we can improve. The norms established so far refer to the general population and not specifically to end-of-life patients. It is urgent that the institutions create preferential circuits for patients at the end of life, considering their particularities, and flowcharts for asymptomatic terminal patients and with suspected infection, which take into account patient and professional safety.

It is reasonable to expect that, over the years, other epidemics or pandemics will emerge. Therefore, a significant research effort has been made to understand the consequences of grieving during this pandemic, so that we are better prepared for similar future situations. We recommend specific studies into how changes brought about by the pandemic will impact grief of family members of terminally ill patients. This may help improve existing prevention and intervention efforts for severe mental health problems within this population.

AUTHOR CONTRIBUTIONS

AC conceived of the presented idea and wrote the manuscript with input from all authors. CF, IS, and SM made the critical revision of the article. All authors provided critical feedback and helped shape the final manuscript.

REFERENCES

1. World Health Organization. *Fact Sheets: Infectious Diseases*. Available online at: https://www.who.int/topics/infectious_diseases/factsheets/en/ (accessed September 24, 2020).
2. Huremović D. Brief history of pandemics (pandemics throughout history). *Psychiatry Pandemics*. (2019) 7–35. doi: 10.1007/978-3-030-15346-5_2
3. El Zowalaty ME, Järhult JD. From SARS to COVID-19: a previously unknown SARS- related coronavirus (SARS-CoV-2) of pandemic potential infecting humans - Call for a One Health approach. *One Health*. (2020) 9:100124. doi: 10.1016/j.onehlt.2020.100124
4. Zheng J. SARS-CoV-2: an emerging coronavirus that causes a global threat. *Int J Biol Sci*. (2020) 16:1678–85. doi: 10.7150/ijbs.45053
5. World Health Organization. *Q&A on Coronaviruses (COVID-19)*. Available online at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-coronaviruses (accessed September 24, 2020).
6. Harvard Health Publishing. *COVID-19 Basics. Symptoms, Spread and Other Essential Information About the New Coronavirus and COVID-19*. Available online at: https://www.health.harvard.edu/diseases-and-conditions/covid-19-basics (accessed September 24, 2020).
7. Baj J, Karakuła-Juchnowicz H, Teresiński G, Buszewicz G, Ciesielka M, Sitarz E, et al. COVID-19: specific and non-specific clinical manifestations

and symptoms: the current state of knowledge. *J Clin Med.* (2020) 9:1753. doi: 10.3390/jcm9061753
8. European Centre for Disease Prevention and Control. *COVID-19 Situation Update Worldwide, as of 24 September 2020*. Available online at: https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases (accessed December 31, 2020).
9. Mortazavi SS, Assari S, Alimohamadi A, Rafiee M, Shati M. Fear, loss, social isolation, and incomplete grief due to COVID-19: a recipe for a psychiatric pandemic. *Basic Clin Neurosci.* (2020) 11:225–32. doi: 10.32598/bcn.11.covid19.2549.1
10. Gesi C, Carmassi C, Cerveri G, Carpita B, Cremone IM, Dell'Osso L. Complicated grief: what to expect after the coronavirus pandemic. *Front Psychiatry.* (2020) 11:489. doi: 10.3389/fpsyt.2020.00489
11. Verdery AM, Smith-Greenaway E, Margolis R, Daw J. Tracking the reach of COVID-19 kin loss with a bereavement multiplier applied to the United States. *Proc Natl Acad Sci U.S.A.* (2020) 117:17695–701. doi: 10.1073/pnas.2007476117
12. Direção-Geral da Saúde. *Plano Nacional de Preparação e Resposta à Doença por novo coronavirus (COVID-19)*. Available online at: https://covid19.min-saude.pt/wp-content/uploads/2020/03/Plano-de-Conting%C3%AAncia-Novo-Coronavirus_Covid-19.pdf (accessed September 24, 2020).
13. European Centre for Disease Prevention and Control. *Outbreak of Novel Coronavirus Disease 2019 (COVID-19): Increased Transmission Globally - Fifth Update*. Available online at: https://www.ecdc.europa.eu/sites/default/files/documents/RRA-outbreak-novel-coronavirus-disease-2019-increase-transmission-globally-COVID-19.pdf (accessed September 24, 2020).
14. Direção-Geral da Saúde. Norma n° 004/2020 de 23/03/2020. *COVID-19: FASE DE MITIGAÇÃO. Abordagem do Doente com Suspeita ou Infeção por SARS-CoV-2*. Available online at: https://www.dgs.pt/normas-orientacoes-e-informacoes/normas-e-circulares-normativas/norma-n-0042020-de-23032020-pdf.aspx (accessed September 24, 2020).
15. Fraser Health Authority. *Hospice Palliative Care Program. Symptom Guidelines*. Dyspnea. Available online at: https://www.fraserhealth.ca/-/media/Project/FraserHealth/FraserHealth/Health-Professionals/Professionals-Resources/Hospice-palliative-care/Dyspnea.pdf (accessed September 24, 2020).
16. Reuben DB, Mor V. Dyspnea in terminally ill cancer patients. *Chest.* (1986) 89:234–6. doi: 10.1378/chest.89.2.234
17. Direção-Geral da Saúde. Norma n° 002/2020 de 25/01/2020. *Infeção Pelo Novo Coronavírus (2019-nCoV)*. Available online at: https://www.dgs.pt/directrizes-da-dgs/orientacoes-e-circulares-informativas/orientacao-n-0022020-de-25012020-pdf.aspx (accessed September 24, 2020).
18. Centro Hospitalar de Leiria. Notícias e eventos. *CHL Mantém a Suspensão da Entrada de Acompanhante/Cuidador/Visitas*. Available online at: http://www.chleiria.pt/comunicacao-social/noticias-eventos/-/chl-mantem-a-suspensao-da-entrada-de-acompanhantecuidadorvisitas-589/ (accessed November 27, 2020).
19. Wang SSY, Teo WZY, Yee CW, Chai YW. Pursuing a good death in the time of COVID-19. *J Palliat Med.* (2020) 23:754–55. doi: 10.1089/jpm.2020.0198
20. Florêncio RS, Cestari VRF, Souza LC, Flor AC, Nogueira VP, Moreira TMM, et al. Cuidados paliativos no contexto da pandemia de COVID-19: desafios e contribuições. *Acta Paul Enferm*. (2020) 33:eAPE20200188. doi: 10.37689/acta-ape/2020AO01886
21. Associação Portuguesa de Cuidados Paliativos. *Cuidados Paliativos. O Que São?* Available online at: https://www.apcp.com.pt/cuidados-paliativos/o-que-sao.html (accessed November 27, 2020).
22. Artmed Panamericana Editora Ltda. *Cuidados Paliativos No Contexto da Covid-19: Como Proceder*. Available online at: https://secad.artmed.com.br/blog/coronavirus/cuidados-paliativos-na-covid-19/ (accessed November 27, 2020).
23. Diário da República Electrónico. *Direitos e Deveres do Utente dos Serviços de Saúde. Lei n.° 15/2014 - Diário da República n.° 57/2014, Série I de 2014-03-21*. Available online at: https://dre.pt/home/-/dre/571943/details/maximized (accessed November 27, 2020).
24. Rocha C, Oliveira, HM. Cuidados paliativos na pandemia COVID-19. *Med Intern*. (2020) 27:44–7. Available online at: http://dx.doi.org/10.24950/rspmi/COVID19/C.Rocha/H.M.Oliveira/ULSM/S/2020
25. Direção-Geral da Saúde. *Orientação n° 009/2020 de 11/03/2020. Atualização: 23/07/2020*. COVID-19: Fase de Mitigação. Available online at: https://www.dgs.pt/directrizes-da-dgs/orientacoes-e-circulares-informativas/orientacao-n-0092020-de-11032020-pdf.aspx (accessed November 27, 2020).
26. Serviço Nacional de Saúde. *Plano Estratégico Para o Desenvolvimento dos Cuidados Paliativos*. Biénio 2019–2020. Available online at: https://www.sns.gov.pt/wp-content/uploads/2019/04/PEDCP-2019-2020-versao-final-10.02.2019.pdf (accessed November 27, 2020).
27. Wallace CL, Wladkowski SP, Gibson A, White P. Grief during the COVID-19 pandemic: considerations for palliative care providers. *J Pain Symptom Manage.* (2020) 60:e70–e6. doi: 10.1016/j.jpainsymman.2020.04.012
28. Farahmandnia B, Hamdanieh L, Aghababaeian H. COVID-19 and unfinished mourning. *Prehosp Disas Med.* (2020) 35:464. doi: 10.1017/S1049023X20000631
29. Crepaldi MA, Schmidt B, Noal DS, Bolze SDA, Gabarra LM. 2020 Terminalidade, morte e luto na pandemia de COVID-19: demandas psicológicas emergentes e implicações práticas. *Estudos Psicol (Campinas)*. (2020) 37:e200090. doi: 10.1590/1982-0275202037e200090
30. Aguiar A, Pinto M, Duarte R. Grief and mourning during the COVID-19 pandemic in Portugal. *Acta Med Port.* (2020) 33:543–5. doi: 10.20344/amp.14345
31. Burrell A, Selman LE. How do funeral practices impact bereaved relatives' mental health, grief and bereavement? A mixed methods review with implications for COVID-19. *Omega (Westport).* (2020) 1–39. doi: 10.1177/0030222820941296
32. Stroebe M, Schut H. Bereavement in times of COVID-19: a review and theoretical framework. *OMEGA J Death Dying.* (2020) 82:500–22. doi: 10.1177/0030222820966928
33. Eisma MC, Tamminga A. Grief before and during the COVID-19 pandemic: multiple group comparisons. *J Pain Symptom Manage*. (2020) 60:e1–e4. doi: 10.1016/j.jpainsymman.2020.10.004
34. Hamid W, Jahangir MS. Dying, death and mourning amid COVID-19 pandemic in Kashmir: a qualitative study. *OMEGA J Death Dying.* (2020). doi: 10.1177/0030222820953708
35. Breen LJ. Grief loss and the COVID-19 pandemic. *Aust J Gen Pract.* (2020) 49. doi: 10.31128/AJGP-COVID-20
36. Eisma MC, Tamminga A, Smid GE, Boelen PA. Acute grief after deaths due to COVID-19, natural causes and unnatural causes: an empirical comparison. *J Affect Disord.* (2021) 278:54–6. doi: 10.1016/j.jad.2020.09.049
37. Eisma MC, Boelen PA, Lenferink LIM. Prolonged grief disorder following the Coronavirus (COVID-19) pandemic. *Psychiatry Res.* (2020) 288:113031. doi: 10.1016/j.psychres.2020.113031
38. Yahya AS, Khawaja S. Bereavement and grief during the COVID-19 pandemic. *Prim Care Companion CNS Disord.* (2020) 22:20com02661. doi: 10.4088/PCC.20com02661
39. Ordem dos Enfermeiros. *Apoio ao Luto em Familiares de Clientes em Cuidados Paliativos*. Available online at: https://www.ordemenfermeiros.pt/arquivo/projectos/Documents/Projetos_Melhoria_Qualidade_Cuidados_Enfermagem/HospitalLuz_ApoioLutoFamiliaresClientesCuidadosPaliativos.pdf (accessed November 27, 2020).
40. Católica Instituto de Ciências da Saúde. *Observatório Português dos Cuidados Paliativos.* Relatório de Outono (2018). Available online at: https://www.apcp.com.pt/uploads/opcp_projeto_3_relatorio_2018_vf-1.pdf (accessed November 27, 2020).
41. Helton G, Wolfe J, Snaman JM. Definitely mixed feelings: the effect of COVID-19 on bereavement in parents of children who died of cancer. *J Pain Symptom Manag.* (2020) 60:e15–e20. doi: 10.1016/j.jpainsymman.2020.08.035
42. Münch U, Müller H, Deffner T, von Schmude A, Kern M, Kiepke-Ziemes S, et al. Empfehlungen zur Unterstützung von belasteten, schwerstkranken, sterbenden und trauernden Menschen in der Corona-Pandemie aus palliativmedizinischer Perspektive. Empfehlungen der Deutschen Gesellschaft für Palliativmedizin (DGP), der Deutschen Interdisziplinären Vereinigung für Intensiv- und Notfallmedizin (DIVI), des Bundesverbands Trauerbegleitung (BVT), der Arbeitsgemeinschaft für Psychoonkologie in der Deutschen Krebsgesellschaft, der Deutschen Vereinigung für Soziale Arbeit im Gesundheitswesen (DVSG) und der Deutschen Gesellschaft für Systemische Therapie, Beratung und Familientherapie

(DGSF). *Schmerz.* (2020) 34:303–13. doi: 10.1007/s00482-020-00483-9

43. Mayland CR, Harding AJE, Preston N, Payne S. Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J Pain Symptom Manage.* (2020) 60:e33–e9. doi: 10.1016/j.jpainsymman.2020.05.012
44. Singer J, Spiegel JA, Papa A. Preloss grief in family members of COVID-19 patients: recommendations for clinicians and researchers. *Psychol Trauma.* (2020) 12:S90–S3. doi: 10.1037/tra0000876

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 10 February 2021
doi: 10.3389/fpsyt.2021.593918

The Impacts of SARS-CoV-2 Pandemic on Suicide: A Lexical Analysis

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Background: Although COVID-19 is a public health emergency, its consequences for the mental health of the population are still scarce. Likewise, its impact on critical situations such as suicide is still poorly explored in the literature. Therefore, this study aimed to analyze in a pioneering way, through lexical and content analysis techniques, the possible impacts of the new COVID-19 pandemic on suicide behavior.

Methods: A lexical analysis, whose sample (not probabilistic, i.e., for convenience) was made up of full-length papers (abstracts) and short communications, about suicide behavior in COVID-19 pandemic, in PubMed and Virtual Health Library (VHL) was carried out following a lexical and content analysis using the software IRaMuTeQ, version 0.7 alpha 2.

Results: The most frequent active words were suicide behavior (n = 649), covid (n = 439), health (n = 358), mental (n = 268), and social (n = 220). Four lexical classes were found and organized into two large groups: the first group, formed by the classes 2 ("methods for psychological treatment") and 3 ("strategies to minimize the COVID-19 impacts"), was the most representative, totaling 50.6% of the text segments and second group formed by classes 1 ("signs of clinical depression") and 4 ("COVID-19 pandemic as a public health problem") with 49.4% of the text segments.

Conclusion: Facing suicide behavior, the direct effects of the COVID-19 pandemic, and the negative feelings and trigger of previous psychiatric illnesses; the measures to deal with the pandemic such as social isolation, decrease in the number of professionals, the opening hours of health establishments, and decrease in the demand for medications; and competing phenomena such as the spread of fake news and lack of empathy are aggressive and potentiating factors of suicidal ideation.

Keywords: coronavirus infections, pandemic, mental health, suicide, qualitative analysis, quantitative analysis

OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *11 August 2020*
Accepted: *07 January 2021*
Published: *10 February 2021*

Citation:
Gonçalves Júnior J, Sales JP, Moreno MM and Rolim-Neto ML (2021) The Impacts of SARS-CoV-2 Pandemic on Suicide: A Lexical Analysis. Front. Psychiatry 12:593918. doi: 10.3389/fpsyt.2021.593918

INTRODUCTION

Around one million deaths by suicide behavior are registered every year (1), which is one person every 40 s and 1.4% of all deaths worldwide, being the 18th leading cause of death in 2016. Thus, suicide behavior is a global phenomenon and occurs throughout the life span (2).

In the face of the new coronavirus (COVID-19), SARS-CoV-2, pandemic that occurred in

Wuhan, China, in December of 2019 (3), with more cases and news about people in quarantine (4), the isolation and feeling of loneliness are high. As of December 30, 2020, a total of 80,155,187 cases of COVID-19 have been confirmed in 222 countries with 1,771,128 deaths (5).

During pandemics, the number of people whose mental health is affected tends to be greater than the number of people affected by the infection. Indeed, in a pandemic, fear increases stress, negative symptoms, and anxiety levels in the general population and intensifies the symptoms in individuals with pre-existing psychiatric disorders (6, 7). A Chinese study reported that patients infected with COVID-19 (or suspected of being infected) may experience intense emotional and behavioral reactions, such as fear, boredom, loneliness, anxiety, insomnia, or anger (8) as has been reported about similar situations in the past.

Suicide behavior is likely to become a more pressing concern as the pandemic spreads and has longer-term effects on the general population, as much as on the economy, and on vulnerable groups (9). The increase in suicide behavior rates is being predicted worldwide, from the United States (10) to India (11).

However, as COVID-19 is a new disease, both biological and psychological impacts lack greater theoretical input. And when it comes to suicide behavior in the context of a pandemic, that situation becomes more critical. Therefore, this study aimed to analyze, through lexical and content analysis techniques from recent original publications, the possible impacts of the new COVID-19 pandemic on suicide behavior. Moreover, a lexical analysis could be considered a complementary approach to a thematic analysis once it allows a deeper investigation of textual data (12).

METHODS

A lexical analysis whose sample (not probabilistic, i.e., for convenience) was made up of abstracts in full-length papers and complete texts in short communications in PubMed and Virtual Health Library (VHL), which hosts recognized databases—LILACS (*Literatura Latino-americana e do Caribe em Ciências da Saúde*), MEDLINE, and SciELO (Scientific Electronic Library Online)—was carried out.

Procedure

Data collection was performed in databases, and the following descriptors were used: #1 "coronavirus infections" (Medical Subject Headings [MeSH term]) AND #2 "suicide" (MeSH), which referred to mental health situations facing suicide or suicidal behavior in the pandemic period of SARS-CoV-2.

Eligibility Criteria

The period reported in the literature ranged from December 2019 to April 2020 for two phases since the pandemic started in this time span. Compilation of the data was performed in May 2020. The manuscript and abstract selection occurred primarily through the analysis of abstracts (for full-length papers) and short communications. The analysis had the following eligibility criteria: (1) texts written in English, Portuguese, or Spanish; (2) studies addressing the impact of the COVID-19 pandemic on suicide attempt; (3) titles with a combination of search terms; and (4) full text available through the CAPES (Coordination of Personal Improvement of Higher Level) Periodicals Portal, a virtual library created by the Brazilian Ministry of Health where content is restricted to authorized users. Monographs, dissertations, and these were excluded. Manuscripts that were repeated in more than one of the databases were counted only once. Some articles which have already generally approached the suicide behavior in other viruses/pandemics were excluded.

To ensure the trustworthiness of the findings, data collection was performed, individually, by two researchers with divergences being solved by a third senior researcher.

Data Analysis

After tabulation, the data were processed by using the IRaMuTeQ (*Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires*) software, version 0.7 alpha 2, developed by Pierre Ratinaud, which allows the statistical analysis of textual corpus and individual tables/words (13). IRaMuTeQ provides five types of analysis: classical textual statistics, research regarding group specificities, descending hierarchical rank, similarity analysis, and word cloud (14–16).

The abstracts and short communications were transformed in three corpus named by the letter "S" and analyzed through similarity analysis, word cloud, confirmatory factorial analysis (CFA), and descendent hierarchical classification (DHC) (14, 15).

Before the analysis was started, in the text segment parameters, only "full" language elements were selected as assets, adjectives, unrecognized forms, nouns, verbs, and auxiliary nouns and verbs such as complementary (supplementary), aiming to enrich the text content.

Ethical Issues

Since this is a qualitative study with public domain information, Resolution 510/16 of the Brazilian National Health Council (CNS) ensures its exemption from submission to a Human Beings Research Ethics Committee. The ethical criteria of the Declaration of Helsinki and international standards were observed.

RESULTS

According to the research strategy in PubMed, 54 papers were found. Thirty-nine articles were selected after applying the filters. Fifteen were out of context and/or beyond the search period. In VHL, 29 articles were found, but none was selected since 12 were repeated and the 17 others were out of context.

Initially, the corpus was built with 39 texts separated by 1,184 text segments, in which only 885 were used (74.75%). The lexicographic analysis of the textual corpus produced 42,562 occurrences (words and forms), with 3,195 being active forms. The most frequent active words were suicide ($n = 649$), covid ($n = 439$), health ($n = 358$), mental ($n = 268$), and social ($n = 220$).

Moreover, the DHC of active words produced five lexical classes divided into two major groups, shown in the dendrogram (**Figure 1**). The first group, formed by classes 2 and 3, was

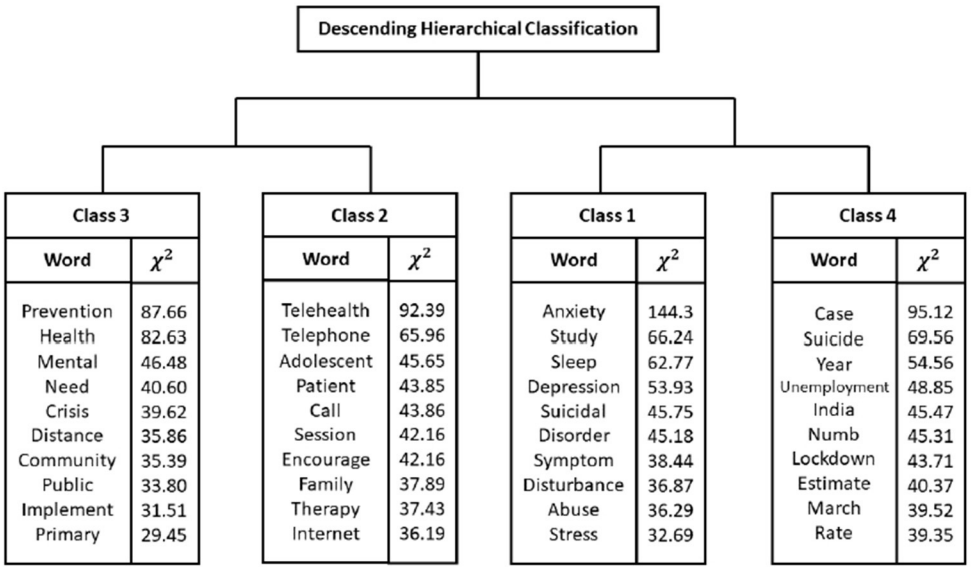

FIGURE 1 | Descending hierarchical classification (dendrogram) with most frequently words and chi-square values.

the most representative, totaling 50.6% of the text segments. Complementarily, the second group was formed by classes 1 and 4 (49.4% of the text segments). The four lexical classes received the following names: "signs of clinical depression" (class 1); "methods for psychological treatment" (class 2); "strategies to minimize the COVID-19 impacts" (class 3); and "COVID-19 pandemic as a public health problem" (class 4).

Regarding the CFA, two factors explain 42.81% and 29.14% of the model, which are represented on the X and Y axes in **Figure 2**. The two-dimensional view clearly presents four distinct areas, which are directly associated with the four classes previously presented.

Figure 3 shows the similitude analysis, using a graph that represents the connection between words in the analyzed textual corpus (17). In this case, six groups of words were constructed. The first DHC class, "signs of clinical depression," seems to be related to the yellow and red groups of words. Further, "methods for psychological treatment" (class 2) and "strategies to minimize the COVID-19 impacts" (class 3) seem to be related to the purple group. Finally, the fourth class ("COVID-19 pandemic as a public health problem") and the blue group have words with close meanings.

DISCUSSION

The most frequent active words were suicide ($n = 649$), covid ($n = 439$), health ($n = 358$), mental ($n = 268$), and social ($n = 220$). In DHC, four lexical classes emerged (**Figure 1**). The second ("methods for psychological treatment") and third ("strategies to minimize the COVID-19 impacts") classes were the most representative, totaling 50.6% of the text segments, and are correlated to each other (**Figures 1**, **2**). The most evoked words in the second class ("strategies to minimize the COVID-19 impacts") are prevention, health, mental, need, crisis, and distance (**Figures 1**, **3**).

Indeed, with the COVID-19 pandemic, the World Health Organization (WHO) affirms that introducing quarantine measures early may delay the introduction of the disease to a country or area or may delay the peak of an epidemic in an area where local transmission is ongoing or both (7, 18). Therefore, the quarantine has an impact on worsening mental and biologic health and causes strong emotions in adults and children (7, 19). It enhances insomnia, denial, stress, anxiety, fear, depressive symptoms, and anger (20) (words evoked in the first class) and increases use of tobacco, alcohol, or other drugs (19).

In the second great group, with 49.6% of the text segments each, are the first ("signs of clinical depression") and fourth ("COVID-19 pandemic as a public health problem") classes. The first class evokes the words anxiety, study, sleep, depression, and suicidal (**Figures 1**, **3**). In this context, it is understandable that the correlations established in the first class are evident, since it correlates anxiety and mood disorders (such as depression) and their consequences, such as insomnia, with the increase of suicide risk. In this case, the literature affirms that during and following the COVID-19 outbreak and the outcomes of isolation and quarantine, we might see an increase in suicidal ideation and behavior among at-risk populations (21). This could happen due to the factors mentioned above, associated with the financial crisis (22), decreased support from health services, limited access to medications (3, 4), and bullying in those who are infected and who have previous psychiatric comorbidities.

The correlation in the first and third classes reminds us that suicide behavior is a public health problem and demands attention from governments, public agencies, and health professionals. Estimates suggest that fatalities could rise

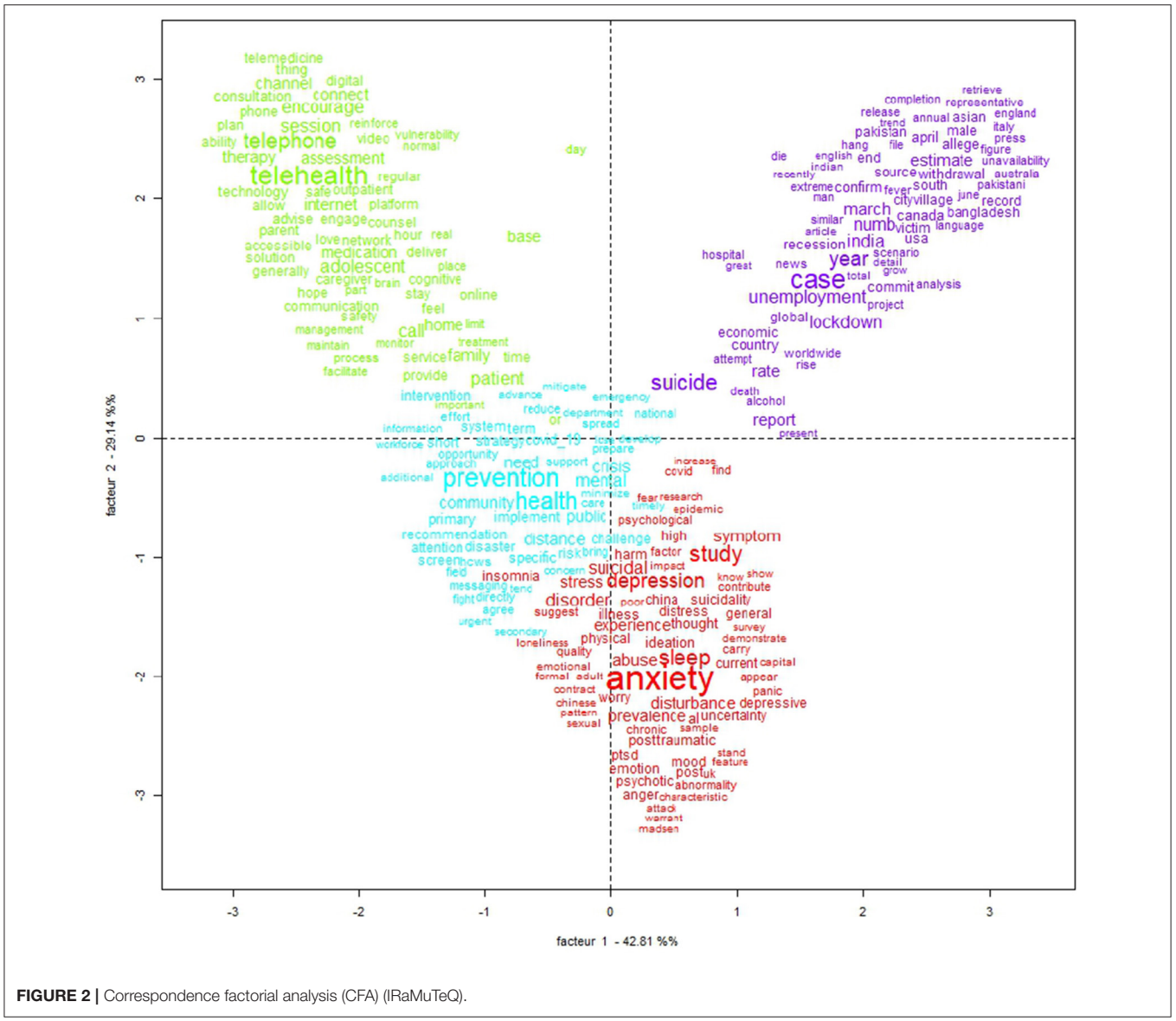

FIGURE 2 | Correspondence factorial analysis (CFA) (IRaMuTeQ).

to 1.5 million by 2020 (23). In the United States, suicide is one of the leading causes of death among young people. It is the third leading cause of death among 15–24-year-olds and the second leading cause of death among 25–34-year-olds (24). In the Western Pacific Region, it accounts for 2.5% of all economic losses due to diseases. In most European countries, the number of suicides is larger than annual traffic fatalities (18).

The second class ("methods for psychological treatment"), when the evoked words are analyzed, calls us to action. It is mandatory to emphasize social support for populations and patients in the COVID-19 pandemic, reinforcing that there is always hope and that there are several solutions to any problem (21); to improve self-esteem and social bonds, especially with family and friends, by having social support, being in a stable relationship, and having religious or spiritual commitment (18); to monitor dysphoric mental states such as irritability and aggression and to not disseminate information from unofficial sources (6). For governments, it is important to standardize psychotropic medications and make them available; to conduct training in stress management, trauma, depression, and risk behavior protocols; to provide alternative service channels (apps, websites, and telephones) (25, 26); and to encourage the participation of multidisciplinary mental health teams at national, state, and municipal levels (27, 28). Finally, the words highlight the fundamental role of social networks and telemedicine as a tool for health care, monitoring, and health promotion during the COVID-19 pandemic against suicide behavior and psychiatry illness. As shown in **Figure 2**, the most

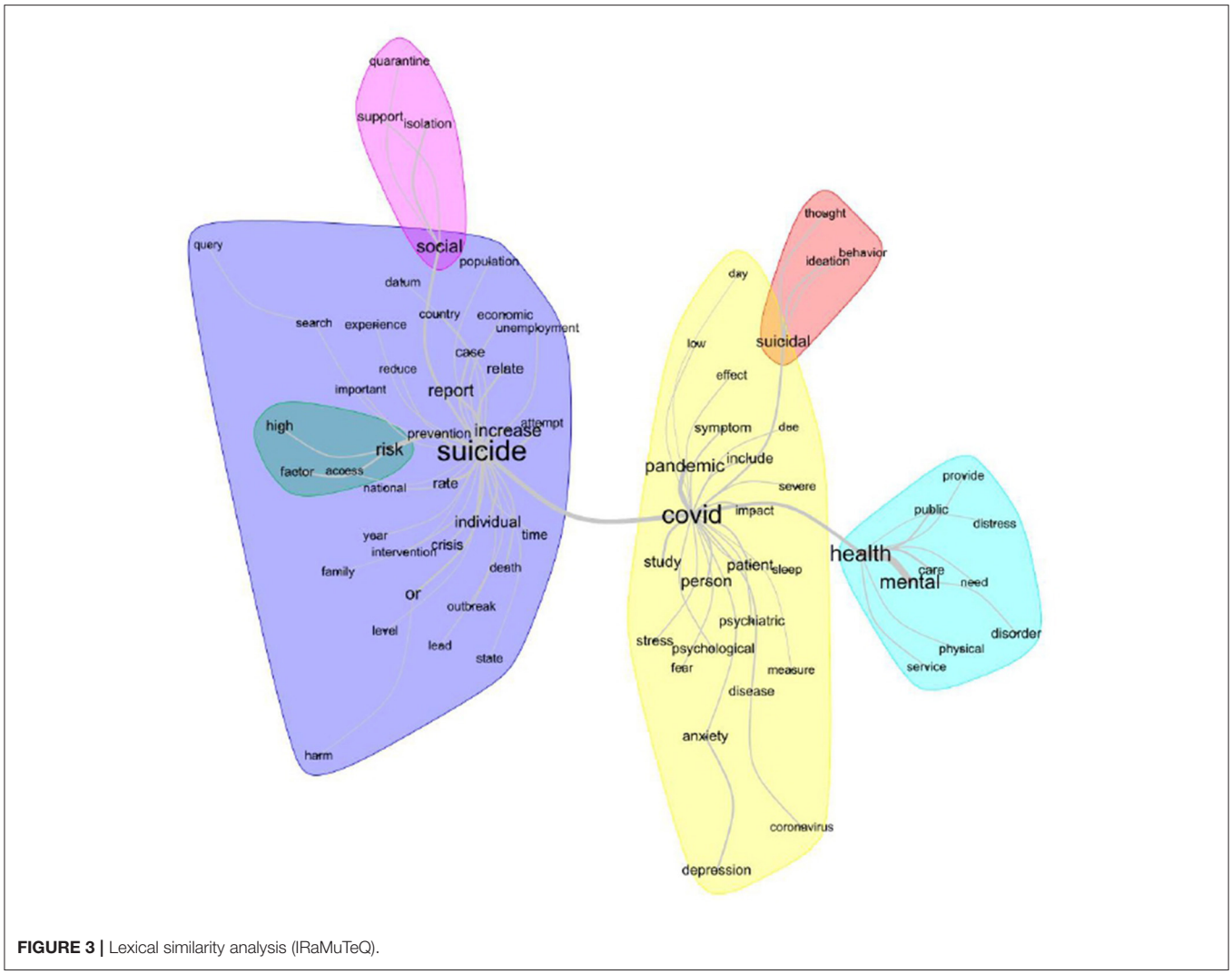

FIGURE 3 | Lexical similarity analysis (IRaMuTeQ).

prominent words in the green group are encourage, telehealth, and telephone.

The fourth class ("COVID-19 pandemic as a public health problem") evokes the word unemployment (fourth most common word in this class). Truly, suicide behavior has many complex underlying causes, including poverty and unemployment (23), especially harming the extremes of age like the elderly and children in a pandemic such as COVID-19. A study with forecasting in 63 countries observed that suicide risk was elevated by 20–30% when associated with unemployment during 2000–2011 (including the 2008 economic crisis) (29), and in New Zealand, 2.04 million cases are included to investigate the relation between suicide and unemployment. The authors concluded that unemployment was associated with a 2 to 3 fold increased relative risk of death by suicide associated to 18–24-year-old men, compared with being employed (30). It is important to consider that in situations of humanitarian crisis such as a pandemic, the economic impact of readjustments in public accounts, the collapse of industry/commerce, and the increase in the prices of basic inputs worsen the scenario (3).

FINAL CONSIDERATIONS

This study aimed to carry out in a pioneering way a lexical analysis of recent publications on the relationship between the COVID-19 pandemic and suicide behavior. Therefore, a search for original papers was conducted. Then, based on the findings, a lexical analysis was performed using the IRaMuTeQ software.

During a humanitarian crisis, it is not uncommon for the mental health of the general population and, above all, for psychiatric patients to be neglected. From this discursive textual analysis, this reality seems apparent. Thus, a collective effort involving civil society, governments, and medical entities to develop urgent damage control/health promotion policies is of utmost importance.

The mapping of risk factors for suicidal behavior, such as patients with previous psychiatric illnesses and/or negative feelings; social isolation and competing phenomena such as the spread of fake news and lack of empathy; poverty; precarious health care conditions or their absence (decrease in the number of professionals, the insufficient opening hours of health establishments, and decreased availability of medications for continuous use); and structured actions to reduce these situations, is essential so that there is no new pandemic within COVID-19.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

All the authors designed the review, developed the inclusion criteria, screened titles and abstracts, appraised the quality of included papers, and drafted the manuscript.

ACKNOWLEDGMENTS

The authors would like to thank the Suicidology Research Group from Universidade Federal do Ceará (UFC); Scientific Writing Lab, Medicine School, Universidade Federal of Cariri (UFCA); and the Brazilian National Council for Scientific and Technological Development (CNPq), an institution linked to the Brazilian Department of Science, Technology and Scientific Writing Lab, Medicine School, Universidade Federal of Cariri (UFCA).

REFERENCES

1. Damascenos KS, Barbosa ES, Pimentel JVC, Júnior AGT, de Meneses ACP, Júnior JG, et al. Suicide among physicians and methodological similarities of MEDLINE/PubMED and BVS/BIREME open access bibliographic databases: a systematic review with metanalysis. *Health.* (2017) 9:352–75. doi: 10.4236/health.2017.92025
2. WHO. *Mental Health – Suicide Data*. WHO (2020). Available online at: https://www.who.int/mental_health/prevention/suicide/suicideprevent/en/ (accessed August 11, 2020).
3. Júnior JG, de Sales JP, Moreira MM, Pinheiro WR, Lima CKT, Neto MLR. A crisis within the crisis: the mental health situation of refugees in the world during the 2019 coronavirus (2019-nCoV) outbreak *Psychiatry. Res.* (2020) 288:113000. doi: 10.1016/j.psychres.2020.113000
4. Neto MLR, Almeida HG, Esmeraldo JD, Nobre CB, Pinheiro WR, de Oliveira CRT, et al. When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. *Psychiatry Res.* (2020) 288:112972. doi: 10.1016/j.psychres.2020.112972
5. WHO. *Coronavirus Disease (COVID-19) Outbreak Situation*. WHO (2020). Available online at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 (accessed August 11, 2020).
6. Ornell F, Schuch JB, Sordi AO, Kessler FHP. Pandemic fear and COVID-19: mental health burden and strategies. *Braz J Psychiat.* (2020) 42:232–5. doi: 10.1590/1516-4446-2020-0008
7. Rolim N. An essay on the psychological effects of quarantine in SARS-CoV-2 pandemic. *Rev Med Herediana.* (2020) 31:136–7. doi: 10.20453/rmh.v31i2.3780
8. Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: mental health consequences and target populations. *Psychiatry Clin Neurosci.* (2020) 74:281–2. doi: 10.1111/pcn.12988
9. Gunnell D, Appleby L, Arensman E, Hawton K, John A, Kapur N, et al. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiat.* (2020) 7:468–71. doi: 10.1016/S2215-0366(20)30171-1
10. Mannix R, Lee LK, Fleegler EW.Coronavirus disease 2019 (COVID-19) and firearms in the United states: will an epidemic of suicide follow? *Ann Intern Med.* (2020) 173:228–9. doi: 10.7326/M20-1678
11. Dsouza DD, Quadros S, Hyderabadwala ZJ, Mamun MA. Aggregated COVID-19 suicide incidences in India: fear of COVID-19 infection is the prominent causative factor. *Psychiatr Res.* (2020) 290:113145. doi: 10.1016/j.psychres.2020.113145
12. Lamore K, Vioulac C, Fasse L, Flahault C, Quintard B, Untas A. Couples' experience of the decision-making process in breast reconstruction after breast cancer: a lexical analysis of their discourse. *Cancer Nurs*. (2020) 43:384–95. doi: 10.1097/NCC.0000000000000708
13. Mendes FR, Zangão MO, Gemito ML, Serra Ida C. Representações sociais dos estudantes de enfermagem sobre assistência hospitalar e atenção primária. *Rev Bras Enferm.* (2016) 69:343–50. doi: 10.1590/0034-7167.2016690218i
14. Camargo BV, Justo AM. IRAMUTEQ: um software gratuito para análise de dados textuais. *Temas Psicol.* (2013) 21:513–18. doi: 10.9788/TP2013.2-16
15. Castro A, Koelzer LP, Camargo BV, Bousfield ABS. Representações sociais na internet sobre cotas para negros em universidades federais. *Cad Pesq Interdisc em Cis Hums.* (2014) 15:201–20. doi: 10.5007/1984-8951.2014v15n106p202
16. Santos V, Salvador P, Gomes A, Rodrigues C, Tavares F, Alves K, et al. IRAMUTEQ nas pesquisas qualitativas brasileiras da área da saúde: scoping review. *Atas CIAIQ.* (2017) 2:392–401. doi: 10.5020/18061230.2018.8645
17. Salviati ME. *Manual do Aplicativo IRAMUTEQ. Versão 0.7 Alpha 2 e R Versão 3.2.3.* (2017) Available online at: http://www.iramuteq.org/documentation/fichiers/manual-do-aplicativo-iramuteq-par-maria-elisabeth-salviati (accessed August 11, 2020).
18. WHO. *Considerations for Quarantine of Individuals in the Context of Containment for Coronavirus Disease (COVID-19)*. WHO (2020). Avaialble online at: https://apps.who.int/iris/bitstream/handle/10665/331497/WHO-2019-nCoV-IHR_Quarantine-2020.2-eng.pdf (accessed August 11, 2020).
19. CDC. *Coronavirus Disease (COVID-19) - Stress and Coping*. CDC (2020). Available online at: https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html (accessed August 11, 2020).
20. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry.* (2020) 66:317–20. doi: 10.1177/0020764020915212
21. Klomek AB. Suicide prevention during the COVID-19 outbreak. *Lancet Psychiatry.* (2020) 7:390. doi: 10.1016/S2215-0366(20)30142-5
22. Yahya AY, Khawaja S, Chukwuma SJ. The impact of COVID-19 in psychiatry. *Prim Care Companion CNS Disord.* (2020) 22:20l02627. doi: 10.4088/PCC.20l02627
23. WHO. *Suicide Huge But Preventable Public Health Problem*. WHO (2004). Avaiable online at: https://www.who.int/mediacentre/news/releases/2004/pr61/en/ (accessed August 11, 2020).
24. CDC. *Enhanced Evaluation and Actionable Knowledge for Suicide Prevention Series*. CDC (2010). Avaiable online at: https://www.cdc.gov/violenceprevention/pdf/asap_suicide_issue2-a.pdf (accessed August 11, 2020).
25. Liu S, Yang L, Zhang C, Xiang YT, Liu Z, Hu S, et al. Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry.* (2020) 7:e17–8. doi: 10.1016/S2215-0366(20)30077-8
26. Fagiolini A, Cuomo A, Frank E. COVID-19 diary from a psychiatry department in Italy. *J Clin Psychiatry.* (2020) 81:20com13357. doi: 10.4088/JCP.20com13357
27. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatr.* (2020) 7:e15–6. doi: 10.1016/S2215-0366(20)30078-X

28. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet*. (2020) 7:e14. doi: 10.1016/S2215-0366(20)30047-X
29. Kawohl W, Nordt C. COVID-19, unemployment, and suicide. *Lancet Psychiatry*. (2020) 7:389–90. doi: 10.1016/S2215-0366(20)30141-3
30. Blakely T, Collings S, Atkinson J. Unemployment and suicide. Evidence for a causal association? *J Epidemiol Community Health*. (2003) 57:594–600. doi: 10.1136/jech.57.8.594

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

CASE REPORT
published: 11 February 2021
doi: 10.3389/fpsyt.2021.626940

Case Report: Parental Loss and Childhood Grief During COVID-19 Pandemic

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The coronavirus disease 2019 (COVID-19) pandemic is an unprecedent public health crisis, transforming many aspects of our daily life. Protection measures, such as social distancing, nationwide lockdowns, and restrictions on hospital visits and funerals have a serious impact on how people mourn their loved ones. The grieving process during childhood and adolescence evolves along the developmental stages and is a dynamic, non-linear process that needs time. Parental death increases the risk for psychopathology in the short and long term. We present a case of an 11-year-old girl referred to child psychiatry-liaison service by her neurologist due to peer relationship problems and sadness. Fifteen days before her first psychiatric consultation, her father suffered a myocardial infarction complicated with hypoxic ischemic encephalopathy, and he was hospitalized in the intensive care unit. Positive coping mechanisms and adaptive emotional expression strategies were explored during her consultations. Her father died 2 weeks after emergency state and nationwide lockdown was declared in Portugal, during the first COVID-19 outbreak. The family did not have the opportunity for a proper farewell, the funeral obeyed strict rules, and the patient and her family were at home, due to social distancing and school closure policies. Consultations were maintained by telephone calls and, less frequently, by face-to-face appointments. Adaptive and helpful strategies to grieve were shared with the patient and her mother. Intervention with the mother alone was also helpful. Death circumstances related to COVID-19, confinement policies, and social–economical stressors can intensify the grief experience, increasing the risk for complicated grief. Although psychiatric teleconsultation is essential during COVID-19 pandemic, it poses various limitations. Non-verbal communication clues may not be totally apprehended; it may represent a problem in the therapeutic relationship, and access to technology can be difficult for psychiatric patients and clinicians. COVID-19 pandemic policies should include mental health protection measures, which should facilitate adjusted grief responses for those who lose a loved one during this pandemic.

Keywords: child and adolescence psychiatry, parental death, COVID19, bereavment, childhood grief

OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Mood and Anxiety Disorders, a section of the journal Frontiers in Psychiatry

Received: *20 November 2020*
Accepted: *07 January 2021*
Published: *11 February 2021*

Citation:
Santos S, Sá T, Aguiar I, Cardoso I, Correia Z and Correia T (2021) Case Report: Parental Loss and Childhood Grief During COVID-19 Pandemic. Front. Psychiatry 12:626940. doi: 10.3389/fpsyt.2021.626940

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic represents a challenge at multiple levels. It is an unprecedented public health crisis with undeniable social, economic, and emotional impact.

The fear and uncertainty along with dramatic changes in our daily lives imposed by physical and social isolation, home schooling, and telework strain families' lives and may have a negative impact on children and adolescents' mental health (1). In a cross-sectional study among 8,079 Chinese adolescents conducted by Zhou et al. during the COVID-19 outbreak, the prevalence of depressive and anxiety symptoms was 43.7 and 37.4%, respectively. More than 30% of the adolescents reported combined symptomatology. Being female, in senior high school, and having low levels of awareness of COVID-19 were related to higher prevalence of depressive or anxiety symptoms (2). Duan et al. applied online questionnaires to 359 Chinese school-age children and 3,254 adolescents during COVID-19 outbreak and reported high anxiety levels in 23.9% of children and in 29.27% of adolescents. Prevalence of clinical depressive symptoms was 22.28% (3). The pandemic situation can also worsen previous psychiatric disorders, as Nissen reported regarding a sample of children and adolescents diagnosed with obsessive–compulsive disorder (4).

Fear of death may be exacerbated in this period. How children and adolescents understand death and mourn a loved one depends not only on their development stage but also on religion and social aspects, cognitive ability, and prior life events.

Infants and toddlers react to separation from an attachment figure with distress. Due to their sensitivity to routine changes, routines should be maintained as much as possible. Preschool children do not understand death as irreversible, and their characteristic magical and egocentric thinking may lead them to believe they somehow cause the death with their actions, words, or thoughts, inducing guilt and regret. As they do not understand death as irreversible and non-functional, they may believe that the deceased will return or the deceased did not cease to sleep, eat, and feel. They often cope through play, which can be misinterpreted by adults. As children enter school age, they progressively develop logical, concrete operational thinking. They can understand death's irreversibility and may ask specific and scientific questions about death and its circumstances. Their thinking is less egocentric than younger children. Therefore, besides being concerned about their own needs, they also worry about others' well-being. As adolescents develop existential and abstract thought, they can understand death as irreversible, universal, and non-functional, so their mourning process resembles that of the adults. Structural developmental tasks of adolescence (identity consolidation, separation from family, and identification with peers) can be at risk when a family member dies, as they may feel different from their peers. Depending on their copying style, they may be at risk of developing internalized or externalized perturbed responses to death (5, 6).

All children and adolescents go through a mourning process when someone important dies, and it includes a wide range of emotions, cognitions, physical symptoms, and behavioral changes (6, 7). *On death and dying,* Kubler-Ross characterized grief as a five-sequential-stage process: denial, anger, bargaining, depression, and acceptance (8). In the last decades, other models have been presented, understanding grief as a dynamic process that implies proactivity in adaptation to the loss. According to Worden, grief process develops through four tasks: accepting the reality of the loss, processing the pain of grief, adjusting to a world without the deceased, and finding a way to remember the deceased through life (6). As one of the most personal experience someone lives, grieving takes its own time in a fluid, non-linear process, where tasks are revisited and reexperienced through life. Persistence of grief response and failure to adapt to the loss, with intrusive thoughts, avoidance behaviors, and loss of interest in daily activities are signs of a maladaptive grief response. Complicated grief was previously described in children and adolescents and is associated with increased risk for depression and functional impairment (7, 9). The 11th edition of the International Classification of Diseases introduced the diagnosis of Prolonged Grief Disorder when it persists for an abnormally long period of time following the loss (more than 6 months) (10). The 5th edition of the Diagnostic and Statistical Manual (DSM) of Mental Disorders considers a specific set of bereavement-related symptoms (Persistent Complex Bereavement Disorder) under the diagnosis of Other Specified Trauma and Stressor-Related Disorder. This diagnosis, which can only be made 12 months (6 months in children) after the loss, is nowadays included in Section III (Proposed disorders for future study) of DSM (11). Despite its specificity to detect prolonged grief reactions in children, these criteria are not sensitive enough in children, as pointed out in a study conducted by Melhem et al. (12). The addition of a new diagnosis, "Prolonged Grief Disorder," to the Depressive Disorders Chapter in Section II of DSM was recently proposed, including symptoms of identity disruption, marked sense of disbelief about the death, avoidance of reminders of the loss, difficulty moving on with life, intense emotional pain or emotional numbness, and intense loneliness (13).

It is of consideration that the internal resources someone has and develops to integrate the loss and reconstruct life are as important as the time grief may take. As Worden says, "healing comes from what the grieving person does with the time" (6). In children and adolescents, those resources are inherently changing along with developmental stages. Therefore, they may revisit the grief as they grow, integrating it differently and giving it new meanings, in a developmentally appropriate way (14).

CLINICAL REPORT

We present a case of an 11-year-old girl, referred to the child psychiatry-liaison service by her neurologist due to peer relationship problems and sadness. The patient had no prior personal or familiar psychiatric history. She was diagnosed with centrotemporal spikes epilepsy 2 years before and was prescribed with prednisolone, valproate, and clobazam. Her last intelligence assessment (Wechsler Intelligence Scale for Children III) was 6 months before her first psychiatric appointment and reported an IQ of 114 (verbal IQ, 106; performance IQ, 121).

Her first psychiatric consultation occurred before the first COVID-19 outbreak in Portugal. Her mother was highly concerned about a recent life event: the patient's father had suffered a myocardial infarction complicated with hypoxic

ischemic encephalopathy 15 days before and was, since then, hospitalized in an intensive care unit.

The patient lived with her parents and her two sisters, with limited social and extended family support as her father's family was from another region of the country and her mother's family was from another continent. Her father was the family's primary financial provider.

The patient was teased by her classmates about her body changes, weight gain, and attention difficulties associated with her medication side effects, making her sad, which also worried her mother.

During clinical observation, the patient was well-groomed and dressed appropriately to her age. Her speech was spontaneous, fluent, and age appropriate, mostly about past episodes when she felt rejected or was teased by her classmates. She presented difficulties regarding emotional states' recognition and their expression. There were no psychotic symptoms, and she denied sleep or appetite disturbance.

In the following 6 weeks, during psychiatric appointments, the patient was hesitant to talk about her fathers' condition, diverting the conversation to other daily problems as an avoidance behavior.

We aimed to provide a safe environment for emotional expression and exploration of negative and positive coping mechanisms. As the patient liked and felt competent expressing herself through drawing, we used this strategy in consultations and proposed drawing as a mean to express and share her feelings with others.

We explored her ambivalence about visiting her father, who had been transferred to internal medicine service meanwhile. At this point, her father remained in minimally conscious state and suffered multiple nosocomial infections, with poor prognosis of recovery.

During consultations, the patient told us about a fantasy she had that her father was not in the hospital, but he would be traveling and would return well and safe. Visiting the father, after careful preparation of all the involved (the patient, her mother, child psychiatrists, and father's medical team), would be helpful in reducing anxiety and regaining some sense of control. She was also concerned about the possibility of her father being in pain or discomfort, so contacting the medical and nursing team who could explain the care and treatment her father was receiving would reassure her.

We arranged meetings alone with the mother to explore her concerns and to provide psychoeducation about normal grief reactions, as well to normalize the temporary reduction in patient's academic performance. Those interviews with the mother alone were crucial to discuss the importance of giving information about the father's clinical state incrementally in small doses, in an optimistic but not unrealistic way.

We were planning a hospital visit, preparing all the involved when the government declared suspension of visiting arrangements at all hospitals and nationwide lockdown.

In the next weeks, follow-up was conducted by telephone calls.

Adding to the distress about her father's health, the challenges related to home schooling, social contacts' restriction, suspension of extracurricular activities, and change in family routines caused increased anxiety in all family members.

The father died 2 weeks after emergency state was declared in Portugal. Although his death was not COVID-19 related, the funeral obeyed the norm published at beginning of the pandemic by the Directorate-General of Health regarding postmortem and mortuary care. Only the mother and an uncle of the patient attended the funeral. The patient, her sisters, and their mother organized a ceremony at home, where they lit a candle near photographs of the family and the father and shared thoughts and feelings about him.

Clinical interviews were maintained by telephone calls once every 2 weeks and by face-to-face appointments monthly. The patient was tearful, sad, and complained about concentration difficulties during online classes. There was a decline in the patient's school grades, which was a high concern for her mother. The patient also complained about episodic initial insomnia that spontaneously remitted. The mother's emotional well-being and change in familial roles and responsibilities were also explored. The death of the patient's father implied a change in the family income, and consequently, she had to attend a different school, which made her anxious.

She gradually verbalized feeling sad and anxious about the future without her father, the family's financial situation, and her mother and sisters' well-being.

Strategies to help the patient and her family to adjust to the new reality and adaptative ways to remember the deceased were shared. The patient was encouraged to choose a linking object as memento. Besides, she started sleeping with a stuffed animal her father gave her years before, which provided a way to externally maintain a relationship with her deceased father. In the next months, she learned how to sew and knit and made a t-shirt to the stuffed animal. As the patient and her mother recalled pleasant and funny experiences with the deceased during consultations, it was suggested to make a memory book as a family activity. It would include family stories, traits the family missed about the deceased, photographs, writings about activities family engaged together, drawings, etc.

DISCUSSION

The death of a parent is an extremely stressful life event and is associated with increased psychiatric problems in the short and long term. The normative sadness and suffering in the grieving process can develop into psychopathology requiring mental health professional intervention. Previous studies report higher rates of depressive symptomology in bereaved children compared to community controls (15–17).

Cerel et al. interviewed 360 children (6–17 years old) and their surviving parents 2, 6, 13, and 25 months after parental death and compared them to 110 depressed children and 128 community control children. Bereaved children showed more behavioral, anxiety, and depressive symptoms than community controls in the first 2 years, although less than clinically depressed children (16). While in most bereaved children, depressive symptoms gradually decline over time, the risk for depression remains

higher than community controls up to 2 years after the death (16–18). Parental death has also been associated with increased risk for posttraumatic stress disorder (17); alcohol or substance abuse (18); and lower competence in peer relations, work, career planning, and educational aspirations (19).

Death circumstances related to COVID-19, quarantine policies, and social–economical stressors can affect all necessary tasks for an adaptative grieving process. The number of individuals and families struggling with complicated grief is expected to increase during and after the pandemic (20–22).

Kentish-Barnes et al. evaluated relatives of patients who died on ICU and identified symptoms of complicated grief in 52% of them. Among the risk factors for complicated grief were patient dying while intubated, relatives not being present at the time of death, relatives not saying goodbye to the patient, and inadequate communication between physicians and the relatives (23), which are frequent in deaths related to COVID-19.

Time criteria for the diagnosis of Prolonged Grief Disorder (6 months) and Persistent Complex Bereavement Disorder (12 months; 6 months in children) impede those diagnoses among individuals who lost a loved one during COVID-19 pandemic. Eisma et al. compared acute grief levels among people recently bereaved due to COVID-19, natural, and unnatural causes, considering that acute grief is a strong predictor for pathological grief. Those who lost someone due to COVID-19 reported more severe acute grief reactions than those who lost someone to natural causes (but not unnatural causes) (24).

Accepting the reality of the loss is crucial in the mourning process. Funerals and ceremonies help the grieving process, as they make the loss real and final, get the social support network close and allow family and friends to share feelings about the deceased (6). Therefore, COVID-19 protection measures, such as hospital visits suspension and restrictions on funerals deprive family members of a proper farewell. Rules of social distancing, closing cemeteries, and prohibiting religious celebrations and other worship events do not allow friends and family to express their support and affection, leaving the beavered with feelings of loneliness.

Children inclusion in decisions about the funeral and ceremonies increase their sense of involvement and reduce their perceived sense of lack of control, empowering them (6, 25, 26). They should be given the choice to attend the funeral, and their involvement can be accomplished in multiple degrees, such as deciding what objects to put in the coffin, including them when choosing the funeral flowers or music, letting them help selecting the tombstone or even helping carrying the coffin (25). The degree of their involvement depends on their developmental stage, cultural, and religious customs. If they choose to attend the funeral, it should be explained in advance and in age-appropriate terms what may happen and what they might see. They need to be protected from strong emotions that may be displayed. Therefore, it is helpful to let them be accompanied, by someone they like, but who is not close to the deceased, and with who they can leave the funeral if necessary (6, 27).

With the COVID-19 pandemic, direct participation of children and other family members in the formalities is more difficult. As their inclusion is of most importance, we should consider their participation in indirect ways, such as asking them to write something they want to be said during the funeral, describing the ceremony to them in a sensitive and appropriate way, participating in family rituals, and respecting their opinions and decisions about cemetery visits.

Reestablishment of family routines is a known protective factor in the bereavement process, and it may be problematic because of measures imposed by the COVID-19 pandemic, such as school closures and telework (1, 6).

Additionally, we should consider the variety of grief manifestations in children. Even if they do not disclose their emotions right away, they might begin to make the connection between emotions and how their body is reacting, grieving with complains of physical symptoms. A visit to the pediatrician or neuropediatrician may be advised in some cases, to reassure the child that nothing is wrong. On the other hand, children often express their emotional discomfort with anger, which should be address so it does not escalate or feed on itself. Physical activity and physiotherapy have been consistently associated with activation of multiple neurophysiological processes involved in discomfort relief and mood improvement (28, 29). As bereavement also interferes in occupations and occupational performance of bereaved child, the occupational therapist should also be included in support teams providing spaces of speech, resignification, and reflection to reduce occupational losses (28, 30). Therefore, grief intervention in children should be carried out by a coordinated multidisciplinary team comprising healthcare professionals from different disciplines, who work in regular collaboration with one another and with schools and families to ensure the provision of consistent, goal-directed care (30). However, multidisciplinary work to help children regain educational, recreational, and social skills is hampered by school and extracurricular activities suspension, meetings and consultations restrictions, and other COVID-19 protection measures.

Among the risk factors that have been associated with higher risk of psychopathology in parent-bereaved children are parental suicide (18), the surviving parent's level of depression, family socioeconomical status, and the presence of other stressful life events in the family (16). Additional to their own overwhelming grief and distress, the surviving parent may have to deal with bureaucratic constraints imposed by restrictions on public services and with the economic impact of the COVID-19 pandemic. As the functioning of the surviving parent and family relationship and communication patterns are important mediators of the grief process in children who lost a parent (26), intervention programs for bereaved children should also include the surviving parent. Interventions directed to the surviving parents and/or the family reduce maladjusted grief responses years after the loss (31, 32).

Grief counseling and therapy for those struggling with the grieving process had to adapt to the new reality that COVID-19 pandemics brought us. Hospitals had to quickly reorganize services, and non-urgent surgeries and face-to-face consultations were suspended. Individual and family psychotherapeutic interventions had to be held by telephone or videoconference.

Before the pandemic, child, and adolescent telepsychiatry was mostly used to address the disparity in access to services for populations with inadequate psychiatric care and to provide care in non-traditional settings, such as schools, correctional facilities, and at home (33).

Although psychiatric teleconsultation is essential during COVID-19 pandemic, as it allows to maintain contact with patients and to help them in a safely manner, it presents several limitations. The abrupt switch to telemedicine, the impossibility to capture the patient's non-verbal communication clues through telephone calls, and the physical and affective distancing while dealing with sensitive issues such as death may represent a burden in the therapeutic relationship.

Other obstacles must be considered, namely, technological difficulties for patients and clinicians. Such problems are especially important in psychiatric services, where families may struggle with financial hardship, which can complicate access to technology. Maintaining privacy and confidentiality can be worrisome, especially for large families living in small houses, where it can be difficult to find an isolated place to talk openly and freely with the psychiatrist (34–36).

Wagner et al. conducted a systematic review and meta-analysis regarding web-based interventions (based on cognitive behavioral therapy) for people with elevated levels of disturbed grief. Their results suggest that this type of intervention can help in reducing symptoms of posttraumatic stress disorder and grief (37).

CONCLUSION

Mourning a parent during childhood or adolescence is stressful enough *per se*. Going through this process during the COVID-19 pandemic, with its uncertainties and rapid changes in daily life, can be a real struggle.

Child and adolescent psychiatrists as well as other mental health professionals should be prepared to help the numerous individuals and families who are expected to struggle with complicated grief, depression, and posttraumatic stress disorder. Knowing and comprehending the grief process and developing and disseminating grief counseling and treatment programs possible to be remotely delivered should be a priority not only for clinicians but also for policy makers. Policies and rules regarding the COVID-19 pandemic have to considerate measures to protect mental health, facilitating the grief process.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

Written informed consent was obtained from the individual(s), and minor(s)' legal guardian/next of kin, for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

SS and TS conducted the patient's consultations under the supervision of IA, IC, ZC, and TC. SS conducted the literature search and wrote the first draft of the manuscript. SS and TS wrote the final version of the manuscript. IA, IC, TC, and ZC critically revised the manuscript.

REFERENCES

1. Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G. Impact of COVID-19 and lockdown on mental health of children and adolescents: a narrative review with recommendations. *Psychiatry Res.* (2020) 293:113429. doi: 10.1016/j.psychres.2020.113429
2. Zhou SJ, Zhang LG, Wang LL, Guo ZC, Wang JQ, Chen JC, et al. Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. *Eur Child Adolesc Psychiatry.* (2020) 29:749–58. doi: 10.1007/s00787-020-01541-4
3. Duan L, Shao X, Wang Y, Huang Y, Miao J, Yang X, et al. An investigation of mental health status of children and adolescents in china during the outbreak of COVID-19. *J Affect Disord.* (2020) 275:112–8. doi: 10.1016/j.jad.2020.06.029
4. Nissen JB, Højgaard DRMA, Thomsen PH. The immediate effect of COVID-19 pandemic on children and adolescents with obsessive compulsive disorder. *BMC Psychiatry.* (2020) 20:511. doi: 10.1186/s12888-020-02905-5
5. Mosher PJ. Everywhere and nowhere: grief in child and adolescent psychiatry and pediatric clinical populations. *Child Adolesc Psychiatr Clin N Am.* (2018) 27:109–24. doi: 10.1016/j.chc.2017.08.009
6. Worden JW (editor). *Grief Counseling and Grief Therapy*. New York, NY: Springer Publishing Company (2018). doi: 10.1891/9780826134752
7. Melhem NM, Brent DA. Bereavement. *Encycl Adolesc.* (2011) 3:69–75. doi: 10.1016/B978-0-12-373951-3.00102-2
8. Kübler-Ross E. On death and dying. *JAMA J Am Med Assoc.* (1972) 221:174. doi: 10.1001/jama.1972.03200150040010
9. Melhem NM, Porta G, Shamseddeen W, Payne MW, Brent DA. The course of grief in children bereaved by sudden parental death. *Arch Gen Psychiatry.* (2011) 68:911–919. doi: 10.1001/archgenpsychiatry.2011.101
10. World Health Organization. *International Classification of Diseases for Mortality and Morbidity Statistics (11th Revision)*. Geneva: World Health Organization (2018).
11. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association (2013). doi: 10.1176/appi.books.9780890425596
12. Melhem NM, Porta Gi, Payne MW, Brent DA. Identifying prolonged grief reactions in children: dimensional and diagnostic approaches. *J Am Acad Child Adolesc Psychiatry.* (2013) 52:599–607.e7. doi: 10.1016/j.jaac.2013.02.015
13. American Psychiatric Association (APA). *View and Comment on Recently Proposed Changes to DSM−5. Addition of a New Diagnosis, "Prolonged Grief Disorder," to the Depressive Disorders Chapter*. (2020) Available at: https://www.psychiatry.org/psychiatrists/practice/dsm/proposed-changes (accessed April 6, 2020).
14. Biank NM, Werner-Lin A. Growing up with grief: revisiting the death of a parent over the life course. *Omega J Death Dying.* (2011) 63:271–90. doi: 10.2190/OM.63.3.e
15. Gray LB, Weller RA, Fristad M, Weller EB. Depression in children and adolescents two months after the death of a parent. *J Affect Disord.* (2011) 135:277–83. doi: 10.1016/j.jad.2011.08.009
16. Cerel J, Fristad MA, Verducci J, Weller RA, Weller EB. Childhood bereavement: psychopathology in the 2 years postparental

death. *J Am Acad Child Adolesc Psychiatry.* (2006) 45:681–90. doi: 10.1097/01.chi.0000215327.58799.05
17. Melhem NM, Walker M, Moritz G, Brent DA. Antecedents and sequelae of sudden parental death in offspring and surviving caregivers. *Arch Pediatr Adolesc Med.* (2008) 162:403. doi: 10.1001/archpedi.162.5.403
18. David Brent MD, Nadine Melhem, Ph.D. MPH, M. Bertille Donohoe, Psy.D., Monica Walker MAA. The incidence and course of depression in bereaved youth 21 months after the loss of a parent to suicide, accident, or sudden natural death. *Am J Psychiatry.* (2009) 166:786–94. doi: 10.1176/appi.ajp.2009.08081244
19. Brent DA, Melhem NM, Masten AS, Porta G, Payne MW. Longitudinal effects of parental bereavement on adolescent developmental competence. *J Clin Child Adolesc Psychol.* (2012) 41:778–91. doi: 10.1080/15374416.2012.717871
20. Morris SE, Moment A, Thomas J deLima. Caring for bereaved family members during the COVID-19 pandemic: before and after the death of a patient. *J Pain Symptom Manage.* (2020) 60:e70–4. doi: 10.1016/j.jpainsymman.2020.05.002
21. Gesi C, Carmassi C, Cerveri G, Carpita B, Cremone IM, Dell'Osso L. complicated grief: what to expect after the coronavirus pandemic. *Front Psychiatry.* (2020) 11:489. doi: 10.3389/fpsyt.2020.00489
22. Kokou-Kpolou CK, Fernández-Alcántara M, Cénat JM. Prolonged grief related to COVID-19 Deaths: do we have to fear a steep rise in traumatic and disenfranchised griefs? *Psychol Trauma Theory Res Pract Policy.* (2020) 12:94–5. doi: 10.1037/tra0000798
23. Kentish-Barnes N, Chaize M, Seegers V, Legriel S, Cariou A, Jaber S, et al. Complicated grief after death of a relative in the intensive care unit. *Eur Respir J.* (2015) 45:1341–52. doi: 10.1183/09031936.00160014
24. Eisma MC, Tamminga A, Smid GE, Boelen PA. Acute grief after deaths due to COVID-19, natural causes and unnatural causes: an empirical comparison. *J Affect Disord.* (2021) 278:54–6. doi: 10.1016/j.jad.2020.09.049
25. Søfting GH, Dyregrov A, Dyregrov K. Because i'm also part of the family. children's participation in rituals after the loss of a parent or sibling. *Omega.* (2016) 73:141–58. doi: 10.1177/0030222815575898
26. Howell KH, Shapiro DN, Layne CM, Kaplow JB. Individual and psychosocial mechanisms of adaptive functioning in parentally bereaved children. *Death Stud.* (2015) 39:296–306. doi: 10.1080/07481187.2014.951497
27. Black D. Coping with loss: bereavement in childhood. *BMJ.* (1998) 316:931–3. doi: 10.1136/bmj.316.7135.931
28. Kasia K, Nicola G, Stephen S, Blanche S. Psychologically informed physiotherapy as part of a multidisciplinary rehabilitation program for children and adolescents with functional neurological disorder: physical and mental health outcomes. *J Paediatr Child Health.* (2020) 57:73–9. doi: 10.1111/jpc.15122x
29. Carek PJ, Laibstain SE, Carek SM. Exercise for the treatment of depression and anxiety. *Int J Psychiatry Med.* (2011) 41:15–28. doi: 10.2190/PM.41.1.c
30. Pereira M, Johnsen I, Hauken MA, Kristensen P, Dyregrov A. Early interventions following the death of a parent: protocol of a mixed methods systematic review. *JMIR Res Protoc.* (2017) 6:e127. doi: 10.2196/resprot.7931
31. Sandler IN, Ma Y, Tein J-Y, Ayers TS, Wolchik S, Kennedy C, et al. Long-term effects of the family bereavement program on multiple indicators of grief in parentally bereaved children and adolescents. *J Consult Clin Psychol.* (2010) 78:131–43. doi: 10.1037/a0018393
32. Werner-Lin A, Biank N. Holding parents so they can hold their children: grief work with surviving spouses to support parentally bereaved children. *Omega.* (2012) 66:1–6. doi: 10.2190/OM.66.1.a
33. Gloff NE, Lenoue SR, Novins DK, Myers K. Telemental health for children and adolescents. *Int Rev Psychiatry.* (2015) 27:513–24. doi: 10.3109/09540261.2015.1086322
34. Rosic T, Lubert S, Samaan Z. Virtual psychiatric care fast-tracked: reflections inspired by the COVID-19 pandemic. *BJPsych Bull.* (2020). doi: 10.1192/bjb.2020.97. [Epub ahead of print].
35. Chin HP, Palchik G. Telepsychiatry in the age of COVID: some ethical considerations. *Cambridge Q Healthc Ethics.* (2020) 30:37–41. doi: 10.1017/S0963180120000523
36. Yellowlees P, Nakagawa K, Pakyurek M, Hanson A, Elder J, Kales HC. Rapid conversion of an outpatient psychiatric clinic to a 100% virtual telepsychiatry clinic in response to COVID-19. *Psychiatr Serv.* (2020) 71:749–52. doi: 10.1176/appi.ps.202000230
37. Wagner B, Rosenberg N, Hofmann L, Maass U. Web-based bereavement care: a systematic review and meta-analysis. *Front Psychiatry.* (2020) 11:1–13. doi: 10.3389/fpsyt.2020.00525

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

OPINION
published: 12 February 2021
doi: 10.3389/fpsyt.2021.638874

COVID-19 and Disenfranchised Grief

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Keywords: death, grief, bereavement, disenfranchised grief, COVID-19

INTRODUCTION

Although death is an inherent part of life, for many it is a terrifying event, which awareness is often to be avoided at all costs (1). However, with the daily updates of COVID-19 cases and deaths, the confrontation with human mortality and physical fragility is unavoidable. Over 100 million confirmed cases and over 2 million confirmed deaths worldwide have been recorded (2). The COVID-19 pandemic is a health crisis unprecedented in contemporary history.

Furthermore, an estimate of 9 bereaved family members results from each COVID-19 death (3). Recent evidence indicates that, due to the circumstances in which deaths in the COVID era occur—unexpected and shocking deaths, social distancing, restrictions in visits in healthcare facilities and in funerals—another epidemic is on the rise: prolonged grief disorder (PGD) [e.g., (4)]. PGD is characterized by persistent and pervasive longing for, or preoccupation with the lost one, as well as severe emotional pain (such as, guilt, anger, or sadness), difficulty accepting the death, emotional numbness, a sense that a part of them has been lost, an inability to experience positive mood and difficulty participating in social activities (International Classification of Diseases-11, (5)).

With each death that occurs, there are loved ones who will be deeply impacted by the loss, particularly at a time when, due to sanitary restrictions, they may experience limited autonomy, and resourcefulness when coping with their grief. The awareness of these limitations heighten the risk of grievers experiencing their grief as disenfranchised to a degree.

Kenneth Doka first formally introduced the notion of disenfranchised grief in 1989 and defined it as the process in which the loss is felt as not being "openly acknowledged, socially validated, or publicly mourned" (1989, p. xv). This experience of grief might pose difficulties in terms of emotional processing and expression, as one may not recognize his/her right to grieve, and in terms of social support, by diminishing the opportunity to freely express their emotions, and to obtain expressions of compassion and support (6).

Given the challenges that the disenfranchisement of grief might add to the bereavement experience, it is important to reflect on the risk for this experience in the context of the COVID-19 circumstances. In this opinion paper we aim to frame this in light of the felt limitations in autonomy and resourcefulness in the COVID-19 bereaved, either imposed externally, or internally (self-disenfranchisement).

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
María Nieves Pérez-Marfil, University of Granada, Spain

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *07 December 2020*
Accepted: *22 January 2021*
Published: *12 February 2021*

Citation:
Albuquerque S, Teixeira AM and Rocha JC (2021) COVID-19 and Disenfranchised Grief. Front. Psychiatry 12:638874. doi: 10.3389/fpsyt.2021.638874

DISENFRANCHISEMENT IMPOSED EXTERNALLY

Doka (6) suggests that which losses and which relationships have the legitimacy of being grieved is defined by each society's grieving norms. When a loss does not accommodate these guidelines, the resultant grief remains unrecognized and undervalued and a person may feel as his/her "right to grieve" has been denied. So it seems that there are bereavements that are not socially acceptable, in which its grieving is complex and triggers secondary variables like the disenfranchised grief. According to Corr (7) an aspect that contributes to the grieving process being disenfranchised is the devaluing of public mourning rituals. Arguably, restrictions are needed to contain the spread; however, there are concerns about how current restrictions in end of life care and funeral rites may compromise the salutary grieving process and amplify the risk for disenfranchised grief.

The usual rituals, customs and interactions that occur in the context of end of life and after a death are another casualty of the virus. During end of life, in order to conform with the guidelines for preventing the spread of the disease, patients are often faced with separation from their loved ones reporting high levels of loneliness, uncertainty and despair. In the same way, it could increase feelings of neglect and dehumanized treatment (8).

In addition, Bromberg (9) identifies therapeutic functions in the funeral rituals: (1) they assist family members and friends in recognizing and confronting the reality of the loss; (2) they offer room for introspection on the death as a process integrated into life; (3) they foster the awareness and assimilation of the grief process. These therapeutic functions may be deeply compromised currently as families are deprived from access to social support and usual burial and funeral rituals.

Funeral rituals have been taking place with a reduced number of family members present, leaving the online mode as the only option for many people. These virtual interactions don't replace usual in person interactions and rituals. Not only did they previously include both immediate and extended family members and friends but allowed for physical connection and touch—a pat in the back, a stroke, a hug (10). Sharing their pain with other bereaved people, and having a place of memorialization, may foster emotion expression and meaning-making for bereaved people (11, 12). Therefore, bereaved people may find the shortage or minimalistic nature of funerary rituals painful (13). Also challenging is the perception that their loved one didn't receive the funerary ritual they deserved, not being able to say farewell to the deceased and not being able to visit the grave afterwards (14).

Likewise, feeling disallowed and unsupported to openly express and manage their grief may contribute to disenfranchisement (15). We are facing times that compromise the normal and necessary social support usually available during the illness and after death. Touch is a basic human need, especially in grief, and can help the person in their coping process after a loss (16). It could help to ground in the present moment (here and now), to have someone, something to hold on to.

Finally, the increasing accumulation of deaths could impede acknowledgment of each individual's grief. The deaths framed as statistic also leaves the bereaved individuals feeling that the pain of their loss in undervalued. In addition, not only can grief

TABLE 1 | Recommendations regarding disenfranchisement imposed externally to promote healthy COVID-19 related grieving.

Changes due to COVID-19	Impact	Disenfranchisement imposed externally: Recommendations
Limitations to funerals and/or burials		Discuss about desired ritual or spiritual practices and funeral/memorial Helping families to memorialize or remember the deceased in alternative and innovative ways Collective rituals (e.g., express feelings through phone calls, letters, text, and audio messages) Virtual religious celebrations such as cults, masses, funerals and online memorials in which family members, friends, and others can express their condolences and share thoughts about the loved one
	Not being able to say goodbye	
Limitations in visits and in end of life care	Unfinished business Survivor guilt Loss of social support	Assisting families in working through the information and decision in the dying process Validating their emotions and gaining awareness of potential salutary coping skills according to their values and beliefs Helping brainstorm creative strategies for maintaining closeness and communication using technology Psychoeducation on the grief process, particularly regarding risk factors, and warning signs
Limitations in access to social support	Loss of social/physical connections and support	Assisting families in accessing social support networks practices and funeral/memorial plans Help in accessing resources to help them plan for practical needs after the death Provide access to additional grief support Enhancing the importance of self-care Promoting contact with other people going through the same experience in order to foster reciprocity and reduce isolation Highlighting the need of bereaved people in terms of feeling listened to and in everyday tasks
Negative social perceptions	Stigma Feelings that the loss is not acknowledged by society	Publicly organized commemoration activities to foster collective grief and a sense of belonging Provide a minute of silence Taking actions to improve de grief literacy in the general population

be overlooked by society but patients and their families can also experience social stigma regarding COVID-19 losses (17).

SELF-DISENFRANCHISEMENT

Expanding on Doka's original work on disenfranchised grief, Kauffman (18) proposed the concept of self-disenfranchisement, which occurs when individuals have difficulty in acknowledging their own grief as being legitimate. One proposed associated emotion of these situations is guilt, which is especially present in situations of unexpected or sudden loss (19). In the present pandemic context, bereaved people have scarce opportunities to prepare for their loss as, after contracting the virus, it can only take weeks or even days for the person to die. Literature has shown that sudden deaths in the context of intensive care are associated with more mental health problems (20), and highlight the particular impact of the lack of information and the consequent intrusive constant doubts (21). Examples of these doubts in the present context may refer to whether the person has suffered or if they have received appropriate care (associated with the perception of resource scarcity). They may also wonder why they were spared and whether they had a part in the person getting infected (8). Also, the bereaved may feel guilty for not being able to be present at the time of death; for not having reaffirmed their love, providing comfort as they wished to or saying goodbye (22). An experience of guilt-shame at their impotence may therefore be magnified in the current pandemic context (23).

On the other hand, self-disenfranchisement may be related to not having the emotional safeness conditions and coping resources in order to fully connect with their pain and grieving process. One aspect that may contribute to this is the current rise in pandemic-related anxiety and depression levels. It may deplete the emotional resources needed to grieve the loss of the person, on its own, or due to the risk of triggering previous mental illness issues (24). Also, the overload concept of the well-established Dual Process Model (25) may be particularly representative of the current grieving context. These authors argue that apart from the necessary oscillation between loss-oriented coping (confronting and handling feelings of grief and loss) and restoration-oriented coping (stressors of daily life that result from the death) it is important to evaluate the existence of more loss or restoration stressors than the person feels capable of handling. It is our view that the COVID-19 pandemic poses serious risks of overload of restoration stressors. First of all, simultaneously to the already arduous process of grieving, individuals are experiencing varying degrees of personal, economic and social losses (26). Also, as people are being deprived of usual social, recreational, and occupational activities, there are less opportunities for taking time off from the overwhelming emotional experience of grief. Likewise, without face-to-face meetings, after-death practicalities (e.g., sort out phone contracts in the deceased person's name, bank accounts, liaise with funeral directors) may be more difficult to some, especially those with less technology resources, paving the way to difficulties in accepting the loss. Finally, access to support services and social support is much harder. In general, overall needs for grieving and bereavement are largely unattended.

CONCLUSION AND CLINICAL IMPLICATIONS

Despite acknowledging the importance of future research investing at primary empirical data, in this opinion paper we aimed at offering a preliminary and exploratory view of the risk for disenfranchisement in grief and bereavement in the current pandemic context.

Therefore, in this context, access to evidence-based bereavement psychological interventions is critical. The existing gaps in the area of mental health can contribute to the lack of investment among the bereaved. Therefore, in order to

TABLE 2 | Recommendations regarding self-disenfranchisement to promote healthy COVID-19 related grieving.

Changes due to COVID-19	Impact	Self-disenfranchisement: Recommendations
Unexpected or sudden loss	Feelings of impotence, guilt, and shame	Validating their emotions and give space to their expression Using memory to create compassionate feelings (e.g., recall the feelings when one has experienced the kindness of others) Help in building compassionate approaches to cope with the emotions (e.g., focus the attention in the present moment rather than becoming distracted by "what if's?") and rumination processes Keep in mind that things and feelings change Imagine oneself as a compassionate person speaking to a friend Encourage the integration of the idea "I did the best I could, with the knowledge I had." Reach out to others and see if help is available Understanding what one can and can't control
Depletion of emotional and coping resources	Lack of emotional safeness conditions	Psychoeducation on the risk factors and warning signs of common mental health disorders (e.g., anxiety and depression) Encourage people to ask for professional help Improving access to psychological interventions, support services, and social support Promoting strategies of self-care and values and meaningful future plans Monitoring the oscillation between loss-oriented coping (confronting and handling feelings of grief and loss) and restoration-oriented coping (focused on secondary stressors)

better prepare for managing grief-related mental health issues, we must first increase general public's literacy around mental health and grief (grief-informed communities), combating stigma and discrimination (27).

For this purpose, we need a public health approach aimed at restoring the normal social and community support systems. It is also important to be aware of risk factors in order to intervene earlier and effectively in the mental health issues and in the grief process. Simultaneously, it could be relevant to build intervention protocols that involve screening and mental health risk assessment for those with greater risk factors for grief complexities.

In addition, specific recommendations regarding coping with social restrictions in funerals, access to social support, and in regards to promoting more supportive social perceptions for bereaved people are offered in **Table 1**. Recommendations to address feelings of impotence, guilt and shame and lack of emotional and coping resources are offered in **Table 2**.

COVID-19 related deaths are in multiple ways lonely and dehumanized processes for patients and families. Limitations in self-efficacy, choice, and control not only changed the landscape of grief and grieving but pose a significant risk and added burden in the already arduous and painful grieving experience.

AUTHOR CONTRIBUTIONS

SA and AT contributed to the development of the idea, the literature research, and the writing of the manuscript. JR provided critical feedback.

REFERENCES

1. Solomon S, Greenberg J, Pyszczynski T. The cultural animal: twenty years of terror management theory and research. In: Greenberg J, Koole SL, Pyszczynski T, editors. *Handbook of Experimental Existential Psychology*. New York, NY: Guilford Press (2004). p. 13–34. doi: 10.1037/e631532007-001
2. World Health Organization. *WHO Coronavirus Disease (COVID-19) Dashboard*. Geneva: World Health Organization (2021).
3. Verdery AM, Smith-Greenaway E, Margolis R, Daw J. Tracking the reach of COVID-19 kin loss with a bereavement multiplier applied to the United States. *Proce Natl Acad Sci USA*. (2020) 117:17695–701. doi: 10.1073/pnas.2007476117
4. Eisma MC, Boelen PA, Lenferink L. Prolonged grief disorder following the Coronavirus (COVID-19) pandemic. *Psychiatry Res*. (2020) 288:113031. doi: 10.1016/j.psychres.2020.113031
5. World Health Organization. *International Classification of Diseases for Mortality and Morbidity Statistics (11th Revision)*. Geneva: World Health Organization (2018). Retrieved from https://icd.who.int/browse11/l-m/en
6. Doka KJ. (Ed.). *Disenfranchised Grief: New Directions, Challenges, and Strategies for Practice*. Champaign, IL: Research Press (2002).
7. Corr CA. Revisiting the concept of disenfranchised grief. In: Doka KJ, editor. *Disenfranchised Grief: New Directions, Challenges, and Strategies for Practice*. Champaign, IL: Research Press (2002). p. 39–60.
8. Taylor S. *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease*. Cambridge: Cambridge Scholars Publishing (2019).
9. Bromberg MHP. *A Psicoterapia em Situações de Perdas e Luto*. São Paulo: Editora Livro Pleno (2000).
10. Fang C, Comery A. Understanding grief in a time of COVID-19 - a hypothetical approach to challenges and support. *J Popul Ageing*. (2020). doi: 10.31124/advance.12687788.v1. [Epub ahead of print].
11. Davies D. *Death, Ritual and Belief: The Rhetoric of Funerary Rites*. London: Bloomsbury Publishing(2017).
12. Walter T. A new model of grief: Bereavement and biography. *Mortality*. (1996) 1:7–25. doi: 10.1080/713685822
13. O'Rourke T, Spitzberg BH, Hannawa AF. The good funeral: toward an understanding of funeral participation and satisfaction. *Death Stud*. (2011) 35:729–50. doi: 10.1080/07481187.2011.553309
14. Ingravallo F. Death in the era of the COVID-19 pandemic. *Lancet Pub Health*. (2020) 5:e258. doi: 10.1016/S2468-2667(20)30079-7
15. Doka KJ. *Disenfranchised Grief: Recognizing Hidden Sorrow*. Lexington, MA: Lexington Books (1989).
16. Johns L, Blackburn P, McAuliffe D. COVID-19, Prolonged Grief Disorder and the role of social work. *Int Soc Work*. (2020) 63:660–4. doi: 10.1177/0020872820941032
17. Kokou-Kpolou CK, Cénat JM, Noorishad PG, Park S, Bacqué MF. A comparison of prevalence and risk factor profiles of prolonged grief disorder among French and Togolese bereaved adults. *Soc Psychiatry Psychiatr Epidemiol*. (2020) 55:757–64. doi: 10.1007/s00127-020-01840-w
18. Kauffman J. The psychology of disenfranchised grief: Liberation, shame, and self-disenfranchisement. In: Doka K, editor. *Disenfranchised Grief: New Directions, Challenges, and Strategies for Practice*. Champaign, IL: Research Press (2002). p. 61–77.
19. Holst-Warhaft G. *The Cue for Passion: Grief and Its Political Uses*. Cambridge: Harvard University Press (2000). doi: 10.4159/harvard.9780674498587
20. Siegel MD, Hayes E, Vanderwerker LC, Loseth DB, Prigerson HG. Psychiatric illness in the next of kin of patients who die in the intensive care unit. *Crit Care Med*. (2008) 36:1722–8. doi: 10.1097/CCM.0b013e318174da72
21. Van der Klink MA, Heijboer L, Hofhuis JGM, Hovingh A, Rommes JH, Westerman MJ, et al. Survey into bereavement of family members of patients who died in the intensive care unit. *Intens Crit Care Nurs*. (2010) 26:215–25. doi: 10.1016/j.iccn.2010.05.004
22. Van Bortel T, Basnayake A, Wurie F, Jambai M, Koroma AS, Muana AT, et al. Psychosocial effects of an Ebola outbreak at individual, community and international levels. *Bull World Health Organ*. (2016) 94:210–4. doi: 10.2471/BLT.15.158543
23. Tay AK, Rees S, Steel Z, Liddell B, Nickerson A, Tam N, et al. The role of grief symptoms and a sense of injustice in the pathways to post-traumatic stress symptoms in post-conflict timor-leste. *Epidemiol Psychiatr Sci*. (2017) 26:403–13. doi: 10.1017/S2045796016000317
24. Xiang Y-T, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry*. (2020) 7:228–9. doi: 10.1016/S2215-0366(20)30046-8
25. Stroebe M, Schut H. Overload: A Missing Link in the Dual Process Model? *OMEGA J Death Dying*. (2016) 74:96–109. doi: 10.1177/0030222816666540
26. Mayland CR, Harding AJE, Preston N, Payne S. Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J Pain Symptom Manag*. (2020) 60:33–9. doi: 10.1016/j.jpainsymman.2020.05.012
27. Sun Y, Bao Y, Lu L. Addressing mental health care for the bereaved during the COVID-19 pandemic. *Psychiatry Clin Neurosci*. (2020) 74:406–7. doi: 10.1111/pcn.13008

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychology

PERSPECTIVE
published: 12 February 2021
doi: 10.3389/fpsyg.2021.636384

Hindu Response to Dying and Death in the Time of COVID-19

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We wake each morning to news on the glaring statistics of people infected by COVID-19 and others reportedly dying from complications thereto; the numbers are not receding in at least a number of countries across the world (barring a few that imposed strict lockdowns, testing and quarantining measures, such as Australia, Singapore, New Zealand and Vietnam). It is hard to imagine a moment such as this that most of us have lived through in our life-time; but it is a reality and public challenge that we can neither ignore nor look away from. In what follows I will explore perspectives on death from the Hindu tradition and the kinds of response—and solace or wisdom—afforded by the tradition to the *angst* and fears evoked by this pandemic situation. In concluding the discussion, I shall offer tentative reflections on how the Hindu perspective may be universalized, such as might invite conversations with therapists and care workers who may be seeking alternative resources to help expand the therapeutic space in more beneficent ways during the Covid-19 pandemic and its after-effects

Keywords: COVID- 19, Hinduism, death, wisdom, India, empathy

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Jeffery Long, Elizabethtown College, United States
Stephan De Beer, University of Pretoria, South Africa

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Specialty section:
This article was submitted to Theoretical and Philosophical Psychology, a section of the journal Frontiers in Psychology

Received: *01 December 2020*
Accepted: *19 January 2021*
Published: *12 February 2021*

Citation:
Bilimoria P (2021) Hindu Response to Dying and Death in the Time of COVID-19. Front. Psychol. 12:636384. doi: 10.3389/fpsyg.2021.636384

COVID-19 EPIDEMIOLOGICAL DATA

WHO reports in the closing week of January 2021 that there have been some 1 billion and 500,000 confirmed cases of COVID-19 infections across the globe, half of which have been in the Americas (4.4 million, with close to 25.2 million alone in the United States); Europe has had 33.5 million cases and South-East Asia 12.7 million (of which India has had 10.7 million cases, with a rapid downward curve); Brazil 9 million. While the global acceleration in case incidence has slowed down – around half-a-million new cases reported on average every 24 h- death rates, however, continue to increase with over 100,000 new deaths reported in 2021, bringing the global total to 2.2 million; the United States (over 421,600), South and South-East Asia (200,000) and extended Europe (730,000, largest single cluster in the UK), remain the lead contributors to death through COVID-19; and it is escalating egregiously in some parts of the globe[1]. The world is experiencing a tryst with destiny and its people are living through difficult times which calls for a phenomenological response to this new threat of unnatural and in the majority of cases untimely death.

HINDUISM AND DEATH

Since the large percentage of those infected and dying from COVID-19 in South Asia (and the diaspora), are Hindus it behooves me to focus on the Hindu perspective on dying, death, and dealing with the traumas associated with the challenges of mortality. We shall ask toward the end of the discussion if the Hindu response could have fruitful application in the context of the wider challenges of the COVID-19 pandemic.

[1] Available online at: https://covid19.who.int/ (accessed January 29, 2021).

We begin with the question, whether in Hindu thinking a distinction is made between the body and the soul; and if so what be fate of the body and the destiny of the soul? The closet cognate in Sanskrit to "soul"(*psychē)* is "*ātman*" which refers to the subjective unity of the self-consciousness of the individual and captures their vital and cognitive or conscious and unconscious functions. The combination of the vital, cognitive and conative functions is better known as the indwelling *jīva,* which is often combined with "*ātman*" to read as "*jīva-ātmā*" *(*"spirit," "self," or psychical self), since the *ātman* always remains the timeless essence of the individual, regardless. The latter is a useful ontological signifier for that which dwells within the individual, provides the life-breath (*prāṇa)*, mental prowess, and volition, and which ultimately departs at death; the transcendental self (or Self) that is denoted by *ātman* has the secondary connotation of being a living agency much as one would speak of the "soul." At face value, there might seem to be a dualistic relation between the *jīva-ātmā* and the body; however, this is not to be understood in Cartesian terms—i.e., complete separation of "spirit-mind" and "body," the corporeal matter—but rather as a more intertwined and interdependent relation or the triunity of "spirit-mind-body"; so it is a distinction without difference, and certainly not a separation, perhaps not until the point of death (Bilimoria, 2016).

So what happens at death? The first point to note is that death remains an inevitable condition of sentient existence. Whatever has birth, grows through nutrients, heat, time, air, ether (space) and breath; but it also faces decay of the elements making up the fractious body that leads to death in its time-cycled existence.

At the point of death, the *jīva* is believed to leave the body, escorted by Yama (Lord of Death) who, much like Thanatos, controls the destiny of the individual beyond the earthly realm. While departing, the *jīva* takes with it as its propulsion force *prāṇa*, or "vital breath" conceived non-corporeally—akin to Bergson's *elan vital*—as the underlying principle of sentience. This occurs as soon as the "trace-data" curled from the memory bank and subliminal psychical dispositions have been uploaded; and since the mind of the individual is believed to be "extended," the process may continue outside of the deceased body. Death is indeed of the body (the terminal cessation of heart, organs, and brain), though not of the spirit-mind. This indicates that the spirit-mind while the individual was alive had been fully integrated and embedded throughout the biological body-frame.

Once the "uploading" is complete and the mind is freed from the shackles of the mortal remains, the shepherding *jīva* is said to move through various dimensions in rapid succession: the *jīva* might sift through light-scented tunnels, or spiral through energy-fields suffuse with welcoming god-like beings (*devas*). Some NDE-reports suggest sighting of ancestors and teachers as well, with garlands, fanfare and celestial music, or frighteningly disturbing clamor in other cases, as the *jīva* is whisked away to some celestial location. However, the connection with the body back on earth and the surrounds or family is not completely severed for another three or so days. In India it is normative for Hindus to cremate the corpse within 24 h. The underlying belief here is that the *jīva* of the departed is relieved from the "higher planes" to be present at the last rites, both out of attachment to the prior body but also to bear witness to the completion of their mission on earth and cherishing in spirit-state the last moments with family and well-wishers (Mishra, 2010).

But if it is believed that the "soul" as *ātman* is timeless, might there be a peaceful resting place, such as heaven as we have in certain of the world's religions? Indeed, as the seminal *Bhagavad Gītā* (BhG, 1981) states, *jīva*'s existential core, i.e., the *ātman*, never dies, neither is it born, nor can it be cut, burnt by fire, moistened by water, weltered by wind, or overrun by time, because it is eternally immortal and pure: death cannot come anywhere near the *ātman*. Knowing it as such, there is no cause for lamenting (2.23–25).

The scriptural accounts, however, differ as to where exactly the surviving *jīva* ends up after it after leaving the earthly body: in Krishna's universal body or his heavenly abode, or in another body, or finds liberation from the cycle of birth and birth; or sequentially each of the above? One thing nevertheless is clear that the after-life is not conceived in *linear temporal* terms, but rather in cyclical or curving time-dimensions that far exceed the four dimensions of the natural world that we inhabit.

The philosophical Upaniṣads (2008) speak of two alternative destinies depending on the person's stock of *karma* (action-traces) mitigated by the effective performance of one's *dharma* (right duties and normative practices) in the life just concluded (perhaps compounded with as-yet unresolved karma carried over from previous existences). If a person has performed three requisite rites in the fire-altar and departs during the sun's northern journey and in moonlight, they reach *Brahma- or devaloka* (the realm of the supreme deity), from which there is no returning; if one departs during the "night of the smoke" or long winter solstice and dark-moon, then *pitṛaloka* (hierarchical dwellings of the foreparents), is reached, from which one returns to another life-mode.

There are nevertheless variations in certain of the Upaniṣadic texts, couple of which are worthy of noting. Release of the soul from the conditioned life on earth may lead to immortality in the form of eternal state of bliss *(ānanda*), most likely in an astral or spirit-form embodiment, marked by complete fulfillment of all desires and cravings and absence of pain and pleasure. Another account suggests total oneness with the Supremely Divine Effulgence *(paratparaṃ puruṣa divyam)*; yet another underscores indistinguishable merger with the Absolute as Brahman. They also speak of retributive hellish realms for those who may have committed excessive felony, trespassed *dharma's* rites, or violated rights of others. Where one ends up in the postmortem condition is determined by the autonomous clockwork of karma.

Each of the worlds yonder has its own path not of voluntary choosing, although there can be transitional movement from one world to the other, which is distinct from the cyclical journey of the *jīva* from one incarnation to the next in this world, or from death to death. After a period of reparation, the *jīva* undergoes metempsychosis and is reborn in another body with the past trace-memories intact in the unconscious, which puts a limit on their free-will.

So now faced with the fear death – in normal life and, especially, in the current pandemic, what kind of solace does Hinduism have to offer? Death, in Hindu thought, is indeed acknowledged to be a great mystery, an unknown; and yet one

could arm oneself to avert attendant fears and *angst*. Fearing death is not considered to be unnatural; the fear of death in one life might be exacerbated by cumulative fears of death from the countless past lives that each *jīva* has passed through. The classical text of Yoga (*Yoga-sutras,* YS, 1990) opines that fear of death to life is one of the five unwholesome mental states which have to be overcome by attaining enlightenment (YS 2.3). Fear of death and clinging to life—which is a form of attachment—constitute an affliction that bedevils everyone, both the wise and the motley ignorant (YS 2.9). Krishna consoles the despondent warrior, Arjuna, with a surprise epiphany proclaiming, "I am now become Death [Time grown old], the destroyer of the world;.. you should have no fears" (BhG 11.32).

The broader tradition itself suggests various means through which one could come to accept impending death, even advancing its adjudged inevitability, rather than prolonging life. The solace is more in way of being reminded that death is not the end of life, but rather that, as Mahatma Gandhi put it, "life and death are phases of the same phenomenon, the reverse and observe of the same coin..; life becomes livable, only to the extent that death is not treated as an enemy but as a friend.…. death is not a fiend, it is the truest of friends. It delivers us from agony." (Mahatma, 1960, 3, 4; 2, 237). Again, very often the sagely sermon of Krishna is recited to provide some succor to persons – especially in terminal state or who have been overcome with excessive *angst* about death as a possibility or as a reality facing them: "As a person casts off worn-out garments and puts on new ones, so the embodied *jīva* casts off the worn-out body and enters other new ones." (BhG 2.22). Our thrownness onto death—to borrow an adage attributed to Heidegger—is not something to be avoided but rather to be countenanced and faced with courage and boldness, as does a martyr upon their calling to duty of justice. Furthermore, the *Yoga-sutras* and a number of other yoga texts prescribe various yogic (or spiritual) practices that help the adept to overcome "fear, agony, despair, helplessness and other feelings [that are] embedded in one's being" and which pertain as much toward death (YS 4.11). The Bhagavadgītā follows up with a proposition that if one could cultivate the alternative emotion of detachment (*asakti*) as a virtue in its own right (3.25), freeing oneself from the temptations of desire to go on existing—as if immortality was the order of the universe—and its counterfactuals of anger, fear and loss of hope, then one would achieve a state of reasonable intelligence (*vyavasāyātmikā buddhir ekeha,* 2.41). In this resolute state one determines the best course of practical action grounded in steadfast disposition. This is a normative heuristic, not a categorical imperative, for virtues no more than emotions can be prescribed; they can only be cultivated, prophylactically and pedagogically in a cultural setting. Armed with this rational wisdom, as in a battlefield, one confronts the menace of death.

The next question that follows from the foregoing is: how might one prepare for death? Does Hinduism provide directives those afflicted and nearing death to face steadfastly their dying moments? The sage advice is that what we ought to do in life is to work toward attaining a state of selfless awareness or a preparatory spiritual disposition "of steadfast constitution" (*stithaprajña)* that would unburden the ubiquitous fear of dying when the fatal moment arrives. And then there would be no need for mourning, or grief either in the aftermath, on the part of those living and left behind, who we call the surviving kin and associates. The trauma of dying need not be debilitating; it could indeed be transformative: there is indeed hope, and hoping.

A Hindu person will spend a good part of their life preparing for a new life which may or may not entail re-embodiment in a physical body in the after-life; they may intentionally wish for an eternal life in the *devaloka*, should they be so eligible. But there may be number of normative practices that might well prepare one for death. These could range from virtuous excellences—such as the courage and temerity to face any untoward consequence, however fearful and threatening to life these may be—to more concrete praxis such as regular purposeful fasting that would both cleanse the body of toxins and sediments from medications, and help ground one in the suffering that the body might recurrently experience when deprived of food—as may be the predicament at the point of death and in the aftermath, for that is an unknown. The cultivation of this disposition is reinforced with constant practice of contemplation, meditation, devotion or supplication to the gods and ancestors with mantra-recitations, and counseling of a guru or care-therapist. The profess intent here is to seek release from mortality and fear of death—often personified, again, in the image of Yama, or indeed of Kāli, the ferocious feminine deity who adorns herself with a garland of skulls—a stark reminder of death—trembling a bloodied sword in one hand and a severed head in the other. One is also expected to have fulfilled all duties and obligations while in the embodied community, and settled all debts in the transactional world of commence and good-willed interrelations.

There really is no short-path to what might be called "the yoga of dying." Likewise, again, the *Bhagavad Gītā* ordains obligations, sacrifice, askesis and other ascetic disciplines that are intended to free one from inclinations and impulses that chain us to the relentless wheel of birth and death, and have their intent set on *mokṣa*, or salvific liberation. These disciplines too are variously called "*yoga*" by Krishna (BhG 17.15–25). To aid the departing *jīva* in its onward journey to the appropriate or karmically-assigned destiny in the beyond, there is emphasis placed on proper demeanor and certain mandatory rites, observances and ritual preparations in the period before the last breath is taken, and after the life-breath has left, i.e., the work of death (*yama)* is completed. In the Tantric (esoteric) tradition, contemplative visualization of one's death is practiced, often in cremation grounds; even a concluding yoga-posture emulates the corpse-state (*shavasana*). We may also note the particular practices and ceremonies associated with cremation—or burial, depending on the status of the person—and after, and their continuing importance in the Hindu life-world. The mystic power of mantras (syllabic sound-forms) recited during the service, with other Vedic (prescribed scriptural) offerings (ghee and rice grains, sandalwood) to the god of fire (Agni) upon lighting the funeral pyre, are powerful moments meant both for a smooth apparitional transit of deceased (i.e., the *jīva*) to the beyond, as much as for the mourning community left behind on the ground: the two seemingly estranged parties might even stand together momentarily in an uncanny transcendental

unity (or *communitas*) (Sherma and Bilimoria, 2020, p. 94, 163, 170, 200).

Finally, would one say that there is room for a "good and dignified death"? Certainly, the practices and rituals at the time of dying are of particular importance toward cultivating an equanimous state that would have the challenged individual prepared for an unperturbed arrival of death. A resolutely peaceful death where one has the sense of having fulfilled life's mission and completed all that was expected by the normative order—presumably the gods too or the larger tradition (*dharma)*—accounts for what could be called a "good and dignified death." Without an antecedent good-life one cannot expect a consequent good-death; it is not simply a matter of grace or forgiveness from some divine supremo. There might be room for remorse for the wrongs one might have done, the injuries caused to others, and obstacles one might have put in the path of the societal or greater *dharma* running its course, that may mitigate the severity of the post-mortem suffering; but there will be no grief or mourning for one's own death (here or in the hereafter)[2].

This motif is brought out rather colorfully and movingly in the retelling of the concluding hours of the battle between two warring fraternal clans in the classic epic, *The Mahābhārata* (MBh, 2009), by the poet Bhāsa (3rd CE) where Duryodhana, the scion of the so-depicted "bad guys," is struck down in the bitter internecine battle by an opposing warrior. Even though the manner of the defeat was in violation of the rules of war, he was nevertheless overcome with remorse precisely for reasons of the excesses of his own insatiable ambition (to lay claim to the father's kingdom), as well as for the deceits, war-mongering trajectory, and the horrendous evils he had trumped up as the elder leader among his brothers upon the cousins who were favored by the aging and infirm king as the rightful heirs.

Bleeding profusely from the insufferable blow of Bhima's mace around his thighs, Duryodhana declares that he is dying but that this is to be a "glorious death"; in many words, he tells his bereft parent and his son who are overwhelmed with grief that they should not be concerned because the warrior-hero will soon join his hundred brothers/cousins (among those also who his forces have killed), indeed that he is "reborn today," freed of the malice he had long harbored for his fraternal counterparts, and instead is overcome with magnanimity and compassion for their eldest, Yudhisthira, leader on the competing side. His conscience now reminds him in fast-moving images of the wicked and malevolent acts and decadent intentions he had indulged himself in the tussle for power, directed at the opposing filial community; but he also feels fulfilled in his heart as he witnesses his own son being coronated by his Guru's son. He continues: "My life is now slipping away. I see my ancestors, my hundred brothers, and Karṇa [protégé brother] ahead of them; I see Abhimanyu (youngster from the rival side who has killed in a staged ambush), seated on [god] Indra's elephant rebuking me. Urvaśi and other heavenly nymphs have come to welcome me; here are the oceans to greet me. Lo, the river Gaṅgā too is greeting me with love. Yama with chariot drawn by thousands of swans has come for me. Here I go to meet them all." With these words, Duryodhana breathed his last. This in the tradition is what would be considered a "good and dignified death."

DISCUSSION

It is believed in the Hindu tradition that death, detachment and grief are not unrelated psycho-tropes of human experience. When the imminent death of a dear or near one, or in someone's care, calls another or others to grieve and mourn, they should have the courage, faith, love and support to remain open to the pain and the loss in the situation, and introjectively exude empathy (Bilimoria, 2012; Zeeshan et al., 2020).

The keen reader however may still wonder whether the responses and pathways discerned from certain classical texts and cultural moorings remain confined to beliefs and praxis of caste-based Hindus as a whole; and the corollary: whether these bear any relevance outside of his cultural context to clinicians, therapists and care providers more widely who are confronted with the intense suffering and/or the dying moments of patients afflicted with COVID-19, or other fatal conditions, but who may come from different faiths or no-faith at all and in very different cultural location (i.e., they belong to the largely secular modern world)? At the risk of seeming to excessively decontextualize (some would say demythologize) a historically and culturally rooted psycho-religious normativity, I would venture to suggest—following the 7th−8th century (CE) doyen of Indian philosophy, Ādi Saṅkara—that the central teaching of Hindu ethics and eschatology, especially that articulated in the *Bhagavadgītā*, are amenable to universalization—just as Gandhi transformed the localized Jaina moral vow of non-injury (to microbials and all creatures) into a forceful principle of nonviolence that found broad application in civil, political and ecological spheres as well.

A therapist therefore may improve their practice by looking through the broad lens of Hinduism. This will not only help develop a deeper understanding of a client's cultural and religious beliefs but also provide concrete examplery case-points to present to the broader class of patients. For instance, the therapist may offer her client alternatives to their preconceived "interpretation of death," regardless of whether the client is religious, agnostic, non-theistic, or an atheist. These examples can provide the

[2]Of course, mourning and grief and a deep sense of helplessness or hopelessness on the part of the close kith and kin witnessing the dying and eventual passing of the loved one cannot be avoided. Space does not allow further discussion of this facet of Thanatos, which has been treated in much detail elsewhere, see Bilimoria (2012); in that paper I engage with some currents from western philosophical thinking on the more troubling or "heavy" passions and feelings. people everywhere experience grief and mourning; however, the emotions and feelings through which they express this intense state varies across cultures and possibly also history. I draw on a personal encounter with the death of dear ones that a colleague has narrated from their work as a care-therapist (Kaetz, 2020), and my own, that has led me to question and even overturn the neat theorizing and methodology afforded in Western studies on the emotions that are unleashed in such experiences. I turn instead to cross-cultural studies where "reciprocity" has a stronger presence than anything like a Kantian sense of duty—or "virtue ethics," propositional judgment, the natural law imperative—of reconciling with forces higher or now-other than the mortals. Rather, I find a more perspicuous direction in psychoanalysis tempered with Indian phenomenology on the work of grief and mourning (see Sharma, 2014, p. 84–87).

therapist with a more expansive toolkit to draw from and utilize in the therapy sessions. Hindu (along with Buddhist) philosophy and theology have already brought more widely through various channels, media and scientific experimentations a rich repertoire of ideas, teachings and practices that are now interactively part of the mainstream culture and vocabulary in our modern, secular, globalizing world: these include the well-known ideas about the law of *karma* and wheel of *samsara*, but also the much popularized practices of Yoga, muscle relaxation, meditation (mindfulness, transcendental attention, vipassana, walking, silent), mantra-contemplation, visualization, Guru-guidance, well-being retreats, puja-chanting, deity-devotion, affirmations, non-injurious (veggian) diet, Ayurveda-herbal treatments (with homeopathy and Himalayan-oil massage), tantra-chakra-kinesiology (akin to acupuncture) etc. A selection of these have rendered positive contribution to outcomes in, for instance, supporting cancer, PTSD, distressed-mental state, and palliative care, as well as toward wellness, psychotherapeutic and cognitive-aesthetic initiatives (often, understandably, stripped of the religious trappings of their Dharma-dhamma origins).

When a person with COVID-19 is stuck in a specific concept of death and has not achieved adequate psychological relief from it they may find strength in aligning their own psychic battles with Arjuna's struggles. Just as a client may believe their prayers are no longer being heard but then discover that daily affirmations or regular visualization practices bring about a profound sense of relaxation in their being and allaying of the experience of physical and emotional pain.

Hence there is compelling reason to believe that the Hindu position on death and dying opens up new conversation with therapists and care workers who may wish to expand their therapeutic space even as they deal with incidents and the after-effects of the Covid-19 pandemic. If for nothing-else then as a heuristic supplement to the normative framework and resources provided by current allopathic or clinical psychology praxis. These insights may make for the kind of solace that the philosopher Schopenhauer found on his death-cot as he heard passages recited from the *Upanisads*, or when Oppenheimer of the Manhattan (atomic-explosion) Project resorted to the verses in the *Bhagavadgītā* to describe the splendor of "thousand suns bursting forth," while remaining opposed the development of nuclear H-Bomb for use in warfare. But beyond providing mere solace the potential of empowering those impacted to normalize their fears and welcome the supplemental strategies from Hinduism and other faiths toward the healing process need to be taken on board. We are here arguing and pleading for a paradigm shift in the discursive and practical approaches to the COVID-19 pandemic.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

ACKNOWLEDGMENTS

PB is grateful for helpful comments from the two reviewers, and to Karyn MacDonnell for help with discussion on applications.

REFERENCES

BhG (1981). *The Bhagavad Gītā in the Mahābhārata.* A Bilingual Edition. Translated and Edited by J. A. B. van Buitenen. Chicago, IL: University of Chicago Press.

Bilimoria, P. (2012). "Of grief and mourning, thinking a feeling back To Robert Solomon," in *Passion, Death and Spirituality, The Philosophy of Robert C Solomon*. Sophia Studies in Cross-Cultural Philosophy of Traditions and Cultures, eds K. Higgins, and D. Sherman (Dordrecht: Springer), 149–174.

Bilimoria, P. (2016). *Horizons of the Self in Hindu Thought*. New Delhi: DK Printworld.

Kaetz (2020). *Travelling With a Grief Case, Based on True Stories*. Melbourne, VIC: Ultimate World Publishing.

Mahatma (1960). Compiled by D. G. Tendulkar. Vols 1–8, 2nd Edn. Delhi: Publications Division, Government of India.

MBh (2009). *The Mahābhārata*. Translated by John D. Smith. Westminster: Penguin Classics.

Mishra, T. (2010). *The Hindu Book of the Dead*. New Delhi: Vitasta Publishers.

Sharma, R. (2014). *Empathy Theory and Application in Psychotherapy*. New Delhi: DK Printworld.

Sherma, R., and Bilimoria, P. (eds.) (2020). *Contemplative Studies and Hinduism*. Delhi: Routledge.

Upaniṣads (2008). Annotated translation by Patrick Olivelle, Oxford World's Classics. New York, NY: Oxford University Press.

YS (1990). *The Yoga Sutras of Patañjali*. Sanskrit with English translation by Christopher Chapple and Yogi Anand Viraj. Delhi: Satguru Publications.

Zeeshan, M., Chaudhry, A. F., and Khan, S. E. (2020). Unmaking the anthropology of mourning in a psycho analytical perspective. *Glob. Reg. Rev*. V, 100–107. doi: 10.31703/grr.2020(V-I).13

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

ORIGINAL RESEARCH
published: 12 February 2021
doi: 10.3389/fpubh.2021.622592

Mourning and Management of the COVID-19 Health Emergency in the Priestly Community: Qualitative Research in a Region of Northern Italy Severely Affected by the Pandemic

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OPEN ACCESS

Edited by:
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Reviewed by:
Penrose Jackson,
Vermont Public Health Institute, United States
Klaus Baumann,
University of Freiburg, Germany

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Specialty section:
This article was submitted to Public Health Policy, a section of the journal Frontiers in Public Health

Received: 28 October 2020
Accepted: 12 January 2021
Published: 12 February 2021

Citation:
Testoni I, Zanellato S, Iacona E, Marogna C, Cottone P and Bingaman K (2021) Mourning and Management of the COVID-19 Health Emergency in the Priestly Community: Qualitative Research in a Region of Northern Italy Severely Affected by the Pandemic. Front. Public Health 9:622592. doi: 10.3389/fpubh.2021.622592

Background: The COVID-19 pandemic is causing major social changes to which significant psychological effects are linked. During the first phase of the pandemic wave in Italy, whilst there was insufficient information about the phenomenon and the strategies to safeguard the population against it, many categories of people, whose professions required constant contact with the public, were affected by the contagion.

Aims: The literature has shown how religiousness can support the management of stress due to diseases and health risks. In relation to this, the current study wanted to investigate how priests managed the early stages of the pandemic. This work, therefore, aimed to investigate the psychological experiences related to the contagion and the eventual death of colleagues as well as the resilience strategies activated by the priests during the process.

Participants: The research involved 12 Catholic priests, all male and aged between 42 and 63 years. They came from the same pastoral community in one of the regions in Northern Italy that were most affected during the first phase of the pandemic. Those ministers had been constantly in contact with the faithful of their parishes since the breakout of the virus.

Methodology: A qualitative research design was adopted, and in-depth interviews were conducted. The dialogues aimed at investigating the deep, personal and relational experiences of the priests, together with their concerns and the tools they adopted to manage anxiety. The texts obtained from the interviews were subjected to thematic analysis.

Results: The areas studied concerned the experiences of the participants during the lockdown, the implications of social distancing and lack of funeral rituality and, finally, the importance of prayer as a resilience factor.

Conclusions: In the current scenario dominated by the pandemic, it is significant and stimulating to understand and reflect on the functions and roles of the experiences of faith, particularly the act of elaborating the process of mourning due to COVID-19.

Keywords: COVID-19 pandemic, priest, traumatic loss, mourning, funeral, religiosity

INTRODUCTION

Literature has already considered the importance of the spiritual support work of priests in their communities and how their activity exposes them to difficulties and critical incidents, especially when they have to operate in difficult contexts (1–4). The COVID-19 pandemic has strongly contributed to the deterioration of the general level of mental health and well-being in all countries where the pandemic exploded (5). In fact, it has intensified the feelings of loneliness and social isolation due to the lockdown and the need for distancing as well as the rarefaction of social relations to prevent the spread of the contagion (6, 7). In Italy, the first phases of the COVID-19 pandemic strongly affected many categories of people who, either for professional or personal reasons, had to be in daily and direct contact with a significant number of other individuals (8, 9). In addition to medical and nursing staff and those working in commercial distribution, these groups of people also included priests (10). In normal times, when death appears in family life, mourners reflect on their lives and on their close relationships with relatives and with God. In these tasks, they are often assisted by priests, so that they can open their mind and face suffering, forgiveness and the perspective of the afterlife. In the emergency phase, during the breakout of the pandemic and in the subsequent lockdown, the manner in which the numerous deaths occurred exposed the survivors to traumatic loss, and priests were called upon to help them in various and exceptional ways. Unfortunately, these events exposed the priests to the risk of contracting the virus even without being guaranteed a really effective form of support due to the dramatic and unmanageable situation. Indeed, during the COVID-19 breakout, people who suffered from the death of their loved ones had to face the factors that classically characterize traumatic loss, such as sudden death and the manner in which the death was reported.

Moreover, social loneliness, brought about by government-imposed distancing to prevent transmission, heightened the emotional loneliness caused by the breaking of an emotional bond, thereby exacerbating its negative effects as the literature on mourning had already described (5, 11–13). For families, their COVID-19 experiences involved anxiety, separation, loss, grief and financial distress, and recent research showed how the pandemic exposed the world population to risk factors related to chronic psychological distress (14, 15). The literature emphasizes the need to carry out studies that consider the clinical risks for traumatic mourning caused by the pandemic (16). Aside from all these dramatic factors, the importance of other dimensions that exacerbated mourners' suffering, including the inability to accompany their loved ones during the end of life and the inability to celebrate the funeral rites, emerged (17, 18). These limitations restricted the possibilities of resorting to religion as a tool for the elaboration of suffering.

The importance of funeral services has been addressed by numerous studies highlighting their relevance both from the point of view of the mourners and the community [e.g., (19)]. The elaboration of loss through a religious rite offers a consolation that buffers the pain brought on by such a loss and makes it bearable (20). Scholars already showed how spirituality and religiosity can help develop resilience in stressful situations related to health and grief (21–23). These two aspects, whilst being able to coexist, are not limited to each other: in fact, spirituality is, in itself, independent of any external regulation of a religious nature and concerns the ability of the individual to access the dimension of transcendence (24). The tools offered by religion are based on the social sharing of rituality, language and symbolism (25), which directly influence a person's ability to manage experiences of death and mourning (26). The predictive power of religious commitment to well-being, both physical and psychological, could be explained by the affective relationship established between the believer and divinity. Such a bond could be based, like all feelings of union, on the need for protection and security to face the terrifying prospect of death (27–31). The darkening of spirituality and religiosity implies the nullification of the consolatory potential offered by these dimensions in the management of illness and loss (21, 22).

Yet, the literature seems to have failed to consider the point of view of priests, as no research has yet to investigate how the stress linked to the impossibility of officiating funerals due to emergency situations may have affected their well-being. To remedy such a gap in the literature, this article aims to explore the role of pastoral care during the pandemic and examine how priests managed their chaplaincy during this time.

AIMS OF THE STUDY

The present study aimed to analyse the emotional experiences of priests belonging to a community in Northern Italy, which had been strongly plagued by the first two phases of the COVID-19 pandemic. The main objective was to listen to the priests in order to understand how they had experienced the first phase of the pandemic, which coincided with the general lockdown (March 11 to May 3, 2020). It was important to explore whether and how they had been influenced by the awareness that many priests had been infected and that their category had been recognized as an at-risk group. We further wanted to study how they experienced the limitations on the possibilities of officiating funeral rites and how they managed this limitation with the mourners within

the community of believers. In parallel, we sought to consider whether and how their representations of death affected their pastoral activities and contact with the faithful and how they perceived the role of religion in the management of collective trauma amongst believers.

PARTICIPANTS AND METHODOLOGY

This research followed a qualitative research design, particularly the assumptions of the phenomenological interpretative analysis or IPA (32). The study was conducted at the beginning of phase 2 of the pandemic (May 2020) and involved 12 participants, all members of pastoral communities in one of the regions in Northern Italy most affected by the pandemic during the first phase. The participants were aged between 42 and 63 years (average = 54 years; SD = 7) and were living with other priests and/or seminarians. Before starting, the purpose and the modalities of the research were explained to all the participants.

The data collection was carried out through in-depth interviews, which allowed the researchers to understand the participants' points of view on the investigated topic and draw on in-depth narratives about their experiences, attitudes and perceptions (20). The dialogues, lasting about 60 min each, were realized via the Internet; these were recorded and literally transcribed. The peculiar design of the IPA allowed the researchers to obtain a general and flexible outline, which left the possibility of modifications according to the progress of the dialogues with each participant. In this way, the themes they considered most significant can be further explored. This methodology was chosen, because it gave access to the sphere of profound experiences, thus responding to the need of examining how people made sense of their lived experiences (32–35). Therefore, the analysis of these experiences made it possible to understand how participants related to the COVID-19 pandemic.

As required by the approach, we followed three different levels of analysis of the texts: the idiographic analysis (repeated listening to the audio recordings of the individual interviews and reading of their transcription, in order to retrieve as much information as possible about how the participants lived and managed their experiences, thus leading to the recognition of the main nodes of their narratives), interpretation (recognition of the meanings of the main nodes and their links with the whole discourse, recognition of the perspectives of each individual participant as well as the similarities and the differences between them), and phenomenological dimension (recognition of a unitary integrated discourse that emphasizes individual specificities representing specific but also shared points of view). This procedure allowed the researchers to highlight the main points of the narrative through the faithful transcription of the interview and the rereading of the text (36). Next, we proceeded with the analysis of the semantic content and the used language as well as the identification of the themes that emerged. Finally, the various themes were organized in clusters and then in superordinate categories, allowing the researchers to achieve a more articulated analysis of the information collected.

It has to be noted that this type of analysis does not aim at grasping the essence of the phenomenon, but only at bringing out the most relevant themes reported by the participants (33). The analysis process was meant to facilitate the identification of some fundamental themes emerging from the narrations through a bottom-up approach. These themes, which were common to several participants, were grouped into broader thematic categories (37). Analyses were performed by a trained researcher under the supervision of an experienced qualitative analysis researcher. After they reached agreement on the interpretation, another researcher discussed the procedure and the first results obtained. Finally, after modifications agreed upon by the three researchers, the final structure of the report was defined.

Informed consent was obtained from all the participants. The research has been approved by the Ethics Committee of the University of Padua with unique number CD8470F7F42ACDD0679DC171884311B3 and protocol number 3635. As requested by ethical norms, all the names reported below are fictitious to respect the anonymity of the participants.

RESULTS

During the meetings, it was possible to divide the experiences reported into different thematic nodes related to the following: the emotions experienced during the initial emergency phase, the implications of social distancing and the lack of funeral rituality and the importance of prayer as a factor of resilience.

First Theme: The Prevailing Early Emotions

The participants reported a concentration of negative emotionality associated with fear, uncertainty and helplessness, mainly during the first weeks of isolation. Domenico, a 58-year-old man, has been a priest for 33 years and spent 24 of them in a mission in Kenya. He had been the pastor of a community of about 4,000 people for 6 years, and the priest with whom he lived at that time had just died after a long illness. "Having to deal with the death of the colleague I was living with," he said, "made me feel an abysmal emptiness. This was associated with the emptiness of the lockdown, because suddenly, I no longer had the possibility to see, to feel, to organize activities with people... how relevant can I be as a priest?" Franco, 53 years old, a priest for 27 years and a co-pastor for 16 years of a community of about 7,500 people with another priest, described something similar:

> I don't think I have ever experienced real fear and fright, but I was overwhelmed by questions about the future. I was constantly asking myself what would happen in the future and what tools I had to face the most fearsome scenarios.

Michele, a 61-year-old man who had been the parish priest of a community of about 9,000 people for 11 years and who, at the time of the interview, was living with his mother shared:

> I was assailed by an irrational fear, what happens when you are faced with something dangerous, an enemy. A killer who moves in an ambush and you can't predict if he will strike from the air,

from the ground, if he will take your feet, your hands, because you don't know anything about him, you don't know anything. All these have been strongly destabilizing.

Michele further expressed his experiences:

Here, the emotions were fear and disenchantment and dismay. I wondered how I, my mother [and] my flock would react. I did not know what to propose to the community that I imagined to be as disoriented as I was. What I missed most were the social relationships, all the groups, the pastoral council, the meetings with the altar boys, all the celebrations I had planned: masses, confirmations, confessions, prayers for the spiritual journey. Suddenly the fear of evil, of the unknown evil that paralyzes me, fell upon me. For a moment, I was overwhelmed by the terror of losing my faith. The first time I saw the church empty I cried and I felt lost as the parishioners sent me messages asking me "What is going on?" "What is the point of all this?" I felt that they really needed me as a point of reference and that my bewilderment made them miss it, together with the community, when they met to celebrate the Eucharist. So, I asked myself how I could overcome my helplessness. I don't know how to use social networks, not everyone uses the phone or the computer. How could I reach them? Luckily, some parishioners helped me and on the Facebook page of the parish, we started broadcasting the Sunday Mass. The first time was a unique emotion. I saw people coming out of the balconies to say goodbye. Every Sunday during the mass, I called them by name, those of the Christian association, group by group, and they answered "Here I am!"

This first phase of personal fear was followed by a second one, in which attention to other people and worries for the neighbors became dominant. The desire to transform the time of social closure into a moment of deep reflection characterized the narratives of all the participants. As depicted by Patrizio, a 56-year-old parish priest who had served for 31 years in a community of about 4,500 inhabitants and had been living with a colleague:

At a certain point, I overcame my personal anxieties and remembered that, first of all, my role is to have a responsibility toward others. I thought that I had to help those who were not able to cope and to think also for those who did not know how to manage this situation.

Mauro, a 55-year-old priest for 30 years and pastor for 16 years of a community of 4,000 people, linked the experience of COVID-19 to the sacred texts:

It is important to remember that every crisis implies a change that can be an improvement. The exile for the people of Israel was an immense tragedy, which occurred because of the destruction of Jerusalem [...] And yet, if we think about it, that great suffering was paradoxically very fruitful and allowed the Old Testament, which begins precisely the exile, to take shape entirely. What was announced as a period of great pain and misfortune turned out to be the great and fruitful teaching of the Old Testament.

Second Theme: Social Distancing and The Perceived Inadequacy of The Funeral Rituality

According to the participants, the pandemic caused people to experience strong feelings of loneliness accompanied by deep sadness and the need to safeguard the quality of human relationships. The lack of social contact was a source of suffering for everyone, but "we must not make it become social distance or fracture [or even] estrangement from each other" as Domenico stressed. During this period, an ardently intense desire to return to the community also emerged, thus strengthening the need—according to Franco—to "build a bridge" and extend individual and private reflection to the entire community:

At this time, more than ever, I try to transform my dialogue with God into an effective social relationship. Now, more than ever, I feel that my faith call must express itself in social actions that help people to overcome this trauma.

Giacomo, a 61-year-old pastor of a community of about 7,000 faithful, continued in this thematic line, underlining how the symbolic Eucharistic action and the meeting during religious services are "the construction of the social body, which requires to feel united and aggregated to react to the trauma, also through prayer." Giacomo, who had been living with an Ecuadorian colleague, also maintained this level of analysis as "unliveable." This position is shared by Stefano, a 42-year-old man who has been an assistant parish priest of a parish of 7,500 inhabitants for 8 years. He said that the technological tools, although useful, have not completely made up for the lack of warmth and affection:

Man is relationship, he needs a direct dialogue. He needs to feel closeness and affectivity. The contact, for example, of the handshake makes the presence felt, it is not just a simple greeting said with the voice. Communication mediated via computer or other technological means reduces this type of presence. In this way, the soul of the relationship is missing.

Regarding the difficulties caused by the lockdown and social distancing, Domenico explained how the Internet has helped:

We are immediately equipped not to remain isolated in our task [...] We always guaranteed the essential interventions, first in deferred ways and then by streaming with the means we had at that time. It was not easy, because the parishes were not very well equipped. However, we—the priests—went online and got informed about what everyone was doing on the Internet. I managed to create a WhatsApp group by inviting everyone to sign up in order to receive links and necessary information. Other colleagues have created listening groups. Now, the WhatsApp group has 238 members and we discuss issues in various communities and neighboring villages. We have proposed the *Via Crucis* (Way of the Cross) on Friday and organized the masses on Sunday. Choirs have been set up for Sunday songs and also a real musical company has been set up: there are those who sing, those who record, those who mix, those who take care of the audio effects. Those were all important experiences. For example, after she saw her daughter engaged in these operations, an elderly

> woman who usually watched Mass doing her house crafts felt more involved and is now participating in the streaming Mass whilst standing still, because she is now more involved.

Alessandro continued along the same line:

> We have also activated online catechism and a distance education activity, from kindergarten to high school. Honestly, it was not easy for us to organize all these or to involve children and adolescents, because they need real closeness, to meet in a concrete space in which to move and act. Yes, everything is much more difficult, but let's try to make it.

However, it was the initial phase of the pandemic that outlined what would have been the most traumatic consequence of the social distancing: the impossibility of accompanying the dying for the last farewell, culminating in the prohibition of officiating the funeral rite in the traditional way. As Mauro said:

> It was traumatic for the faithful not having the necessary space to deal with the death of their relatives. From the way I perceived their pain, they all felt as if something extremely precious had been stolen from them. What was taken away from them is precisely the path of processing the loss, and this made them unable to make sense of the void. They live with the feeling that absence is a presence.

Simone, a 63-year-old pastor for 38 years of a community of about 1,100 inhabitants, and who had been living with four other priests, continued this theme, saying that:

> The emptiness and the sense of loss have been amplified by the impossibility of giving body to the community that gathers around the pain with prayer. The funeral rite guarantees this presence and helps give meaning to death and loss. We have all found ourselves in front of a void without being able to attribute meaning to it; therefore, we face a great question mark and are forced to ask ourselves what is beyond death in solitude, without the chorus of the community that gathers around this mystery.

Indeed, the loneliness associated with these rituality-related shortcomings had an effect that Franco called "a lacerating lack." However, according to Giacomo, "The mourners, during the limited funeral resulting from the ongoing emergency, showed great civic sense and did not present recriminations. They seemed very aware." Nicola, a 42-year-old man who had served as the pastor of a community of about 3,000 people for 12 years, linked the emergency situation to his experience as a missionary in Brazil, recalling that:

> The measures that the Church in Italy has taken during this period are those that are always used when there are not enough priests in any other region of the world. We in Italy are used to customizing the funeral rite, but this is not possible all the time and in all places. In situations where this is not possible, the ritual is collective and very fast, and this does not seem traumatic.

Furthermore, according to Nicola, this exceptional suffering is caused by the fact that in the West, "we are used to well-being; we have removed the awareness of death and have hidden its concreteness. COVID-19 has suddenly put us in front of our own limits, and we realized that we are unable to face them."

Third Theme: Religion and Prayer as Sources of Resilience

Prayer was a central knot in the narratives of all the participants. According to Franco:

> Prayer is the optimal instrument to get in touch with God and humanity. Prayer is not a trivial and impersonal formula, learned by the heart and which does not aim at the person. Prayer is an instrument to have a direct contact with God.

Many participants urged families to pray together in order to strengthen their sense of unity and the sharing of contact with the divine. As Giacomo pointed out: "Forced coexistence can find in prayer an opportunity for closeness, strengthened by looking into each other's eyes whilst addressing God. This empty space where even the experience of waiting feels equally void can become a significant experience." Pope Francis compared the priests who assisted the COVID-19 patients to the shepherds who took care of their flock. In particular, one of the speeches most cited by the participants was the *Urbi et Orbi* blessing delivered by the Pope on March 27, 2020 in which the Holy Father referred to the figure of the boat in storm.[1] As Domenico reported:

> During the prayer of March 27th, the Pope compared the world population before COVID-19 to the situation described in the Gospel of Mark in which the disciples found themselves on board a boat during a storm. He used the metaphor of the storm to indicate the condition of vulnerability and the sense of bewilderment felt in the face of the explosion of the pandemic. He used the metaphor of "being all in the same boat" to emphasize the importance of building a sense of community and to say that it is not possible to save oneself alone. In this context, the Pope was able to instill hope and a sense of unity. The reference to the storm was very effective. It allowed us to give an image of our condition, of what we are all living together at the same time. What I then developed around that thought is the greater humility of the world around us.

Nicola, in this regard, shared that:

> God does not remove the human condition of fragility. He only removed the situations of weakness in rare cases. Usually, he does not intervene to simplify the situation. He does not intervene, he leaves everything unchanged...except in rare cases. What really counts and must change is the way of looking at the situation on the part of those who live it, as for example Jesus did on the cross, reinterpreting the meaning of his death. God did not prevent him from experiencing death. Jesus had to reckon with death. He has remained, but instead of interpreting it as evil, he interpreted it as love.

[1] Available online at: http://www.vatican.va/content/francesco/en/homilies/2020/documents/papa-francesco_20200327_omelia-epidemia.html

DISCUSSION

During the first breakout of the COVID-19 pandemic, the category of Italian Catholic priests was among those most affected by the contagion (10). Similar to other studies on COVID-19 and the Ebola virus (38, 39), we therefore wanted to investigate how the priests lived this peculiar experience in that period and how they managed to handle the emergency vis-à-vis their relationships with their parishioners. The results showed that the first impact was shocking, but the fear for one's fate had immediately been replaced by the task of helping parishioners cope with stress. The narratives on the personal aspects were minimal. Rather, the priests gave the impression of not caring much to talk about their personal experiences nor the risks of the contagion they personally took. On the contrary, all the narrators immediately focused on the health emergency and regarded it as a precious and unmissable moment to reconsider their own existential and vocational path. This step was quickly and spontaneously associated with the concern to ensure that they provided support and assistance to their flock.

Many participants referred to the Pope as the source of inspiration for underlying the importance of the prayer. One of the most cited speeches was the one Pope Francis gave on March 27th, in which he mentioned the image of the boat in the storm. The participants appeared to have looked to the Pope as a shepherd of shepherds, a guide capable of transforming the emergence of a potentially overwhelming situation into an opportunity to strengthen community bonds and enable resilient strategies. This passage confirms what has already been indicated in the literature, namely, the ability of believers to deal with stressful situations in a particularly resilient way (22, 26, 40, 41). The possibility of including one's existential path within a divine design endowed with meaning—where events can be regarded as an expression of God's will—can be a source of resilience in the face of death anguish, as widely discussed by terror management theory (TMT) (42, 43). In the perspective of TMT, religion fulfills the need to alleviate the fear of death by giving coherence and significance to the dramatic events related to the evidence of death (44, 45). Considering the studies already present in the literature, religion allows the representation of death as a passage rather than annihilation, and this view responds to the need of individuals to give meaning to their lives (23, 41).

Scholars have already described how faith in religious contents helped people manage the stress caused by the COVID-19 pandemic (46, 47). In particular, the participants of our study appeared to be aware of the fact that they belonged to a category considered to be at risk. Thus, they reacted in a manner considered consistent with the TMT. The use of categories that deny death (such as the afterlife) allowed them to reduce anxiety and fear of death as well as deal with the stressful situations without paralyzing themselves. They have managed to handle negative emotions and transform them into motivation to provide social action and support for their flock. This capability to cope has guaranteed that they can safeguard a certain degree of their physical and mental well-being. In fact, even the restrictions caused by the epidemic have been interpreted as an opportunity to find time for inner reflection and prayer. Furthermore, the initiatives proposed and adopted by the parishes have made it possible to celebrate the liturgical acts with decidedly non-ordinary instruments and methods (e.g., streaming celebrations, telematic meetings of pastoral groups, etc.). This attitude helped the priests keep the religious sentiment alive, transforming their perception of powerlessness into active support for the whole community.

The funeral rite was highly underlined and confirmed by the participants. Its importance has been described as fundamental both for community life and for the mourning process, either familiar and individual, which is in accordance with the literature (18, 48). On the one hand, the priests' testimonies have highlighted the sufferings of the believers, specifically their inability to accompany their loved ones at the end of their lives (17). On the other hand, they underlined the urgent need to guarantee these mourners a special kind of support, which required an early and strong spiritual intervention. In spite of this, the overestimation by the faithful of the value of the funeral rite has also been criticized. It has been reported that, in emergency situations, even the simple collective blessing of the corpses is endowed with value, from the doctrinal point of view, as normally happens in mission areas in poor countries. We can recognize in this passage a further instrument of resilience: the reference to situations that are in a chronic state of emergency, as happens in the poorest areas of the planet, teaches the flock living in the richest countries (e.g., Italy) to consider their privileges and, therefore, bear the frustration of not being able to enjoy the psychological benefits that the traditional funeral ritual guarantees. This perspective highlights an important stance taken by priests: religion should not be considered a mere tool aimed at achieving individual psychological well-being. From this point of view, we must recognize that the power of resilience of religious discourse also hinges on the ability to renounce the subjective need for reassurance. Indeed, this kind of attitude can be useful but not necessarily comforting enough for all mourners, as highlighted in another study (18). In fact, in areas in Italy where the impact of the virus has been particularly violent, the need to ritualise the detachment and the loss has been managed via the Internet. As priests have managed to continue their pastoral activities, keeping alive the connection with their flock via the Internet, as revealed by the results of the current study and in the literature (49), it is our advice that they do the same with commemorative rituals. In doing so, they could support the mourners in the process of sharing their grief with special rites and sacraments, which could also help manage the trauma and close the mourning process. The ritual helps the mourners look ahead and return to normal life by elaborating the separation as a point of no return, instead of leaving the thought of loss constantly open, which is likely to happen if the mourner is left alone in reliving the grief via social media (50–52).

CONCLUSIONS

The priests who participated in this research confirmed how religious faith has the power to transform fear and pain into motivation to strengthen the social bond, thus overcoming

the individual need for reassurance. The transformation of the negative into positive can be seen as a reflection of the call to guide the community toward the goals of spirituality. The pastors enhanced family unity and closeness by indicating the ways of prayer and reflection about the finiteness of life. Therefore, from the point of view of the Catholic religion, the pandemic has provided opportunities to devote oneself to interiority and to share moments of reflection and prayer with loved ones.

Moreover, in order to help their parishioners, the priests quickly learnt to use digital tools to continue their pastoral activities (e.g., meetings with parishioners). In this regard, the Internet is likely to shape a new way of reaching the faithful in their homes, although—as pointed out by the participants—the availability of tools is currently limited. Nevertheless, the participants also highlighted the importance of the concrete, physical presence of the flock. Therefore, we suggest that it would be important to offer priests adequate training to help them enhance both their digital skills and the classical, ritual dimension linked to mourning and loss.

LIMITATIONS AND FUTURE PROSPECTS

As allowed by the guidelines of the IPA, the 12 participants were part of a selected and limited group of priests living in a specific area of Northern Italy that was strongly affected by the first phase of the pandemic. Therefore, inferences and generalizations were not permitted. Nevertheless, these results can be considered as a starting point for further investigations and explorations into the expansion of priestly communities in different areas of life as well as the roles and functions of the liturgy in different cultural and social contexts. Through the recruitment of a larger and more heterogeneous group of participants, an expanded version of this project could represent the initial phase of a longitudinal study investigating the evolution and modification of the psychological impact of the COVID-19 pandemic on this category of people. Finally, it would be very important to set up a quantitative study, using standardized questionnaires to survey the level of spirituality, work-related stress, moral distress and resilience. In fact, from the results that emerged from the present study, it appears that spirituality was the greatest source of resilience, and it would be important to survey the full spectrum of difficulties over which spirituality appears to be a strong protective factor.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The Ethical Committee for the Psychological Research of the University of Padua N.CD8470F7F42ACDD0679 DC171884311B3. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

IT: project ideation, research design, supervision, analysis, article writing, and coordination. SZ: interviews, analysis, and article writing. EI: analysis, coordination, and supervision. CM: research design and supervision. PC: research design and supervision. KB: supervision. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

We thanks to Sara Pompele, Davide Viezzoli, Marco Antonellini, Alice Culcasi, and Gianmarco Biancalani for the help in some critical phases of the work.

REFERENCES

1. Hoge D. *The First Five Years of Priesthood*. Collegeville, MN: The Liturgical (2002).
2. Lount M, Hargie ODW. The priest as counsellor: an investigation of critical incidents in the pastoral work of catholic priests. *Couns Psychol Q*. (1997) 10:247–59. doi: 10.1080/09515079708254177
3. Rossetti SJ, Rhoades CJ. Burnout in catholic clergy: a predictive model using psychological and spiritual variables. *Psychol Relig Spiritual*. (2013) 5:335–41. doi: 10.1037/a0033639
4. Sasmito E, Lopez GD. Compassionate love among catholic priests: its antecedents and its influence on affect toward pastoral ministry in Indonesia. *Pastoral Psychol*. (2020) 69:47–67. doi: 10.1007/s11089-019-00888-z
5. Smith BJ, Lim M-H. How the COVID-19 pandemic is focusing attention on loneliness and social isolation. *Public Health REs Pract*. (2020) 30:302208. doi: 10.17061/phrp3022008
6. Pierce M, Hope H, Ford T, Hatch S, Hotopf M, Kontopantelis E, et al. Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *SSRN Electron J*. (2020) 7:883–92. doi: 10.1016/S2215-0366(20)30308-4
7. Hartt M. COVID-19: a lonely pandemic. *Cities Health*. (2020) 1–3. doi: 10.1080/23748834.2020.1788770
8. Nguyen LH, Drew DA, Joshi AD, Guo CG, Ma W, Mehta RS, et al. Risk of COVID-19 among frontline healthcare workers and the general community: a prospective cohort study. *medRxiv*. (2020) doi: 10.1101/2020.04.29.20084111
9. Koh D. Occupational risks for COVID-19 infection. *Occup Me (Oxford, England)*. (2020) 70:3–5. doi: 10.1093/occmed/kqaa036
10. Bramstedt KA. COVID-19 as a cause of death for Catholic priests in Italy: an ethi-cal and occupational health crisis. *Health Soc Care Chaplaincy*. (2020) 8:180–90. doi: 10.1558/hscc.41620
11. Stroebe MS, Stroebe W. The mortality of bereavement: a review. In: Stroebe MS, Stroebe W, Hansson RO, editors. *Handbook of Bereavement*. Cambridge: Cambridge University Press (1993). p. 175–95.
12. Latham AE, Prigerson HG. Suicidality and bereavement: complicated grief as psychiatric disorder presenting greatest risk for suicidality. *Suicide Life Threat Behav*. (2004) 34:350–62. doi: 10.1521/suli.34.4.350.53737
13. Onrust S, Cuijpers P, Smit F, Bohlmeijer E. Predictors of psychological adjustment after bereavement. *Int Psychogeriatr*. (2006) 19:921–34. doi: 10.1017/S1041610206004248
14. Boyraz G, Legros DN. Coronavirus disease (COVID-19) and traumatic stress: probable risk factors and correlates of posttraumatic stress disorder. *J Loss Trauma*. (2020) 25:503–22. doi: 10.1080/15325024.2020.1763556

15. Masiero M, Mazzocco K, Harnois C, Cropley M, Pravettoni G. From individual to social trauma: sources of everyday trauma In Italy, the US and UK during the covid-19 pandemic. *J Trauma Dissociation*. (2020) 1–7. doi: 10.1080/15299732.2020.1787296
16. Kokou-Kpolou CK, Fernández-Alcántara M, Cénat JM. Prolonged grief related to COVID-19 deaths: do we have to fear a steep rise in traumatic and disenfranchised griefs? *Psychol Trauma*. (2020) 12:S94–5. doi: 10.1037/tra0000798
17. Cardoso É, da Silva B, dos Santos JH, Lotério L, Accoroni AG, dos Santos MA. The effect of suppressing funeral rituals during the COVID-19 pandemic on bereaved families (Efectos de la supresión de rituales fúnebres durante la pandemia de COVID-19 en familiares enlutados). *Revista Latino-Americana de Enfermagem*. (2020) 28:e3361. doi: 10.1590/1518-8345.4519.3361
18. Testoni I, Zielo A, Schiavo C, Iacona E. The last glance: how aesthetic observation of corpses facilitates detachment in grief work. *Illness Crisis Loss*. (2020) doi: 10.1177/1054137320933592
19. Aoun SM, Lowe J, Christian KM, Rumbold B. Is there a role for the funeral service provider in bereavement support within the context of compassionate communities? *Death Stud.* (2019) 43:619–28. doi: 10.1080/07481187.2018.1506835
20. Testoni I, Russotto S, Zamperini A, Pompele S, De Leo D. Neither God nor others: a qualitative study of strategies for avoiding suicide among homeless people. *Trends Psychiatry Psychother*. (2020) 42:171–8. doi: 10.1590/2237-6089-2019-0012
21. Brady MJ, Peterman AH, Fitchett G, Mo M, Cella D. A case for including spirituality in quality of life measurement in oncology. *Psycho-Oncology*. (1999) 8:417–28. doi: 10.1002/(SICI)1099-1611(199909/10)8:5<417::AID-PON398>3.0.CO;2-4
22. Kearney M, Mount B. Spiritual care of the dying patient. In: Chochinov H, Breitbart W, editors. *Handbook of Psychiatry in Palliative Medicine*. New York, NY: Oxford University Press (2000). p. 357–73.
23. Testoni I, Milo V, Ronconi L, Feltrin A, Zamperini A, Rodelli M, et al. Courage and repre-sentations of death in patients who are waiting for a liver transplantation. *Cogent Psychol.* (2017) 4:1294333. doi: 10.1080/23311908.2017.1294333
24. Pargament KI, Mahoney A, Shafranske EP, editors. *APA Handbooks in Psychology®. APA Handbook of Psychology, Religion, and Spirituality (Vol. 2): An Applied Psychology of Religion and Spirituality*. Washington, DC: American Psychological Association (2013).
25. Allport GW. *The Individual and His Religion: A Psychological Interpretation*. New York, NY: Macmillan (1950).
26. McCullough ME, Hoyt WT, Larson DB, Koenig HG, Thoresen C. Religious involvement and mortality: a meta-analytic review. *Health Psychol.* (2000) 19:211–22. doi: 10.1037/0278-6133.19.3.211
27. Mikulincer M, Gillath O, Shaver PR. Activation of the attachment system in adulthood: threat-related primes increase the accessibility of mental representations of attachment figures. *J Pers Soc Psychol.* (2002) 83:881–95. doi: 10.1037/0022-3514.83.4.881
28. Mikulincer M, Shaver PR. Mental representations of attach- ment security: theoretical foundation for a positive social psychology. In: *Baldwin* MW, editors. *Interpersonal Cognition.* New York, NY: Guilford Press (2005). p. 233–66.
29. Pyszczynski T, Solomon S, Greenberg J. Thirty years of terror management theory: from genesis to revelation. *Adv Exp Soc Psycho*. (2015) 52:1–70. doi: 10.1016/bs.aesp.2015.03.001
30. Bianco S, Testoni I, Palmieri A, Solomon S, Hart J. The psychological correlates of decreased death anxiety after a near-death experience: the role of self-esteem, mindfulness, and death representations. *J Humanist Psychol*. (2019) 1–24. doi: 10.1177/0022167819892107
31. Testoni I, Bisceglie D, Ronconi L, Pergher V, Facco E. Ambivalent trust and ontological representations of death as latent factors of religiosity. *Cogent Psychol.* (2018) 5:1429349. doi: 10.1080/23311908.2018.1429349
32. Smith JA. Beyond the divide between cognition and discourse: using interpretative phenomenological analysis in health psychology. *Psychol Health*. (1996) 11:261–71. doi: 10.1080/08870449608400256
33. Smith JA, Jarman M, Osborn M. Doing interpretative phenomenological analysis. In: Murray M, Chamberlain K, editors. *Qualitative Health Psychology: Theories and Methods*. London: Sage (1999). p. 218–40.
34. Kvale S. *InterViews: An Introduction to Qualitative Research Interviewing*. London: SAGE Publications (1996).
35. Shaw R. Why use interpretative phenomenological analysis in health psychology? *Health Psychol Update*. (2001) 10:48–52.
36. Smith JA, Flowers P, Larkin M. *Interpretative Phenomenological Analysis: Theory, Method and Research*. London: SAGE (2009).
37. Testoni I, Mauchigna L, Marinoni GL, Zamperini A, Bucuță M, Dima G. Solastalgia's mourning and the slowly evolving effect of asbestos pollution: a qualitative study in Italy. *Heliyon*. (2019) 5:e03024. doi: 10.1016/j.heliyon.2019.e03024
38. Drummond DA, Carey LB. Chaplaincy and spiritual care response to COVID-19: an Australian case study—The McKellar centre. *Health Soc Care Chaplain*. (2020) 8:165–79. doi: 10.1558/hscc.41243
39. Hannan SE, Nguyen BT. Pastoral care of patients with Ebola virus disease: a medical and canonical opinion about pastoral visits to patients with contagious and highly fatal diseases. *Linacre Q*. (2015) 82:170–8. doi: 10.1179/0024363915Z.000000000125
40. Abdel-Khalek AM, Nuño L, Gómez-Benito J, et al. The relationship between religiosity and anxiety: a meta-analysis. *J Relig Health*. (2019) 58:1847–56. doi: 10.1007/s10943-019-00881-z
41. Testoni I, Visintin EP, Capozza D, Carlucci MC, Shams M. The implicit Image of god: god as reality and psychological well-being. *J Sci Study Relig*. (2016) 55:174–84. doi: 10.1111/jssr.12252
42. Solomon S, Testoni I, Bianco S. Clash of civilizations? Terror management theory and the role of the ontological representations of death in contemporary global crisis. *TPM Test Psychom Methodol Appl Psychol.* (2017) 24:379–98. doi: 10.4473/TPM24.3.5
43. Testoni I, Sansonetto G, Ronconi L, Rodelli M, Baracco G, Grassi L. Meaning of life, representation of death, and their association with psychological distress. *Palliat Supp Care*. (2018) 16:511–9. doi: 10.1017/S1478951517000669
44. Goldsmith SK, Pellmar TC, Kleinman AM, Bunney WE. *Reducing Suicide. A National Imperative*. Washington: National Academy Press (2007).
45. Pyszczynski T, Lockett M, Greenberg J, Solomon S. Terror management theory and the COVID-19 pandemic. *J Humanist Psychol*. 0022167820959488. doi: 10.1177/0022167820959488
46. Koenig HG. Maintaining health and well-being by putting faith into action during the COVID-19 pandemic. *J Relig Health*. (2020) 59:2205–14. doi: 10.1007/s10943-020-01035-2
47. McLaughlin L. Japanese religious responses to COVID-19: a preliminary report. *Asia Pac J Jap Focus*. (2020) 18:1–23.
48. Glock CY, Stark R. *Religion and Society in Tension*. (1965). Available online at: https://www.researchgate.net/publication/334795953_Charles_Y_Glock_und_Rodney_Stark_Religion_and_Society_in_Tension_1965 (accessed March 27, 2020).
49. Bryson JR, Andres L, Davies A. COVID-19, virtual church services and a new temporary geography of home. *Tijdschrift voor economische en sociale geografie*. (2020) 111:360–72. doi: 10.1111/tesg.12436
50. Fonseca LM, Testoni I. The emergence of thanatology and current practice in death education. *OMEGA J Death Dying*. (2012) 64:157–69. doi: 10.2190/OM.64.2.d
51. Pargament KI, Lomax JW. Understanding and addressing religion among people with mental illness. *World Psychiatry*. (2013) 12:26–32. doi: 10.1002/wps.20005
52. Francis Pope. *Extraordinary Moment of Prayer Presided over by Pope Francis, Sagrato of St Peter Basilica*. (2020). Available online at: http://www.vatican.va/content/francesco/en/homilies/2020/documents/papa-francesco_20200327_omelia-epidemia.html (accessed March 27, 2020).

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

PERSPECTIVE
published: 15 February 2021
doi: 10.3389/fpsyt.2021.622850

Strategies to Cope With the COVID-Related Deaths Among Family Members

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The extraordinary circumstances of deaths during COVID-19 pandemic have been challenging for the deceased's families. This contribution aims to describe some spontaneous strategies that family members may adopt to cope with the loss of a relative for COVID-19. The present reflection derives from the experience of a clinical psychology unit of one of the biggest public hospital in Milan, Italy, which supported 246 families of COVID-19 victims in the 1st days after the loss. Spontaneous strategies used by family members to deal with such a unique mourning process involved: creating alternative good-bye rituals, normalizing the loss, addressing faith and hope, highlighting the perks of isolation, supporting others in need, and delivering the bad news to others. These observed strategies may suggest how to assess and support a "normal" bereavement process during the extraordinary COVID-19 circumstances, in order to prevent further psychological distress.

Keywords: COVID-19, grief, coping strategies, loss management, family bereavement

OPEN ACCESS

Edited by:
Sara Invitto,
University of Salento, Italy

Reviewed by:
Donna Wilson,
University of Alberta, Canada
Juan Gómez-Salgado,
University of Huelva, Spain

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *29 October 2020*
Accepted: *25 January 2021*
Published: *15 February 2021*

Citation:
Borghi L and Menichetti J (2021) Strategies to Cope With the COVID-Related Deaths Among Family Members. Front. Psychiatry 12:622850. doi: 10.3389/fpsyt.2021.622850

INTRODUCTION

During the COronaVIrus Disease 2019 (COVID-19) pandemic, especially in the emergency phases, people have been dying in extraordinary circumstances, which have been affecting relatives' grieving process (1), especially for people who lost a relative at the hospital (2). In fact, safety measurements and restrictions often prevented physical closeness: families could not stay close to the loved one in the last moments of life (3, 4). Moreover, some people have been forced to stay at home after the loss to prevent the spread of the virus, reducing the possibility of support from their social network (3, 4). Also, traditional funeral ceremonies - which usually have an important role in the grieving and recovery process, as they foster emotions' expression, social support, and give meaning to the loss (5) - have been banned or limited (6).

The complexity and simultaneity of these stressful and limiting conditions can make the grieving process extremely challenging for families (7); therefore, the possibility of processing the loss of the deceased has been at risk (3, 4). Furthermore, the support usually provided by healthcare professionals has been limited itself by COVID-19 safety restrictions, a small amount of time and little available resources (3, 8). In such a unique scenario, how can families process the loss of a relative for COVID-19? Which spontaneous strategies emerged in dealing with this extraordinary grief?

The current perspective article aims to reflect on these questions, by presenting a secondary analysis of data collected for another research study focused on reporting the experience of a clinical psychology unit of one of the biggest public hospital in Milan, Italy, which, during the first

wave of the pandemic, supported 246 families of COVID-19 victims who died at the hospital. This psychological support was delivered through a phone follow up made by hospital psychologists 2–3 days after the communication of the loss. The contents, the procedures, and the specific aim of these interventions are reported elsewhere, along with details about methodological and ethical procedures (9, 10) (with ethical approval gained in advance of collecting the data). In the present perspective article, we used this clinical experience and research data (in particular, the one derived from written reports that psychologists filled after each call) as the basis to inductively extract recurrently strategies that family members spontaneously showed to cope with the loss in the very first moments after the loss. In the conclusion, we reflect on them and on how these strategies may be useful to help other people in a similar situation.

FAMILIES' SPONTANEOUS STRATEGIES TO COPE WITH COVID-19 DEATHS

From the clinical and research experience that the hospital collected during the first wave of the pandemic in Milan, Italy (9, 10), we extracted the main strategies that families reported 2–3 days after the loss of a loved one at the hospital as their way to cope with the bereavement. In particular, families often reported the following six behaviors and thoughts: finding alternative rituals; normalizing the loss; addressing faith and hope; addressing the positive sides of the isolation; supporting others in need; and communicating the bad news. Such strategies are reported below in detail and connected to relevant literature if there is any.

"Floating Deaths": Creating Alternative Rituals for Grieving

Physical distance and isolation could lead to a detached experience, transforming the loss in a "floating death," not truly realized, and therefore not processed. Nevertheless, our clinical experience with bereaved families showed that those lonely funerals and limited social rituals did not become "missing" funerals. As a matter of fact, similarly to what happened with the Ebola disease outbreaks (11), families found new ways to say the last goodbye and to celebrate the dead: they created new rituals able to ease their pain. Undertakers had a key role to facilitate this process: families often asked them to drive under the family home on their way to the crematory. This way, the last goodbye to the loved one could take place at the window, with a word, a song, or a prayer. In other cases, the undertaker was asked to place special items in/on the coffin or to take a picture of the prepared body. Furthermore, when at least one family member was able to physically attend the funeral, the last goodbye sometimes became a digital experience: the relative shared videos or broadcast the funeral to family and friends. Prayers also became a shared digital experience: e.g., some rosaries and other prayers were said together with the hospital priest on a video-call. Overall, technologies - phone calls, video calls, messages – had a key role to help families not feeling segregated and alone. Moreover, the idea of a future visit to the grave -sooner or later- was something that gave a timeframe and a contingency to the limitations, and thus consistency to the death.

"Death in Old Age": Normalizing a Loss Lived Under Extraordinary Circumstances

When the COVID-19 victim was already sick and/or old, the thought of a quick death often alleviated the sufferance, as death was seen as the natural course of events. "He/she was old, sooner or later this had to happen" was a recurrent thought among relatives that "normalized" a death lived under extraordinary circumstances. Such a process of "normalization" has been highlighted by previous studies as helpful for bereaved families (12). Furthermore, especially families already expecting the loss (e.g., families of already sick and old patients) lived the period before the death as an opportunity to open their hearts to the loved one and say words they never said before. This limited regrets and facilitated acceptance, leading to "peaceful" grief. Sometimes, death was even seen as a relief from very painful conditions.

"Religious and Existential Anchors": Addressing Faith and Hope

Addressing faith or hopes, with thoughts like "it was destiny" or "I hope he is buried in a nice place," helped to come to terms with the death. Faith and spirituality represented an inner anchorage for families searching for meanings in an unpredictable and uncontrollable situation as the COVID-19 pandemic. They managed to reframe a stressful situation into a larger, more benevolent system of meaning. Spiritual resources – like attending church ceremonies or talking to a priest – were often limited, but families relied on an inner faith as a way to positively cope with the loss. Similarly, addressing hope – for the loved one, for themselves, for other family members or friends, for the community and society – could be the first step of grieving.

This is consistent with the previous literature showing how the relative's spirituality and religiosity can represent an important individual protecting factor for normal mourning, giving meaning to the loss and facilitating a process of transformation and identity reconstruction (13, 14).

"Away From the Normal Life": More Time to Process the Loss

Besides its many downsides, the safety measures and confinement restrictions offered some advantages: for example, families had more time to process the bad news, because they did not need to come back to normality in a few days, as it usually happens. This prolonged "time and space" to digest the loss facilitated some aspects of the mourning process, such as reflecting on the loss and emotions processing. At the same time, the practicalities required by the extraordinary situation of the pandemic (e.g., prolonged bureaucracy) offered an occasion to sustain the natural process of shifting between facing the painful reality and avoiding it by doing something else, as proposed by the dual-process model of coping with grief (15).

"Helpfulness": Supporting Others, Supporting the Self

The death of a dear one for COVID-19 was usually a piece of a larger problematic scenario in which stressors piled up. For example, often there was more than one sick relative within the same family, who may have been hospitalized or dead because of Coronavirus. Some people struggled to contain the spreading of the virus among the whole family. This resulted in feelings of anxiety and distress, but also of helpfulness. For someone, indeed, the need to focus on other family members' physical or psychological health helped them feeling useful, fostering their sense of helpfulness, power, and self-confidence. This is aligned with previous studies on exchanging experiences and support within communities sharing some characteristics or life event, such as the online grief groups: the possibility to provide help and support to others helps to mobilize internal resources to cope with the loss (16).

"Delivering the Bad News": Finding Words, Finding Meanings

Relatives and close family members often had to be the ones delivering the bad news to others. This could be a difficult task to accomplish in the 1st days after the loss. At the same time, it seemed to help bereaved individuals to uncover the silence surrounding the death and start to process it. Indeed, choosing the words can become a constructive activity of meaning-making in the mourning process (17). Especially in the confused and disruptive COVID-19 circumstances, delivering the bad news helped families translating experiences into meaningful narrations. This is consistent with the meaning reconstruction theory, which conceives narration as an activity that allows to re-author an experience of loss and to elaborate the loss by reorganizing, deepening, or expanding one's own beliefs and self-narratives to embrace the reality (18).

DISCUSSION AND CONCLUSIONS

In the COVID-19 situation, most of the instruments that psychologists know as helpful for patients and families dealing with a death in the hospital, like family involvement, physical presence, clear information, and preparation (19, 20) have been negated. COVID-19 deaths are solitary, without traditional rituals, often unexpectedly fast, without clear information or preparation, and with limited or interrupted communication bridges (10). Therefore, COVID-19 deaths at the hospital, especially during the emergency phases of the pandemic, when Italian people were in major lockdown, might be lived as "bad deaths," affecting the intensity and the quality of family members' grief reactions (21, 22). In this scenario, the description of the spontaneous strategies used by family members to cope with the losses may represent a precious resource, as it can provide first indications of "normal" bereavement process during the extraordinary COVID-19 circumstances and how to support it, preventing further psychological distress (23, 24). Such strategies represent new and creative ways to activate and to organize substitutive rituals and actions for grieving. They are concrete steps full of symbolic value which give meaning at the loss, helping a positive adjustment. These strategies are aligned with those proposed by previous literature on grief reactions after natural or unnatural losses: finding alternative rituals (11); normalizing the loss (12); addressing faith and hope (13, 14); using the isolation and the bureaucracy to oscillate between confronting the painful reality and avoiding (15); providing support to others living a similar experience (16); and reconstructing meanings by narrating the loss to others (18). This provides indications for considering these strategies helpful beyond the specific cultural and religious backgrounds of family members.

Future clinical and research studies are needed to better understand the long term connection between these spontaneous strategies and the grief processes of bereaved families who lost a relative for COVID-19. In particular, research is needed to assess how much these strategies facilitate a good psychological adaptation to the loss and prevent complicated grief. With further evidence, the presence (or absence) of these spontaneous strategies could be used to easily and early assess markers for future maladaptive grief processes, as well as to orient and support the normal grieving process. Finally, these strategies, as they represent natural strategies used by family members to start coping with the special circumstances of the COVID-19 related losses, could be used in early psychological interventions to assess and support these families in a way that is aligned to their natural ways to cope with these losses and to their specific experiences, as suggested by other studies (19).

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

JM and LB conceived the idea, collected the data, analyzed the data, and wrote the manuscript.

REFERENCES

1. Simon NM, Saxe GN, Marmar CR. Mental health disorders related to COVID-19–related deaths. *JAMA*. (2020) 12:2020. doi: 10.1001/jama.2020.19632
2. Wilson DM, Hewitt JA. A scoping research literature review to assess the state of existing evidence on the "bad" death. *Palliat Support Care*. (2018) 16:90–106. doi: 10.1017/S1478951517000530
3. Sun Y, Bao Y, Lu L. Addressing mental health care for the bereaved during the COVID-19 pandemic. *Psychiatry Clin Neurosci*. (2020) 74:406–7. doi: 10.1111/pcn.13008

4. Carr D, Boerner K, Moorman S. Bereavement in the time of coronavirus: unprecedented challenges demand novel interventions. *J Aging Soc Policy*. (2020) 32:425–31. doi: 10.1080/08959420.2020.1764320
5. Mitima-Verloop HB, Mooren TT, Boelen PA. Facilitating grief: An exploration of the function of funerals and rituals in relation to grief reactions. *Death Stud.* (2019) 11:1–11. doi: 10.1080/07481187.2019.1686090
6. Burrell A, Selman LE. How do funeral practices impact bereaved relatives' mental health, grief and bereavement? A mixed methods review with implications for COVID-19. *OMEGA-J Death Dying*. (2020) 8:30222820941296. doi: 10.1177/0030222820941296
7. Barry LC, Kasl SV, Prigerson HG. Psychiatric disorders among bereaved persons: the role of perceived circumstances of death and preparedness for death. *Am J Geriatr Psychiatry*. (2002) 10:447–57. doi: 10.1097/00019442-200207000-00011
8. Gesi C, Carmassi C, Cerveri G, Carpita B, Cremone IM, Dell'Osso L. Complicated grief: what to expect after the coronavirus pandemic. *Front Psychiatry*. (2020) 11:489. doi: 10.3389/fpsyt.2020.00489
9. Borghi L, Menichetti J, Vegni E. The Early Bereavement Psychological Intervention Working Group. A phone-based early psychological intervention for supporting bereaved families in the time of COVID-19. *Front Public Health*. 9:625691. doi: 10.3389/fpubh.2021.625691
10. Menichetti J, Borghi L, Cao di San Marco E, Fossati I, Vegni E. Phone follow-up to families of COVID-19 patients who died at the hospital: families' grief reactions and clinical psychologists' roles. *Int J Psychol*. (2021) 1:1–14. doi: 10.1002/ijop.12742
11. IASC, Reference Group on Mental Health, and Psychosocial Support in Emergency Settings. *Mental Health and Psychosocial Support in Ebola Virus Disease Outbreaks: A Guide for Public Health Programme Planners*. Geneva (2015).
12. Simonsen G, Cooper M. Helpful aspects of bereavement counselling: An interpretative phenomenological analysis. *Counsell Psychother Res*. (2015) 15:119–27. doi: 10.1002/capr.12000
13. Shaw S, Joseph S, Linley PA. Religion, spirituality, and posttraumatic growth: a systematic review. *Ment Health Relig Cult.* (2005) 8:1–11. doi: 10.1080/1367467032000157981
14. Mason TM, Tofthagen CS, Buck HG. Complicated grief: risk factors, protective factors, and interventions. *J Soc Work End Life Palliat Care*. (2020) 16:151–74. doi: 10.1080/15524256.2020.1745726
15. Stroebe M, Schut H. The dual process model of coping with bereavement: rationale and description. *Death Stud.* (1999) 23:197–224. doi: 10.1080/074811899201046
16. Swartwood RM, Veach PM, Kuhne J, Lee HK, Ji K. Surviving grief: an analysis of the exchange of hope in online grief communities. *OMEGA*. (2011) 63:161–81. doi: 10.2190/OM.63.2.d
17. Neimeyer RA. Reauthoring life narratives: grief therapy as meaning reconstruction. *Israel J Psychiatry Relat Sci.* (2001) 38:171.
18. Neimeyer RA, Burke LA, Mackay MM, van Dyke Stringer JG. Grief therapy and the reconstruction of meaning: from principles to practice. *J Contemp Psychother*. (2010) 40:73–83. doi: 10.1007/s10879-009-9135-3
19. Dose AM, Carey EC, Rhudy LM, Chiu Y, Frimannsdottir K, Ottenberg AL, et al. Dying in the hospital: perspectives of family members. *J Palliat Care*. (2015) 31:13–20. doi: 10.1177/08258597150310 0103
20. Virdun C, Luckett T, Lorenz K, Davidson PM, Phillips J. Dying in the hospital setting: a meta-synthesis identifying the elements of end-of-life care that patients and their families describe as being important. *Palliat Med.*. (2017) 31:587–601. doi: 10.1177/026921631667 3547
21. Wilson DM, MacLeod R, Houttekier D. Examining linkages between bereavement grief intensity and perceived death quality: qualitative findings. *Omega*. (2016) 74:1–14.doi: 10.1177/0030222815598442
22. Wilson DM, Cohen J, MacLeod R, Houttekier D. Bereavement grief: A population-based foundational evidence study. *Death Stud.* (2018) 42:463–9. doi: 10.1080/07481187.2017.1382609
23. McAdam JL, Puntillo K. Pilot study assessing the impact of bereavement support on families of deceased intensive care unit patients. *Am J Crit Care*. (2018) 27:372–80. doi: 10.4037/ajcc2018575
24. Hudson P, Remedios C, Zordan R, Thomas K, Clifton D, Crewdson M, et al. Guidelines for the psychosocial and bereavement support of family caregivers of palliative care patients. *J Palliat Med*. (2012) 15:696–702. doi: 10.1089/jpm.2011.0466

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Sociology

PERSPECTIVE
published: 16 February 2021
doi: 10.3389/fsoc.2020.619913

From Normal to Viral Body: Death Rituals During Ordinary and Extraordinary Covidian Times in Pakistan

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Death is far from being simply a physiologic event; it is a complex phenomenon with sociocultural and politicoeconomic aspects. During extraordinary times such as the 2020 coronavirus pandemic, death becomes a contested site. I argue that the Pakistani government's dealings with the bodies of people who die from COVID-19 have shifted the meaning of a normal dead body to a *viral body* that poses particular challenges to cultures and people, including the government. This article is both autoethnographic and ethnographic. It concurrently draws on my observations and participation in death rituals in a Pakistani village in Sindh province as a member of that society, and on a recent experience that I faced after the death of a gentle lady of my acquaintance due to COVID-19. I also build on my previous long-term ethnographic research in Pakistan and my ongoing research on COVID-19 in that country. I discuss the death rituals and ceremonies performed during "ordinary" situations as background information; and the changes in these rituals that have resulted from the coronavirus pandemic. My data demonstrate significant differences between usual and customary death rituals and those performed during Covidian times by government mandate, which have severely and negatively affected people's mental health. I show the government's "symbolic ownership" of the viral body, in that the government can control how people deal with their *viral dead*.

Keywords: COVID-19, pandemic, rituals and ceremonies, death and dying, standard operating procedures (SOPs), liminiality, Sindh, Pakistan

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Kuldeep Dhama, Indian Veterinary Research Institute (IVRI), India
Marie-José H. E. Gijsberts, Vrije University Brussel, Belgium

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Specialty section:
This article was submitted to Medical Sociology, a section of the journal Frontiers in Sociology

Received: *31 October 2020*
Accepted: *17 December 2020*
Published: *16 February 2021*

Citation:
Ali I (2021) From Normal to Viral Body: Death Rituals During Ordinary and Extraordinary Covidian Times in Pakistan. Front. Sociol. 5:619913. doi: 10.3389/fsoc.2020.619913

INTRODUCTION

Due to its multiple dimensions, death has been an interesting subject matter for many disciplines. Anthropologists, in particular, have long studied the rituals and ceremonies that surround death across cultures (Hertz, 2004). The body of work most relevant to this article is the study of the relationships between mortuary rites and epidemics that reveals how the state controls the final rituals, including burials. Sometimes, due to government policies and/or practical necessity, viral dead bodies are even never shown to their families (Robben, 2018). Barry (2018) describes how during the Great Influenza pandemic of 1918–1920 (aka the "Spanish Flu"), in multiple US cities, so many people died that funerals became impossible and bodies were simply left on front porches and in the streets to rot until a city wagon finally came to pick them up and bury them

in mass graves. Lipton (2017) observed how death rituals became a "principal concern of the international response" during the 2014–2015 Ebola viral outbreak in Serra Leone. This domain raises pressing questions about "who owns death?"; these questions lead to inquiries about sovereignty and authority (Grant, 2011; Bernstein, 2019). These cases reveal whose power counts, "who presides over the funeral, who certifies the death, who serves as custodian…," (Engelke, 2019) and who can show legitimacy to "own" the body.

The body confirmed or suspected to have died from COVID-19 is what I call a *viral body*—a term that can be extended to include bodies dead from other viruses as well. Dead viral bodies critically demonstrate the politics and poetics of death. The Pakistani government enacts its "symbolic authority" to either own the viral body and deny the family performance of the final rituals or to allow family members to observe these rituals according to strictly enforced guidelines, known as standard operating procedures (SOPs). To enact this authority, the government has employed various intricate maneuvers, which I will examine herein (Ali and Davis-Floyd, 2020). I argue that such government dealings have shifted the meaning of a human body from a "normal" to a viral body that, either alive or dead, may pose severe challenges to the living, and especially to the government.

Presenting a painful autoethnographic account of a gentle lady who passed away due to COVID-19, I compare death rituals and ceremonies performed during normal times and during Covidian times. I illustrate what constitutes an "ideal" death from a local perspective and demonstrate the government's SOPs for dealing with dead viral bodies, in order to reveal the differences caused by the government's responses to COVID-19.

METHODS AND MATERIALS

This article draws on autoethnographic and ethnographic research that I have conducted in Pakistan or from a distance. The data for discussing normal death come both from my personal experience and from previous ethnographic work that I conducted for my masters, M.Phil. and Ph.D. degrees (Ali, 2007, 2011, 2020c). This earlier ethnographic research significantly addressed the rituals and ceremonies related to death in Pakistan, especially at the village level. My autoethnographic accounts stem from my participation in the final rituals of my relatives and friends in Pakistan, whose deaths brought me deep grief. I also autoethnographically describe my emotions around the sudden death of a dear and gentle lady from COVID-19, and present ethnographic findings from a mobile phone conversation about the grief and mourning practices of people whose loved ones lost their lives due to COVID-19.

Moreover, for this article, I have conducted content and document analyses of news reports and government documents pertaining to COVID-19 and the government-recommended burial rituals and practices. The data on COVID-19 are part of my ongoing project on COVID-19 in Pakistan, approved by the National Bioethics Committee of Pakistan (reference No.4-87/NBC-471-COVID-19-09/20/).

DEATH RITUALS AND CEREMONIES DURING ORDINARY SITUATIONS IN PAKISTAN

This section draws primarily on my previously conducted ethnographic research in Pakistan (Ali, 2011, 2020c). In my country, the first thing that the family does when someone dies is to send messages to relatives, friends, and acquaintances. In the past, messengers carried this information and announcements were made via loudspeakers from an area mosque. Nowadays, both mobile phones and loudspeakers are used. Once the deceased person is buried (see below), participants discuss the deceased person's qualities, condole with the family, and offer supplications. The condolences often contain the following sentences: "It is God's will. Death is a reality. We all have to depart one day. If one thing will remain here, it is God." In the following sections, I describe the characteristics of "ideal" death and ideal final farewells, primarily for Pakistan's Sindh province.

Dying From Old Age

Death in Pakistan is defined as "natural" when someone dies during old age. Although a prolonged disease is considered the cleansing of your bad deeds prior to your departure, many people pray that they should die without any extended ailment. Most often, elderly people pray, "Ya Allah! bus halandi khay hala'i" ["Oh, God! Let the moving (breath) move without any interruption"]. I well remember the prayers to that effect that my grandparents chanted every morning and evening while rolling their prayer beads around their fingers.

Dying at Home

Ideally, one must die in their own home and not at someone else's home nor in a hospital or *Pardais* (another country). People pray for this as well. I have heard many people say that they need to go back to their "forefathers' home" to die[1]. This cultural understanding has also been shown in various local television series and movies. Furthermore, I know people who, after living in other places for years within Pakistan or abroad, have returned to die in the villages where they were born and grew up. In Sindhi, such home villages are called *Abāi Ggoth*. Married women, however, go to their husband's and son's homes to die.

Dying in the Presence of One's Entire Family

Older people regularly pray that when they die, their relatives should be around them. I remember that my grandmother used to say, "May God keep you around when I die so that you should participate in the funeral rites and be among those who carry my coffin to the graveyard and bury me." It is considered a blessing to have close family members around and for them to perform the necessary rituals, or what Van Gennep (2019) would call rites of separation: ablution of the body, final make-up, dressing the body in a white shroud called *Kafan*, carrying it on a *charpoy*—a locally made bed of woven ropes normally used for sleeping—on

[1]I use "forefathers" because it is the literal translation of local term *Ābāo Ajdād* and because Pakistani society, including Sindhi society, is patrilineal.

their shoulders to the graveyard, participating in the *Namaz-e-Janaza* (funeral prayer), and burying the body. These are the ideal ways to say the final goodbye. After burial, all the charpoys in the house are placed upside-down on carpets laid on the floors throughout the house, especially in the largest hall or room of the house where all the women sit, mourn, and sleep for the first three consecutive days, in a state of what Turner would call "liminality"—the "betwixt and between" aspect of rites of transition (Turner, 1979). Male family members do the same at an *Otaq* (a guest house for male members). Sitting, mourning, and sleeping on the floor symbolize pain, sorrow, and grief. And turning the charpoys upside-down and sleeping "down" on the floor instead of "up" on one's charpoy index the ways in which the family's lives were turned upside-down by the death.

The Performance of *Namaz-e-Janaza* (Islamic Funeral Prayer)

People also wish that when they die, their *Namaz-e-Janaza* will be performed, in which all family, friends, and relatives should participate. This is also related to the national belief system, as most people in Pakistan are Muslims. The number of participants reflects the deceased person's degree of community respect, and having many people offering prayers can be a source of Allah's forgiveness.

Gendered Burial

In this highly patriarchal culture, only men are allowed to carry and/or accompany the charpoy to the forefathers' graveyard (*Ābāi Qabarastan)*. It is ideal that these men be close family members (depending on who died), such as father, brothers, husband, sons, and grandsons. They lower the deceased into the grave and put the first pieces of clay over the body. These male family members do not cover the entire grave with the clay; they just initiate the covering and then the other male participants finish the process. Meanwhile, the women of the family stay inside the house to mourn. They do visit the grave on the third day after the burial, and then again on the seventh day, and may visit the grave for the next seven consecutive Thursdays (Thursday is considered an auspicious day since it welcomes Friday, which is believed to be the holiest day in Islam).

The Performance of the Final Rites

After death and burial, other rites commence that the family should perform. The first thing that occurs soon after the burial is the communal meal prepared for the attendees. In Sindh, there is a ritual called *Tijho*, in which relatives, friends, and acquaintances gather at the home of the bereaved family 3 days after the burial to bathe the grieving family and offer them washed clothes. Women put henna on each other's heads, especially on the heads of the women closest to the deceased person. Henna is a locally available and affordable dye; it symbolizes happiness and the end of sorrow. Its red color is sign of life that symbolically conveys the strong message to the bereaved family that life does not stop with someone's death; it continues. On the day of the death of a close family member, some women put dust or clay on their heads as a symbol of sadness and sorrow. Thus, applying henna 3 days later replaces that dust/clay and brings normality to that family. These rituals constitute what Van Gennep (2019) would call "rites of integration," just as the preceding rituals I have described above constitute rites of separation and transition.

On this third day, in another ritual of integration, if the deceased was an adult male, a turban is put on the elder son and if the deceased is an adult woman, then a scarf/wimple is put on her elder daughter's head to denominate the *Waras* (heir). Moreover, on this day, the carpets are taken away from the floors, and all charpoys in the house are turned right side-up. These practices too are done to make things normal again. It is a very important part of the ritual that only the closest relatives, and not the immediate family members, arrange the materials for the baths, such as water, soaps, and towels. This arrangement shows the family's social standing and also the providers' close connections to the grieving family. Not only does the mourning family bathe, but also all the participants, especially those who have remained at that house for three consecutive days after the death.

Thereafter, on seven consecutive Thursday evenings, in ongoing rites of integration, it is necessary to arrange communal meals that at a minimum should contain seven types of food items. Although local people do not state any specific logic behind the number "seven," in Islam, this number is considered linked to Allah, as it is believed that He created seven heavens, seven earths, and the seven days of the week, and completed the creation of humans in seven stages. Family and friends are expected to attend all these meals. Moreover, one final meal should be offered, called *Khairāt* (the English equivalent is something like "alms"). This meal is arranged at a large scale, in which all relatives and friends should participate; the economically poor are also invited as a means of alms-giving. *Khairāt* mostly entails the cooking of rice—sweet and spicy. It is believed that *Khairāt* brings forgiveness for the departed soul; thus, *Khairāt* constitutes the final ritual of integration. Special prayers are also arranged for this event, especially the chanting of the appropriate verses from the Holy Quran.

DEATH AND COVID-19: AN AUTOETHNOGRAPHIC ACCOUNT

It is 24 September 2020. I am writing this article on the same day when I have lost the dearest and gentlest lady of my acquaintance due to COVID-19. A day before her death, I was sent a photo of her sitting on a hospital bed with mild COVID-19 symptoms and food in front of her. The next morning, I see a picture of her grave. I am shocked and broken. Since at that moment I am sitting in the city center of Vienna, I cannot cry although I want to. With a heavy heart, I start drinking my tears.

Of course, this sweet lady's sudden death has also shocked her entire bereaved family. One day after she was tested COVID-19 positive, her family members who were in physical contact with her were recommended by doctors to go home, observe self-quarantine, and be tested for the virus. The next morning, the hospital staff call them with the news that the lady has died alone in the hospital—the most feared kind of death in Pakistan. Due to the government's SOPs, only a few family members, including her elder daughter, can reach her body there.

Moreover, their grief has been significantly expanded when they had to follow the government's SOPs around the final rituals, including the burial of her viral body, as well as to observe physical distancing and self-isolation. The final Covidian goodbye is extraordinary. While wearing personal protective equipment (PPE), her elder daughter has performed the *Ghusal* (a bath as per Islamic teaching to cleanse and purify the body)[2] and *Kafan* (shrouding of the late person in white cotton sheets) at the hospital with the help of a few hospital staff. The *Ghusal* and *Kafan* otherwise could have been done by a religious lady with the help of some other women, including the sweet lady's daughters. And then the deceased sweet lady has been put in a coffin by the hospital staff while keeping her face slightly visible so that family members, relatives, and acquaintances can view her for the last time before her coffin will be brought to the graveyard by workers and a few male family members. Locally, this viewing is called *Ākhri Didār*. Since it is not allowed by the government, many relatives and friends cannot gather to participate in the *Namāz-e-Janāzā* (funeral prayer) and burial as they would have done in ordinary times. Even her second daughter cannot come to attend the final goodbye due to lockdown and travel bans. Except for her elder daughter wearing PPE, no other family can touch the late person, as the government has recommended, "Family and friends may view the body but should not be allowed to touch or kiss..." (Government of Pakistan, 2020).

Her death has significantly affected her elder daughter's mental and emotional health, who after many days passed still shares with a heavy heart, "I could not believe that our mother has died. I keep wanting to go back to her hospital room to find her, but I cannot, as my family will think I am gone mad. I still cry too much and remember our mother very much. I feel a mother is the only one who wants us to be truly happy. Despite all rights, she never asks us to serve her. In contrast, everyone else wants us, women, to serve. Every day is a new day in which you have to prove your worth." Here this elder daughter speaks to the strongly patriarchal nature of Pakistani society, in which women serve men and feel heavily burdened by their multiple tasks. Her grief over the loss of her mother is compounded by the fact that her mother, despite her right as an elder to be served by the younger women of the house, was the only one who asked nothing of her, only gave.

DEATH RITUALS AND CEREMONIES DURING COVID-19

By 3 December 2020, Pakistan had reported COVID-19 infection in over 406,800 people, out of which over 8,200 have "officially" died (Johns Hopkins University, 2020). This may seem like a very small number of deaths out of so many cases; in other work (Inayat Ali, unpublished), I have shown how the Pakistani government may be fabricating these numbers in order to make it appear that they are doing an excellent job of coping with COVID-19. Pakistan reported its first infections in two men on 26 February 2020 (Ali and Salma, 2020). The government then issued a three-page document, *Burial and Safe Management of COVID-19 Dead Body,* which has affected the first five categories above related to death rituals, as I will describe below.

Burial by Family Members or for Deaths at Home

I present these government guidelines for managing the *viral dead* one by one, listing the current governmental mandates and describing how these conflict with the usual sociocultural practices around death. My analysis does not constitute a critique of the government guidelines, as they are reasonable given the realities of COVID transmission (Rani, 2020). Some studies have documented the possibility of disease transmission from a corpse to other people who come into contact with it (Joob and Wiwanitkit, 2020). To avoid the transmission and provide a possible shield to people involved to deal with the dead bodies, a new safe design body bags have been introduced at the world level (Patel et al., 2020). Instead, my analysis intends to highlight the differences between practices during ordinary and Covidian times.

> Family and friends may view the body but should not be allowed to touch or kiss and should wash hands thoroughly with soap and water frequently (Government of Pakistan, 2020).

During normal times, there is no restriction on touching the deceased person, although kissing is not encouraged. As soon as someone dies at home or in a hospital, as described above, the family moves the body to the biggest room in the house, where they sit on a carpet on the ground, start mourning, and frequently touch the feet of the deceased to show emotions and attachment. In some cases, the closest family members, e.g., sons, daughter, wife, and mother, may kiss the feet and the face. The female relatives, friends, and acquaintances who come by join them on the floor.

> The burial rituals (burial gathering and prayers), if any, should have minimal possible numbers (only immediate family and relatives). All in attendance should observe standard precautions, i.e., social distancing of at least 2 m, facemasks, and frequent hand washes (Government of Pakistan, 2020).

As noted earlier, the *Namaz-e-Janaza* is a component of an ideal death. In ordinary times, there is no limit on the number of people who may participate in these rituals. High numbers are socioculturally encouraged, as they show the character, prestige, and position of the late person. Participants require neither physical distancing nor masks or washing of hands.

> The family member preparing the body for burial should follow the standard precautions of wearing appropriate surgical/medical mask and/or gloves (Government of Pakistan, 2020).

In ordinary times, those who prepare the dead person for the final rituals, including burial, do not use any PPE. Nonetheless, they take a proper *Wuzu/Wudu* (Islamic ablution) prior to the preparation, which is an Islamic procedure to cleanse and purify

[2]Translation by the author.

specific body parts, such as washing the face, arms, and feet and cleansing the nostrils and mouth. Yet this cleansing is not re-performed after the burial; its purpose is not hygiene *per se* but rather to be clean and pure as they honor the dead.

> Clothes worn by the person preparing the body should be immediately removed after procedure, washed with warm water at 60–90°C (140–194°F) and laundry detergent or a disposable apron/gown should be used (Government of Pakistan, 2020).

Usually, this is not the case. It is even culturally encouraged not to take one's clothes off for the next 3 days after preparing and burying the body to symbolize one's desire to hold onto the deceased and to demonstrate the pain and grief caused by the departure.

> Immunosuppressed persons with underlying health conditions and adults > 60 years of age should not directly interact with the body (Government of Pakistan, 2020).

With no gender or age restrictions, ordinary times do not discourage anyone from interacting with the dead body. These are mostly the closest family members, and mainly women, who come into contact with the deceased person. They sob and ululate while surrounding the deceased.

> Anyone handling the belongings of [the] deceased should wear gloves. The belongings should be disinfected with 70% ethanol. The household should be disinfected using 0.5% chlorine or 0.1% bleach solution (Government of Pakistan, 2020).
> The clothes of the deceased or fabrics used like linen, towels, etc. should be washed in a machine using laundry detergent and warm water at 60–90°C (140–194°F) (Government of Pakistan, 2020).

This SOP highlights the urban/rural divide and the bias toward the urban that is common in Pakistan, as many rural people either have no washing machine or no sufficient electricity to run one (Zaidi, 1985; Ali and Ali, 2020). Thus, they cannot follow this SOP; instead, they wash the deceased's clothes with soap by hand, under a handpump, or at the bank of a small canal in normal water. Since simple soap kills the virus, it would have been much more appropriate and egalitarian for the government to take rural people into consideration in the guideline above. Regarding gloves, other than healthcare providers, during normal times, no one is obliged to wear them while preparing the deceased for the final rites. Customary sociocultural patterns do not require disinfection of the belongings nor the household. And, more interestingly, these patterns encourage the distribution of the deceased's possessions, such as clothes and shoes, among participants, or they are donated to economically needy persons as alms in the belief that this distribution would bring rewards to the deceased person. Such alms are of course not given for the viral dead.

According to media, in some places such as Karachi—the capital of Sindh province—specific graveyards have been designated for the burial of Covidian viral bodies (Raza, 2020). In April 2020, instead of family, government officials such as the Deputy Commissioner (DC) and the Station House Officer (SHO—the official in charge of a police station) attended the funerals of 10 people who died due to COVID-19. These officials and the graveyard's administration performed all funeral procedures, including Namaz-e-Janaza. The families never even saw their loved ones' bodies, indicating the full government ownership of these particular viral bodies.

The father of one young boy who died from COVID-19 told the media that only five family members were allowed to participate in Namaz-e-Janaza (Raza, 2020). The family's pain and sorrow were multiplied when the rescue officials showed reluctance to touch the coffin, which then was pulled from the ambulance with ropes (Raza, 2020). In such ways, customary grieving rituals are aborted, leaving people confused, upset, and at a loss for how to properly grieve. This discontent has resulted in the creative live streaming of funerals so that relatives, family members, and acquaintances can participate at a distance. But this does not work in rural areas, as not everyone owns a mobile phone, and often there is no electricity to charge phones nor sufficient bandwidth to establish a stable Internet connection.

The literature is still scant on death rituals during Covidian times in Pakistan, especially to explore what happens when the government really does take ownership of viral bodies and their families do not get to see them at all. Nonetheless, when there is no direct government ownership, then at least a "symbolic authority" of the government has emerged that enables it to recommend and enforce the necessary evidence-based protocols for burying COVID-19 infected dead viral bodies. Governments across the world, including Pakistan, are following and enforcing medically recommended guidelines for the treatment of viral bodies (Dijkhuizen et al., 2020; Raza, 2020).

CONCLUSION

Death is far more than a physiologic event; it is a complex phenomenon that has sociocultural, economic, and political aspects. During extraordinary times, death becomes a contested site where these aspects become entangled, as the pandemic has revealed. Not only have these contestations affected the performance of final rites in Pakistan by relatives, but also they have impacted how and where those who have contracted the virus die. The pandemic's effects are severe in the country (Ali, 2020a,b; Ali and Davis-Floyd, 2020; Ali et al., 2020). In this article, I have demonstrated an ideal death in Pakistan and how, while the cultural ideals have remained the same, the practices that constitute an ideal death have had to change during this great pandemic when deaths are far from "ideal." I have shown how a biological body becomes a "viral body" and triggers political negotiations around it. Considering this viral body as an extraordinary body that poses serious threats, the government has enacted its "symbolic ownership" of these viral bodies and has re-regulated the entire set of rituals and ceremonies normally performed after death. Given the six major characteristics of an ideal death in Pakistan, I have shown how government policies have affected five of them; these include: (1) dying at home; (2) dying in the presence of one's entire family; (3) the performance of *Namaz-e-Janaza* (Islamic funeral prayer); (4) male family members carrying the charpoy to the graveyard and burying it; and (5) the performance of the final rites. Effectively, the government owns these "viral bodies" in that it can control

how they are treated. Government-imposed SOPs have affected people's mental health, in that their ability to mourn their dead in culturally normative rites of passage has been negatively altered. People fear contracting the virus, going into isolation, and dying without their near and dear ones around them, and their families fear the same. In Covidian times in Pakistan, as elsewhere, the families of the dead viral body must simultaneously face the grief of an unwanted departure and interrupted final rituals and rites that now cannot bring the closure for which they were culturally designed.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because: Since the data is confidential, it cannot be shared. Requests to access the datasets should be directed to Inayat Ali, inayat_qau@yahoo.com.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by National Bioethics Committee of Pakistan (reference No. 4-87/NBC-471-COVID-19-09/20/). Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

IA designed the study, reviewed the literature, drafted, and revised the article.

FUNDING

The author acknowledges the Higher Education Commission (HEC) of Pakistan's grant (PD/OSS-II/Batch-IV/Austria/2012/9903), which supported the Ph.D. work that has significantly informed this article.

ACKNOWLEDGMENTS

My special thanks go to Robbie Davis-Floyd for her immense help during the revision of the manuscript. I also would like to thank Shahbaz Ali and Salma Sadique for their help and support in multiple ways that have shaped the current article.

REFERENCES

Ali, I. (2007). *Impacts of modern technology on traditional crafts: the case study of pottery and textile, Hala, Sindh* (M.SCs Qualitative), Quaidi-i-Azam University, Islamabad.

Ali, I. (2011). *Cultural Construction of Health and Illness: The Case Study of a Potohari Village*. M.Phil Qualitative, Quaid-i-Azam University.

Ali, I. (2020a). The COVID-19 pandemic: making sense of rumor and fear. *Med. Anthropol.* 39, 376–379. doi: 10.1080/01459740.2020.1745481

Ali, I. (2020b). Impacts of rumors and conspiracy theories surrounding COVID-19 on preparedness programs. *Disaster Med. Public Health Prep*. 1-6. doi: 10.1017/dmp.2020.325

Ali, I. (2020c). *Constructing and Negotiating Measles: The Case of Sindh Province of Pakistan*. Ph.D., University of Vienna.

Ali, I., and Ali, S. (2020). Why may COVID-19 overwhelm low-income countries like Pakistan? *Disaster Med. Public Health Prep*. 1–5. doi: 10.1017/dmp.2020.329

Ali, I., and Davis-Floyd, R. (2020). The interplay of words and politics during COVID-19: contextualising the universal pandemic vocabulary. *Practicing Anthropol.* 42, 20–224. doi: 10.17730/0888-4552.42.4.20

Ali, I., Sadique, S., and Ali, S. (2020). *Experiencing and Surviving a Pandemic: Perspectives of COVID-19-Survivors from Pakistan*. Social Science Research Network.

Ali, I., and Salma, A. S. (2020). COVID-19 significantly affects maternal health: a rapid-response investigation from Pakistan. *Front. Glob. Women Health* 1:591809. doi: 10.3389/fgwh.2020.591809

Barry, J. M. (2018). *The Great Influenza: The Story of the Deadliest Pandemic in History, 4th Edn*. New York, NY: Penguin Books.

Bernstein, A. (2019). *The Future of Immortality: Remaking Life and Death in Contemporary*. Russia: Princeton University Press. doi: 10.1515/9780691185958

Dijkhuizen, L., Gelderman, H., and Duijst, W. (2020). The safe handling of a corpse (suspected) with Covid-19. *J. Forensic Legal Med*. 2020:101999. doi: 10.1016/j.jflm.2020.101999

Engelke, M. (2019). The anthropology of death revisited. *Annu. Rev. Anthropol.* 48, 29–44. doi: 10.1146/annurev-anthro-102218-011420

Government of Pakistan (2020). *Guidelines: Burial and Safe Management of COVID-19 Dead Body*. Islamabad: Government of Pakistan.

Grant, B. (2011). Shrines and sovereigns: life, death, and religion in rural Azerbaijan. *Comp. Stud. Soc. Hist.* 53, 654–681. doi: 10.1017/S0010417511000284

Hertz, R. (2004). *Death and the Right Hand*. London: Routledge.

Johns Hopkins University, (2020). *Coronavirus COVID-19 Global Cases*. Johns Hopkins University. Available online at: https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6 (accessed April 22, 2020).

Joob, B., and Wiwanitkit, V. (2020). COVID-19 and management of the corpse. *Pathologica* 112:78. doi: 10.32074/1591-951X-133

Lipton, J. (2017). "Black" and "white" death: burials in a time of ebola in freetown, sierra leone. *J. R. Anthropol. Inst.* 23, 801–8819. doi: 10.1111/1467-9655.12696

Patel, M., Khatri, S., Shree, J. R., Patil, A. S., Agrawal, P., Sinha, A., et al. (2020). Conceptual design of a body bag for preventing infections and safe disposal of deceased from covid-19 virus. *Trans. Indian Natl. Acad. Eng.* 5, 429–435 doi: 10.1007/s41403-020-00135-5

Rani, S. (2020). A review of the management and safe handling of bodies in cases involving COVID-19. *Med. Sci. Law* 60, 287–293. doi: 10.1177/0025802420949044

Raza, Z. (2020). *COVID-19 Changed the Social Rituals of Deceased's Burial and Funeral*. Lahore: Daily Times.

Robben, A. C. G. M. (2018). "Death and anthropology: an introduction," in *A Companion to the Anthropology of Death*, ed A. C. G. M. Robben (Hoboken, NJ: Wiley-Blackwell), 1–16. doi: 10.1002/9781119222422

Turner, V. W. (1979). "Betwixt and between: the liminal period in rites de passage," in *Reader in Comparative Religion*, *4th Edn*, eds W. Lessa and E. Z. Vogt (New York, NY: Harper and Row), 238–239.

Van Gennep, A. (2019). *The Rites of Passage*. Berkeley, CA: University of Chicago Press. doi: 10.7208/chicago/9780226629520.001.0001

Zaidi, S. A. (1985). The urban bias in health facilities in Pakistan. *Soc. Sci. Med.* 20, 473–482. doi: 10.1016/0277-9536(85)90362-4

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychology

ORIGINAL RESEARCH
published: 18 February 2021
doi: 10.3389/fpsyg.2021.626638

Coronavirus Disease 2019: Exploring Media Portrayals of Public Sentiment on Funerals Using Linguistic Dimensions

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Funerals are a reflective practice to bid farewell to the departed soul. Different religions, cultural traditions, rituals, and social beliefs guide how funeral practices take place. Family and friends gather together to support each other in times of grief. However, during the coronavirus pandemic, the way funerals are taking place is affected by the country's rules and region to avoid the spread of infection. The present study explores the media portrayal of public sentiments over funerals. In particular, the present study tried to identify linguistic dimensions associated with lexical components of social processes, affective processes, fear, and disgust. An exhaustive search of newspaper coverage of funeral and related articles was made for a specific corona period. After an initial screening for the details and language used, a total of 46 newspaper articles on funerals were finalized for the analysis. Linguistic Inquiry and Word Count (LIWC) software was used to determine the association between linguistic dimensions of function words and words related to social and affective processes, as presented in the newspaper articles. Sentiment Analysis and Cognition Engine (SEANCE) was applied for the analysis of sentiment, social cognition, and social order. Bayesian correlation analysis and regression revealed positive and significant associations between function words and affective processes, between pronouns and social processes, and between negative adjectives and psychological processes of fear and disgust. Also, significant negative associations were found between polarity nouns and psychological processes of fear and disgust and between polarity verbs and psychological processes of fear and disgust. Bayes factor 10 provides strong evidence in favor of the study hypotheses. The media is influenced by the prevailing sentiments in society and reflects their perception of the current social order and beliefs. The findings provide a glimpse into the prevailing sentiment of society through the lens of media coverage. These understandings are expected to enhance our observations of how people express their feelings over the loss of their loved ones and help mental health professionals develop their therapeutic protocols to treat the coronavirus disease 2019 (COVID-19)-affected population.

Keywords: sentiment analysis, COVID-19, LIWC, SEANCE, social cognition, affect, fear and disgust

OPEN ACCESS

Edited by:
Virginia Torres-Lista, Catholic University Santa Maria La Antigua, Panama

Reviewed by:
Erik Cambria, Nanyang Technological University, Singapore
Rishabh Rai, Indian Institute of Technology Kharagpur, India

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Specialty section:
This article was submitted to Cultural Psychology, a section of the journal Frontiers in Psychology

Received: *06 November 2020*
Accepted: *11 January 2021*
Published: *18 February 2021*

Citation:
Saraff S, Singh T and Biswal R (2021) Coronavirus Disease 2019: Exploring Media Portrayals of Public Sentiment on Funerals Using Linguistic Dimensions. Front. Psychol. 12:626638. doi: 10.3389/fpsyg.2021.626638

INTRODUCTION

The coronavirus pandemic changed our daily lives, work behavior, social gathering, and customary funeral traditions. Bidding a ritualistic farewell with prayers for peace and forgiveness is a convention followed since time immemorial, irrespective of religions. This period overwhelms the entire family, relatives, and friends with grief. However, during the coronavirus disease 2019 (COVID-19) pandemic, this age-old practice of offering a farewell to deceased relatives is also affected. Due to the pandemic and the fear of infections, funerals and burials are either postponed or held remotely in most parts of the world. The family members are not present in these rituals and thus are denied opportunities to offer a final goodbye (Bhanot et al., 2020). Under these circumstances, families are anguished, especially when they cannot share their loss with other families/society (Wallace et al., 2020). Literature suggests that the inability to perform the funeral rituals and bid farewell to deceased family members/relatives due to limited exposure or fear of infection results in the feeling of self-blame, grief, and anger (Wallace et al., 2020). The literature related to previous pandemics also suggests similar outcomes. The Commission to Investigate the Introduction and Spread of Severe Acute Respiratory Syndrome (SARS), and Campbell (2006) on the outbreak of severe acute respiratory syndrome-related coronavirus in 2002–2004 noted in its final report that "those left behind had no opportunity to confront the reality of death and to honor the life of the deceased" (p. 943), "with the proviso that funeral rites must obviously carry lower priority than the need to contain the virulent public health threat" (p. 942).

These experiences of grief, self-blame, and anger are heightened as the stories covered by the media and content shared on social media platforms use languages that present an emotional distance to who will contract and/or die from COVID-19 infection (Wallace et al., 2020). During the pandemic, the sensation-seeking and fear-mongering behavior of the media impacted families' sentiments that will be remembered for years to come. It created a wave of emotions through print and television news, and social media shares that people were afraid of burying their deceased family members. The fear of infection again reminded us that our survival is important.

The present study was conducted to highlight how, through language frameworks and emotional contents, the media influences social order throughout the world, extending to funeral practices.

SENTIMENT ANALYSIS

Language shapes our choices, thinking style, and decision making and also differentiates humans from other primates. Dewey (1910) theorized language as a channel of thinking or vehicle for thought, and the philosophy of Freud (1953) encompasses emotions and motives intricately woven around the dreams of a person communicated through language to the listener. McClelland et al. (1953) used language categories such as achievement, affiliation, and power to assess individual needs (Lasswell et al., 1952) by clustering words such as triumph, conquest, prevail, and accomplish victory. Wilhelm von Humboldt (1767–1835) penned, "Language is the outward manifestation of the spirit of people: their language is their spirit, and their spirit is their language; it is difficult to imagine any two things more identical" (in Salzmann, 2004:42). Through diverse research and publications on the human expression of written language, Pennebaker and King (1999), Pennebaker (2004), and Pennebaker et al. (2014, 2015) showed that computerized methods analyze semantics and syntax in language formats.

The prevalence of enormous and unmanageable data along with the need for probabilistic analytical tools like Bayes resulted in a significant rise in the application of machine-based language tools. According to Taraban et al. (2018), "The reliance on probabilistic representations of linguistic features forms a common ground in human and machine-based language processing." NLP or natural language processing refers to artificial intelligence (AI) to process and analyze written or spoken language (Taraban et al., 2018). Word2Vec is a neural network that transforms text inputs into vectors (Mikolov et al., 2013; Pal et al., 2020). Rationality vs. emotional style of thinking can be analyzed through NLP (Cambria et al., 2010a; Akhtar et al., 2020). Emotion words such as glad, fear, blue, eagerness, excitement, agony, alarm, anguish, desire, disgust, and joy are categorized based on syntactic structure. Linguistic Inquiry and Word Count (LIWC) is a supervised learning machine-based tool that provides in-depth information on opinions, thinking style, affect, and cognitive processes. It can objectively quantify text messages, both syntactically and semantically. Sentiment Analysis and Cognition Engine (SEANCE) is another machine-based algorithmic application that analyses sentiments, social behavior, and cognitive processes. The present study was planned to understand the underlying association between the linguistic frame of newspaper articles and their subliminal impact, whether implied or not, on the public. This pandemic has seen the untimely demise of closed ones in many families; the reason is a lack of understanding about the nature of the virus and fear-mongering by governments and the media. Thus, we attempt to utilize two machine-based supervised learning tools to analyze the newspaper texts to comprehend the underlying psychological processes. The specific objectives of the study were (a) to understand the association between the human affective process and the use of function words in newspaper articles, (b) to comprehend the strength of an association between pronouns and social processes through text analysis of newspaper articles, and (c) to study the relationship between fear, disgust, polarity nouns, polarity verbs, and adjectives.

SETTING THE CONTEXT

The potential impact on the news media reporting the travesty of coronavirus shook the world from late 2019 to date. The world as a whole was grappling with fears of an unknown virus, and almost everyone was in voluntary home lockdown starting on March 25, 2020, in India. Citizens were dependent on news media reports regarding the number of people who were dying each day due to the virus. The medical system was overwhelmed

with an increasing number of COVID-19 patients. Everyone was concerned about the health of their close ones and relatives. The situation was bleak when people who got infected or had cold or fever were taken by the medical team appointed by the state departments. The families were quarantined too and separated from the sick member; sometimes, they did not know each other's whereabouts. People were overwhelmed with this news all over television, print media, and social media shares. It was difficult to accept that a family could not cremate their deceased family member, who may be a parent, a grandparent, kin, or spouse. This article is about 1–3% of families who could not cremate their loved ones and how print media across the world and India reported it.

THE LITERATURE GAP AND THE RESEARCH QUESTIONS

This study seeks to understand the potential influence that the media may have upon its readers through the language used in their articles on affect (human emotions), fear, and death. It is evident from the related literature on text analysis of newspaper articles that they have a marked influence on perceptions and health-associated issues (Cambria, 2016). The media's portrayals of funerals via their communication style and language use, especially the weightage on each "part of speech" (POS), make it necessary to study their impact. However, text analysis of the media's portrayals of funerals through print has not been explored much, and work like this may give us a unique perspective (Jalilifar et al., 2014; Chaiuk and Dunaievska, 2020). With this work, we wish to seek answers to the following research questions: (a) does the written communication use more affect or emotion-laden words, or (b) does use of function words and adjectives stir deep emotions like fear and disgust? Using two machine-based learning tools, we analyzed text-based news coverage of funerals during the COVID-19 pandemic.

METHOD

The sentiment analysis research used NLP techniques on 46 newspaper articles published on funeral practices during March–June 2020 and one article on South Korea in November 2019. There were stringent rules in India and worldwide related to burial customs across cultures during the COVID-19 lockdown. The text analysis of media content was done in this study to explore the semantic structure of the written content that can be gained through algorithmic applications (Taraban et al., 2019). The language pattern on sentiments and opinions (Pang and Lee, 2008) and the relationships between its context and interpretation (Wiebe and Mihalcea, 2006; Turney et al., 2011) have not been explored in news articles written on burials or funerals. Machine learning (ML) tools are used to extract linguistic annotations, like verbs, nouns, adverbs, and adjectives (Li et al., 2011; Hao et al., 2013). These linguistic features provide a source for sentiment analysis of the syntactic structure.

Newspaper Selection

Popular newspapers that are also geographically diverse were selected from both India and other countries. The Indian newspapers that were included have both national and regional presence. The Indian papers are *Bangalore Mirror*, *Daily Mail*, *Devdiscourse*, *India Today*, *Indian Express*, *Mumbai Mirror*, *NDTV News*, *Pune Mirror*, *Scroll.in*, *The Hindu*, *The Print*, and *Times of India*. International articles were selected from Licas.news (Asian), BBC News (England, Brazil, Ghana, Italy, USA), MinnPost (USA), The Economic Times (USA), The Guardian (Australia, Ecuador, England, Ireland), *The Hindu* (South Korea), *The New York Times* (USA), Thomson Reuters (international news, South Africa), *Times of India* (China), *USA Today* (USA), and USNews (USA).

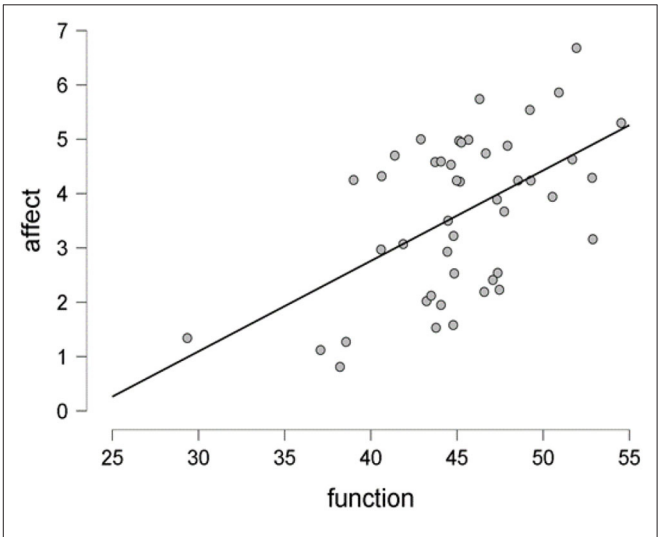

FIGURE 1 | The scatter plot showing the proportion of function words vs. affective processes as per sentiment analysis of data collected from 46 newspaper articles on funerals during coronavirus disease 2019 (COVID-19) pandemic. The figure is based on JASP (0.12.2.0).

TABLE 1 | Descriptive statistics and Bayes correlation analyses of function words and affective processes extracted from newspaper articles on COVID-19 funerals using LIWC.

Dimensions	Mean	SD	Skewness	Kurtosis	*p*-value of Shapiro–Wilk Test	Pearson r	BF_{10}
Function words	45.28	4.64	−0.7	2.06	0.08	-	-
Affect	3.64	1.44	−0.2	−0.83	0.17	0.54	230

COVID-19, coronavirus disease 2019; LIWC, Linguistic Inquiry and Word Count.

Newspaper Article Selection

An exhaustive search of newspaper coverage of the funeral and related articles were made for a specific corona period, mostly from March to June 2020. After an initial screening for the details and language used, a total of 46 newspaper articles on funerals during the coronavirus pandemic were finalized for analysis. The keywords used for article selection were "funerals," "burial," "COVID 19," "Coronavirus," and "Newspaper Articles." Google's search engine was used to extract the articles. After a detailed search, 46 articles were selected that covered different sentiments across varied cultures related to funeral or burial prohibitions imposed in most nations. In India, 19 articles were written on the situation across various cities during the particular strict lockdown phase (late March to early June), and 27 articles that reported on funeral practices during that period over the world were selected for the study.

Linguistic Inquiry and Word Count

LIWC program (Linguistic Inquiry and Word Count: Pennebaker Conglomerates Inc, Austin, TX; LIWC, 2015), a computerized text analysis software that can be installed in the system's hard drive and data, can be processed without an internet connection. LIWC can process data in.txt format and can extract text data from a folder. LIWC dictionaries are available at http://dictionaries.liwc.net. It counts the word frequency and word stem to understand psychological processes of cognition, affect, and social elements (Francis and Pennebaker, 1992; Berry and Pennebaker, 1993; Pennebaker et al., 2015). Other than cognition, emotion, and personal concerns, the LIWC dictionary comprises nearly 6,400 words (Pennebaker et al., 2015), including positive and negative emotions, social, perceptual, and biological processes. The additional dictionaries recently included drives, time orientations, and the use of informal languages. It also has the advantage of composite categories for summary scores of analytic, clout, authentic, and tone, which are then converted to percentiles based on large samples. The linguistic dimensions include function words like pronouns, articles, adverbs, etc. Other grammatical features include verbs, adjectives, quantifiers, etc. LIWC has high content and construct validity (Francis and Pennebaker, 1992; Stirman and Pennebaker, 2001); inter-rater reliability also ranges between 86 and 100% relative

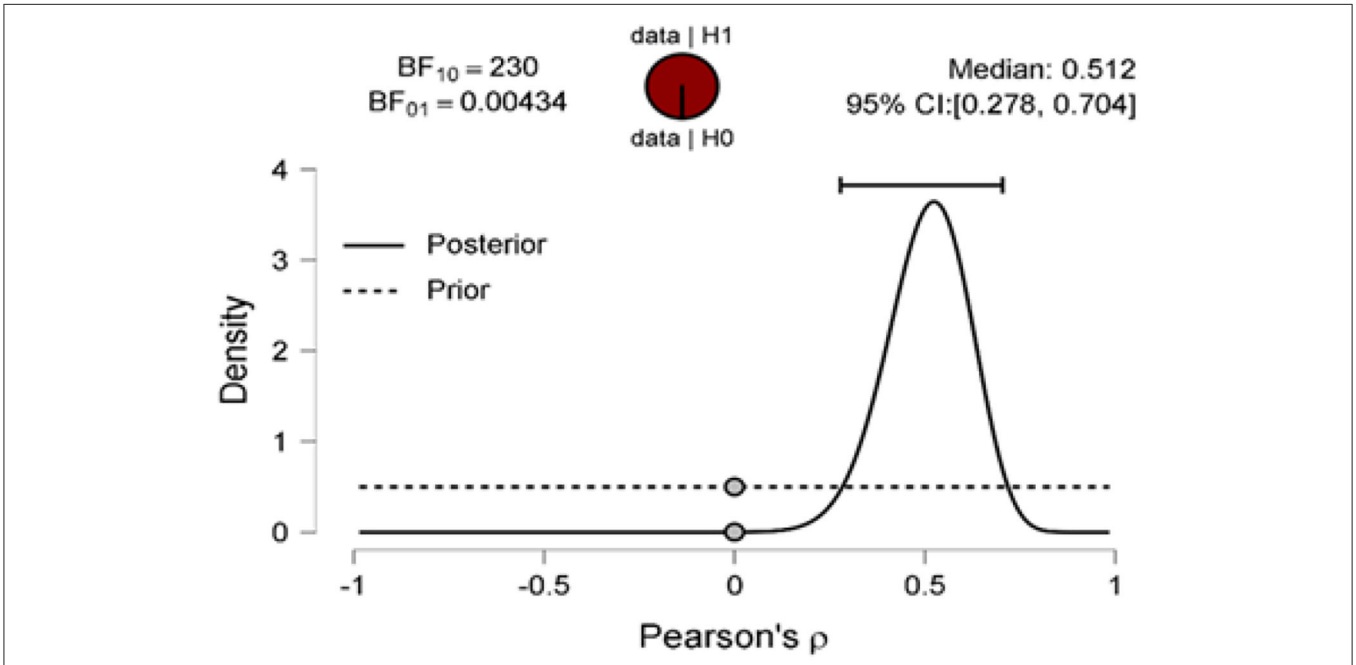

FIGURE 2 | Prior and posterior distributions for the correlation between the proportion of the function words and affective processes as per sentiment analysis of data collected from 46 newspaper articles on funerals during COVID-19. The two-sided Bayes factor is visualized by the ratio between the prior and posterior ordinate at $\rho = 0$ and equals 230 in favor of the alternative hypothesis over the null hypothesis. The figure is based on JASP (0.12.2.0) (Wagenmakers et al., 2018a,b).

TABLE 2 | Posterior summaries of regression coefficients after accounting for the default priors for function words and the likelihood of the observed data.

Coefficient	Mean	SD	P(incl)	P(incl/data)	$BF_{inclusion}$	95% credible interval	
						Lower	Upper
Intercept	3.64	0.182	1	1	1	3.294	4.018
Function	0.151	0.039	0.5	0.995	181.444	0.073	0.23

to the dimension being assessed (Tausczik and Pennebaker, 2010).

Sentiment Analysis and Cognition Engine

SEANCE has a user-friendly graphical user interface (GUI), where the user has to select the input folder that contains a file in.txt format and the output is saved in.csv format (Crossley et al., 2017). The software is freely available at https://www.linguisticanalysistools.org/seance.html. The SEANCE comprises preexisting words related to sentiments, cognition, and social order. These word vectors are taken from freely available dictionaries like SenticNet (Cambria et al., 2010a,b, 2012; also see Cambria et al., 2020 for recently released SenticNet 6), EmoLex (Mohammad and Turney, 2010, 2013), Lasswell dictionary lists (Lasswell and Namenwirth, 1969; Namenwirth and Weber, 1987), Harvard IV-4 dictionary lists used by the General Inquirer (GI; Stone et al., 1966), Geneva affect label coder (GALC; Scherer, 2005), and Affective Norms for English Words (ANEW; Bradley and Lang, 1999). It also includes Hu and Liu (2004) polarity indices for analysis of sentiments, mostly in social media contexts. Similarly, the Valence Aware Dictionary for Sentiment Reasoning (VADER) is more useful in classifying shorter articles related to social media text, movies, and newspaper articles (Hutto and Gilbert, 2014). Other than these databases, SEANCE also includes the Stanford POS Tagger (Stanford Core NLP; Manning et al., 2014) for verbs, nouns, and adjectives. It has the potential to report almost 3,000 indices, which may be a drawback sometimes, so 20 component scores were derived through principal components analysis (PCA) (Graesser et al., 2011; Crossley et al., 2015) to make it more manageable.

Measures

Linguistic Inquiry and Word Count

The association between death, funerals, and emotions or affective processes (Gortner and Pennebaker, 2003; Glasgow et al., 2014) led to the selection of affective processes for further evaluation. Previous studies also identified words expressing emotions or affect significantly that influence linguistic dimensions (Wardecker et al., 2017; Khalil et al., 2018; Patro et al., 2018). The present research aimed to explore the association between linguistic dimensions such as function, words, and affect. The function words comprise articles, prepositions, personal pronouns, impersonal pronouns, auxiliary verbs, conjunctions, negation, and non-referential adverbs. In comparison, content words include nouns, verbs, adjectives, and common adverbs (Miller, 1995; Gamon, 2004; Jordan et al., 2019). The use of function words is also predicted to influence composite scores of analytical thinking and clout/confidence.

TABLE 3 | Bayesian linear regression showing model comparison—affective processes.

Models	P(M)	P(M|data)	BF_M	BF_{10}	R^2
Function	0.5	0.995	181.444	1	0.287
Null model	0.5	0.005	0.006	0.006	0

The affective processes are related to positive emotions (love, nice, and sweet) and negative emotions (hurt, ugly, and nasty). It also incorporated anxiety- (worried and fearful), anger- (hate, kill, and annoyed), and sadness-related (crying, grief, and sad) words.

The second research aim was to identify the nature of the relationship between pronouns and social contexts. Funerals are practiced in different cultures according to their social norms and prevalent practices for ages. The frame of reference had always been social institutions and society, primarily including family and friends. Social processes included social-, family-, friends-, female-, and male-related words. Pronouns comprised personal pronoun (I, them, and her), first-person singular (I, me, and mine), first-person plural (we, us, and ours), second-person singular (you and your), third-person singular (he, she, her, and him), third-person plural (they and theirs), and impersonal pronouns (it, its, these, and those). Social processes are often studied using LIWC, as their relationships bind and impact various psychological processes (Golbeck et al., 2011; Boyd, 2017; Jiang and Brubaker, 2018; Li et al., 2020).

Sentiment Analysis and Cognition Engine

SEANCE helped investigate the link between "fear and disgust" and its association with adjectives, polarity nouns, and polarity verbs. The SEANCE results indicated that writers position emotions primarily in adjectives than in verbs followed by adverbs (Crossley et al., 2017). The fear, disgust, and negative adjective components included words from the EmoLex database, which had 3,324 negative emotions entries. SenticNet is the prime resource in the field of opinion mining and sentiment analysis. It has multiple versions; the current is SenticNet 6 and is a useful ML tool in polarity detection (Poria et al., 2013; Cambria et al., 2020). Polarity nouns and verbs mostly comprise words from SenticNet, which has a collection of around 200,000 words related to four affective dimensions, i.e., introspection, temper, attitude, and sensitivity (Susanto et al., 2020). These words are based on Plutchik's (2001) pioneering work on emotions and norms for polarity.

Bayesian Analysis

Owing to significant practical limitations of employing *p*-values for hypothesis testing (Sharpe, 2013), we used Bayes factors for hypothesis testing. The practice of null hypothesis statement testing started showing constraints in keeping pace with the knowledge advancement (Gigerenzer et al., 2004; Harlow et al., 2016). This led to a loss of confidence in empirical psychological researches (Ioannidis, 2005; Begley and Ellis, 2012; John et al., 2012; Nosek and Bar-Anan, 2012; Pashler and Wagenmakers, 2012; Button et al., 2013; Morey et al., 2016). Bayesian parameter estimation techniques have caught the attention of many researchers recently (Rouder et al., 2008; Lee, 2011; Lodewyckx et al., 2011; Wetzels et al., 2011; Kruschke et al., 2012). The Bayes factor hypothesis test is used to analyze the predictive efficacy of two statistical models on a continuum by quantifying the evidence for any change. The Bayes estimation incorporates prior knowledge (what was already known) and the likelihood (the extent to which the existing data will influence the previous data).

The researcher can verify and estimate valuable information by selecting an appropriate prior distribution (Vanpaemel and Lee, 2012). It estimates and quantifies confidence that θ lies in a specific interval (Wagenmakers et al., 2018a,b).

Bayes compares two models: one is a null hypothesis that supports the absence of the effect (H0: $\rho = 0$), and other is an alternative hypothesis that claims the presence (H1: $\rho = \alpha$). After full specification of the two competing hypotheses, Bayes probability rules are as follows:

$$\underset{\text{Posterior odds}}{p(H1|\text{data})/p(H0|\text{data})} = \underset{\text{Prior odds}}{\{p(H1)/p(H0)\}*} \underset{\text{Bayes factor } BF_{10}}{\{p(data|H1)/p(data|H0)\}}$$

The formula for the prior model indicates $\{p(H1)/p(H0)\}$ as the relative probability of the prior odds before observing the data. After seeing the data, the posterior model is represented by $\{p(H1|\text{data})/p(H0|\text{data})\}$, that is, quantifying the relative plausibility of any change. The change from prior to posterior is estimated as the Bayes factor, BF_{10}, and represented by $\{p(\text{data}|H1)/p(\text{data}|H0)$. Thus, both models provide a probabilistic prediction, and the model with the best prediction is accepted for further inference (Wagenmakers et al., 2018a,b). According to Raftery (1999), the Bayes factor provides a solution to hypothesis testing and model selection by acting as a thermometer to measure the intensity of evidence. The inferential end goal in the parameter estimation through Bayes analysis is the posterior distribution. JASP (jasp-stats.org; JSAP Team, 2016), a free and user-friendly statistical software with a GUI similar to that of SPSS, was used for both descriptive and Bayes analysis (Marsman and Wagenmakers, 2017; Love et al., 2019; van Doorn et al., 2020).

RESULTS AND DISCUSSION

Function Words and Affective Processes

The first study question was to determine whether there is an association between the human affective process and the use of function words in newspaper articles published on funerals during the coronavirus pandemic. If so, then how strong is the relationship between the two variables? The selected 46 newspaper articles were analyzed to study using LIWC to quantify both syntactic features and psychological processes. **Table 1** shows descriptive statistics and Bayes correlation analysis of both study variables. The mean score and SD are as follows: function words (Mean = 45.28, SD = 4.64) and affect/affective processes (Mean = 3.64, SD = 1.44). The skewness and kurtosis are well within the range for both affect and function words. Also, the *p*-value of Shapiro–Wilk test is indicative of a normal distribution.

Now, we discuss the results of hypothesis testing. The null hypothesis states that there is no association between function words and affective processes (H0: $\rho = 0$). Particularly, we were concerned with the Pearson correlation ρ between the proportion of function words and affect. To explain further, we tried to examine the evidence that the data provided for the study hypothesis (H1). The first hypothesis (H1: $\rho = \alpha$, $\alpha \neq 0$): newspaper articles will be more likely to reflect emotions using function words that express grammatical relationships with other words in a sentence. The scatter plot in **Figure 1** shows a positive correlation (r = 0.54) with a 95% credible interval being in the range of [0.278, 0.704], which posits that there is a 95% probability that the correlation coefficient between function words and affect lies within the corresponding credible interval.

The Bayes factor is expressed as BF_{10} (and its inverse is BF_{01}, i.e., $1/BF_{10}$) provides the intensity of the evidence that the observed data provide for H1 instead of H0. Here, Bayes factor was significant at $BF_{10} = 230$ (**Figure 2**), such that the observed data are 230 times more likely under H1 than H0.

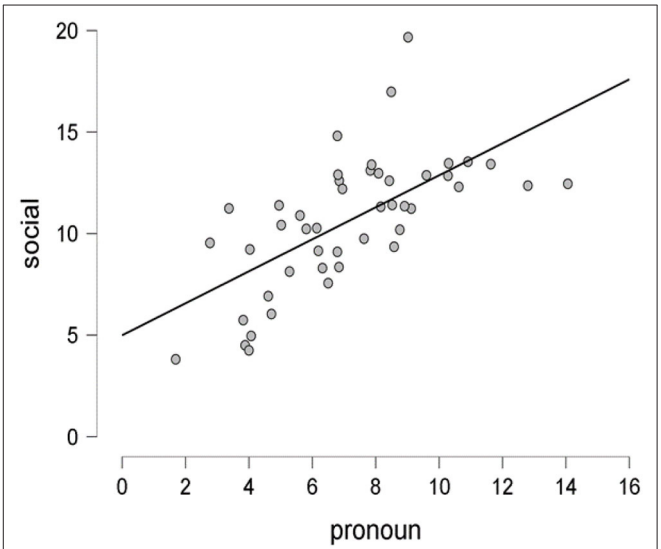

FIGURE 3 | The scatter plot showing the proportion of the pronouns vs. social processes as per sentiment analysis of data collected from 46 newspaper articles on funerals during coronavirus disease 2019 (COVID-19). Figure based on JASP (0.12.2.0).

TABLE 4 | Descriptive statistics and Bayes correlation analyses of pronouns and social processes extracted from newspaper articles on COVID-19 funerals using LIWC.

Dimensions	Mean	SD	Skewness	Kurtosis	*p*-value of Shapiro–Wilk Test	Pearson r	BF_{10}
Pronouns	7.16	2.68	0.32	−0.02	0.9	-	-
Social processes	10.63	3.24	−0.06	0.64	0.14	0.65	19,748.55

COVID-19, coronavirus disease 2019; LIWC, Linguistic Inquiry and Word Count.

The proportion wheel gives a visual representation of the Bayes factor. Here, the corresponding proportion will be odds/odds + 1 = 230/231 = 0.996 (transforming to 0–1 interval); thus, the red area of the proportion wheel represents extremely strong evidence in favor of H1 covering more than 99% of the wheel. **Figure 2** also presents the prior distribution for ρ under H1 (that is, the uniform distribution) and the posterior distribution for ρ under H1. The gray dots (visual representation of Savage–Dickey density ratio) showing the height of the prior and posterior distributions at ρ = 0 under H1. The ratio of these heights provides the Bayes factor for H1 vs. H0 (Wagenmakers et al., 2010).

The posterior mean of the regression coefficient of function words is 0.151 (**Table 2**). We can interpret it as one-unit increase in the use of function words intensifies affect by a gain of 0.151. The 95% credible interval is [0.073, 0.23], which signifies a 95% probability of regression coefficient of function words lying within the corresponding credible interval. The results (**Table 3**) show that $BF_M = 181.444$ shows extreme evidence for the model and that BF_{10} also supports the alternative hypothesis compared with the null hypothesis. In the model comparison **Table 3**, the P(M/data) column signifies the posterior model probability for both H1 and H0, P(M) is the prior model probability. As per the model comparison table, the probability of the model with the predictor (function words) has increased from 0.5 to 0.995. The R^2 is the proportion of variance due to the predictor in the model. The R^2 of 0.287 means that function words explain

TABLE 6 | Bayesian linear regression showing model comparison—social order.

Models	P(M)	P(M|data)	BF_M	BF_{10}	R^2
Pronoun	0.5	1	12849.12	1	0.423
Null model	0.5	7.782e−5	7.783e−5	7.783e−5	0

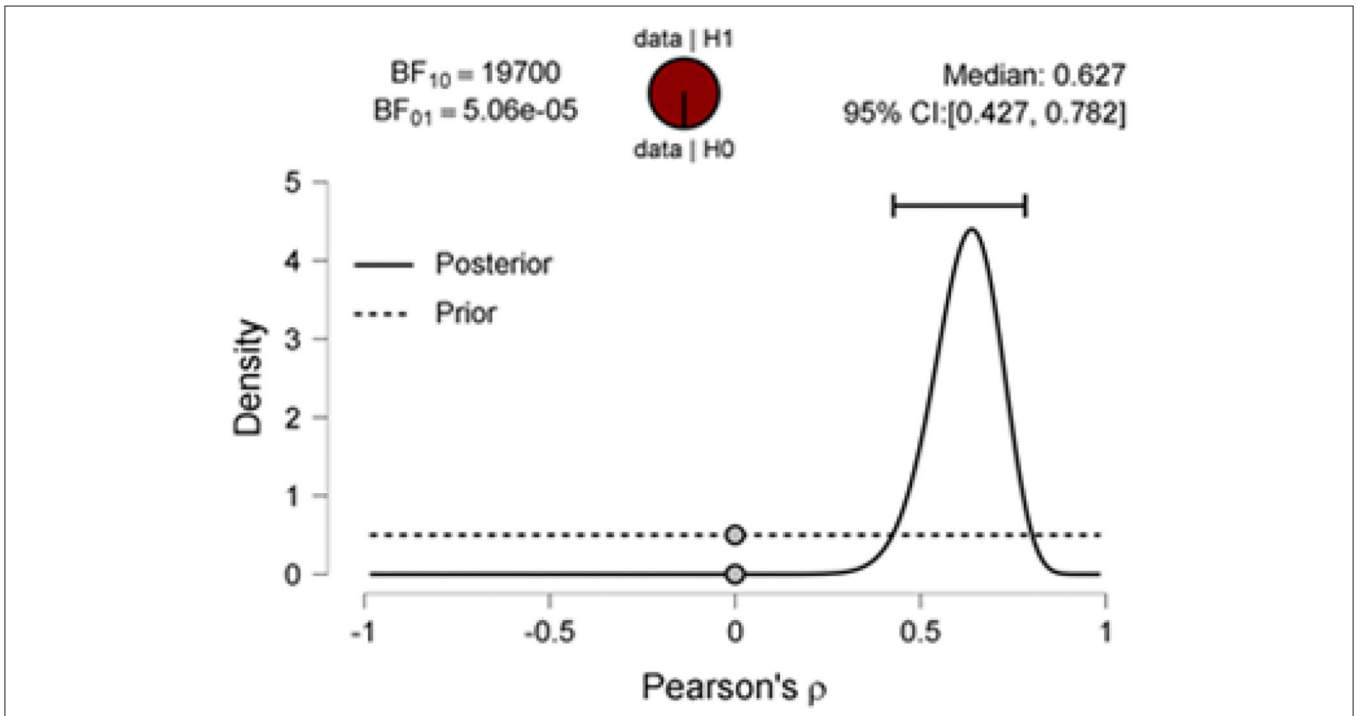

FIGURE 4 | Prior and posterior distributions for the correlation between the proportion of the pronouns and social processes as per sentiment analysis of data collected from 46 newspaper articles on funerals during coronavirus disease 2019 (COVID-19). The two-sided Bayes factor is visualized by the ratio between the prior and posterior ordinate at $\rho = 0$ and equals 19,700 in favor of the alternative hypothesis over the null hypothesis. Figure based on JASP (0.12.2.0) (Wagenmakers et al., 2018a,b).

TABLE 5 | Posterior summaries of regression coefficients after accounting for the default priors for pronouns and the likelihood of the observed data.

Coefficient	Mean	SD	P(incl)	P(incl/data)	$BF_{inclusion}$	95% credible interval	
						Lower	Upper
Intercept	10.632	0.367	1	1	1	9.965	11.42
Pronoun	0.742	0.135	0.5	1	12,849.12	0.497	1.031

TABLE 7 | Descriptive statistics and Bayes correlation analyses of polarity nouns, polarity verbs, negative adjectives, fear, and disgust extracted from newspaper articles on COVID-19 funerals using SEANCE.

Dimensions	Mean	SD	Skewness	Kurtosis	*p*-value of Shapiro–Wilk Test	Pearson r (with fear and disgust)	BF_{10}
Negative adjectives	0.81	0.65	−0.46	0.15	0.2	0.49	64.903
Polarity nouns	0.22	0.16	0.28	−0.51	0.4	−0.56	431.147
Polarity verbs	0.31	0.17	0.57	−0.24	0.041	−0.57	685.947
Fear and disgust	0.25	0.08	0.13	−0.89	0.31	-	-

COVID-19, coronavirus disease 2019; SEANCE, Sentiment Analysis and Cognition Engine.

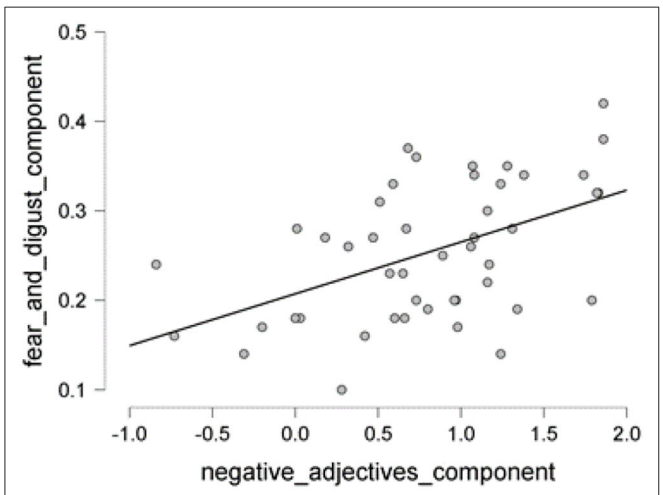

FIGURE 5 | The scatter plot showing the proportion of the negative adjectives vs. fear and disgust.

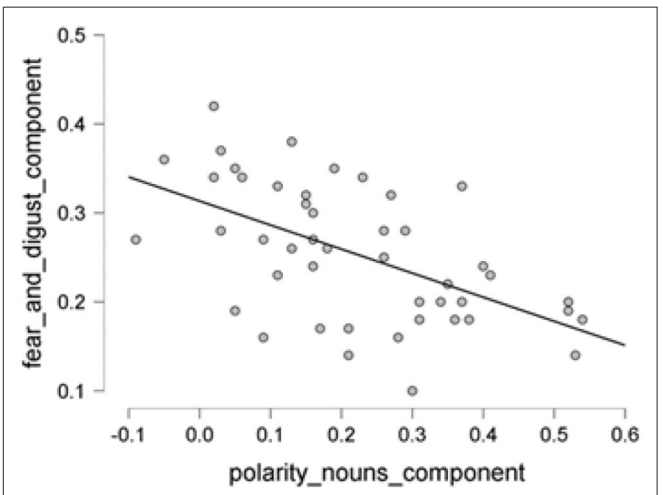

FIGURE 6 | The scatter plot showing the proportion of the polarity nouns vs. emotional word vectors of fear and disgust.

28.7% of the variance in the psychological processes of affect. $BF_{inclusion}$ indicates that there is extreme evidence favoring the alternative hypothesis compared with the null hypothesis (Ly et al., 2016). Our findings also find support in research done by Jordan and Pennebaker (2017) and Jordan et al. (2019), who were of the viewpoint that function words impact the attentional patterns and thinking style of people. Hawkins and Boyd (2017) also supported the use of LIWC language dimensions to provide valuable insight into human psychological processes.

Function words (Pozsonyi, 1938) have little lexical meaning or have an ambiguous meaning. Because of the functions they perform to express grammatical relationships among other words in a sentence or specify the attitude or mood of the speaker, their role in analyzing text cannot be overlooked. In our study, we found that the frequent use of function words in funeral-related newspaper articles have a greater likelihood of influencing emotional or affective processes.

Pronouns and Social Relations

The second research question was to ascertain whether there exists any relationship between social processes and pronouns. If such association exists, to what extent does the data support the presence of a correlation? LIWC was used to analyze both pronouns and social processes in the newspaper articles written on burial rituals, rules, and regulations imposed by governments and public sentiments related to it. **Table 4** presents descriptive statistics and Bayesian correlation analysis of both research variables. The mean score and SD are as follows: pronouns (Mean = 7.16, SD = 2.68) and social order (Mean = 10.63, SD = 3.24). The skewness and kurtosis factors are well within the range for both pronouns and social order. The *p*-value of the Shapiro–Wilk test is also indicative of a normal distribution.

The null hypothesis states that there is no association between pronouns and social processes (H0: $\rho = 0$). The second hypothesis (H2: $\rho = \alpha$, $\alpha \neq 0$) states that newspaper articles will be more likely to reflect social processes using pronouns that use words like I, me, you, they, we, his, her, and it to indicate family, friends, and other acquaintances in a society. The scatter plot in **Figure 3** shows a positive correlation ($r = 0.65$) with a 95% credible interval being in the range of [0.427, 0.782], which posits that there is a 95% probability that the correlation coefficient between pronouns and social factors is within the corresponding credible interval.

The Bayes factor was significant at $BF_{10} = 19748.55$ (**Figure 4**), such that the observed data are 19,748.55 times more likely under H1 than H0. The proportion wheel gives a visual representation of the Bayes factor. Here, the corresponding proportion will be odds/odds + 1 = 19,749/19,750 = 0.999

(transforming to 0–1 interval); thus, the red area of the proportion wheel represents extremely strong evidence favoring H2 covering nearly 100% of the wheel. **Figure 4** also presents the prior distribution for ρ under H2 (that is, the uniform distribution) and the posterior distribution for ρ under H2. The gray dots (visual representation of Savage–Dickey density ratio) show the height of the prior and posterior distributions at $\rho = 0$ under H2.

Table 5 represents the posterior mean of the regression coefficient of pronouns. It can be interpreted as one-unit increase in pronoun impacting social components in the article by an increase of 0.742, nearly three fourth of an increase in the unit. The 95% credible interval is [0.497, 1.031], which signifies a 95% probability of the regression coefficient of pronouns lying within the corresponding credible interval. The results (**Table 6**) show that $BF_M = 12{,}849.12$ shows extreme evidence for the model, and BF_{10} also supports the alternative hypothesis compared with the null hypothesis As per the model comparison table, the probability of the model with the predictor (pronouns) has increased from 0.5 to 1.0. The R^2 of 0.423 means that pronouns explain 42.3% of the variance in the psychological processes of social components. $BF_{inclusion}$ (12,849.12) indicates that there is extreme evidence in favor of the alternative hypothesis in comparison with the null hypothesis. Kelter (2020), in research on null hypothesis significance testing in biomedical studies, draws a comparison between Bayesian inferential methods and conventional methods of analyzing *p*-values. Their findings suggest that the Bayes method using JASP provides an opportunity for the researchers to contrast both null hypothesis and alternative hypothesis before deciding in support or against any of the hypotheses. The social processes refer to social relations with family members and friends. Funerals indicate the loss and mourning of either a member of the family or friend. In funeral-related newspaper articles, frequent use of pronouns heightens our apprehensions about the health and well-being of close family members. We tend to be more alert when such relationship words are used that indicate the loss of someone forever. Further, the chance of mourning and other ritualistic ceremonies are not possible, which induces panic among the citizens in a country.

Polarity Nouns, Polarity Verbs, Negative Adjectives, Fear, and Disgust

The third research question was to explore whether there is any relationship between polarity nouns, polarity verbs, negative adjectives, and emotional components of fear and disgust. SEANCE, an ML tool, was used to analyze newspaper articles. The study hypothesizes (H3) that the word vectors related to polarity nouns, polarity verbs, and negative adjectives are strong predictors of negative emotions like fear and disgust. **Table 7** shows descriptive statistics and Bayes correlation analysis of all study variables. The mean score and SD are as follows: polarity nouns (Mean = 0.22, SD = 0.16), polarity verbs (Mean = 0.31, SD = 0.17), negative adjectives (Mean = 0.81, SD = 0.65), and fear and disgust (Mean = 0.25, SD = 0.08). The skewness and kurtosis are well within the range for all the study variables.

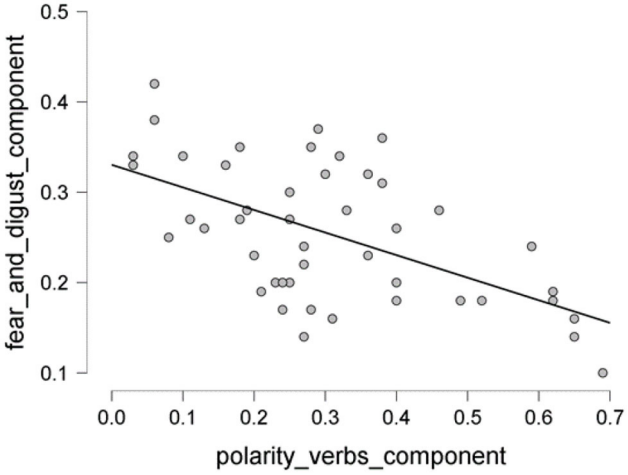

FIGURE 7 | The scatter plot showing the proportion of the polarity verbs vs. components of fear and disgust.

The *p*-value of the Shapiro–Wilk test also indicates a normal distribution for polarity nouns (0.4), negative adjectives (0.2), and fear and disgust (0.31) except polarity verbs (0.041). Even though they provide meaningful insights on the interrelationship of linguistic components with sentiments, cognition, and social order (Asghar et al., 2017; Crossley et al., 2017; Hamborg et al., 2019; Van Swol and Kane, 2019), because of their limited number (46 articles in total), generalizing the findings is not suggested.

The third hypotheses were as follows: there is an association between negative adjectives, and fear and disgust (H3a: $\rho = \alpha$, $\alpha \neq 0$); between polarity nouns, and fear and disgust (H3b: $\rho = \alpha$, $\alpha \neq 0$); and between polarity verbs, and fear and disgust (H3c: $\rho = \alpha$, $\alpha \neq 0$). Crossley et al. (2017) posits that negative emotions (like fear and disgust) are affected more by negative adjective and polarity verbs (negative) than by polarity nouns (negative). Our findings, however, show more support for polarity verbs ($r = -0.57$, $BF_{10} = 685.947$) and polarity nouns ($r = -0.56$, $BF_{10} = 431.147$) in contrast to negative adjectives ($r = 0.49$, $BF_{10} = 64.903$).

The scatter plot shows a positive correlation between negative adjectives, and fear and disgust (**Figure 5**); a negative correlation between polarity nouns (**Figure 6**) and fear and disgust; and polarity verbs, and fear and disgust (**Figure 7**). The 95% credible intervals in **Figures 8**, **9**, **10** show that there is 95% probability that the correlation coefficient between negative adjectives, and fear and disgust [0.226, 0.673]; polarity nouns, and fear and disgust [−0.717, −0.302]; polarity verbs, and fear and disgust [−0.727, −0.319] lie within the corresponding credible interval. Also, the proportion wheels in **Figures 8**, **9**, **10** represent very strong evidence in favor of alternative hypotheses H3a (0.98), H3b (0.9976), and H3c (0.9985) in than the null hypothesis.

The posterior mean of the regression coefficient of negative adjectives is 0.025, polarity nouns are −0.195, and polarity verbs are −0.154 (**Table 8**). Overall, the results suggest that polarity noun relates to emotions or sentiments of fear and disgust

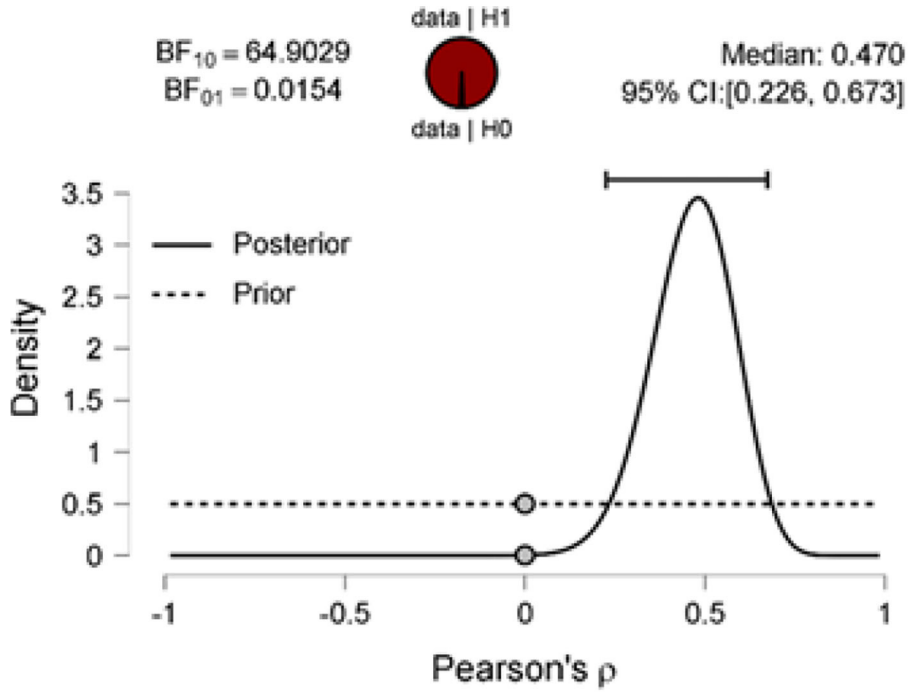

FIGURE 8 | Prior and posterior distributions for the correlation between the proportion of the negative adjectives and fear and disgust. The two-sided Bayes factor equals 64.9029 in favor of the alternative hypothesis over the null hypothesis.

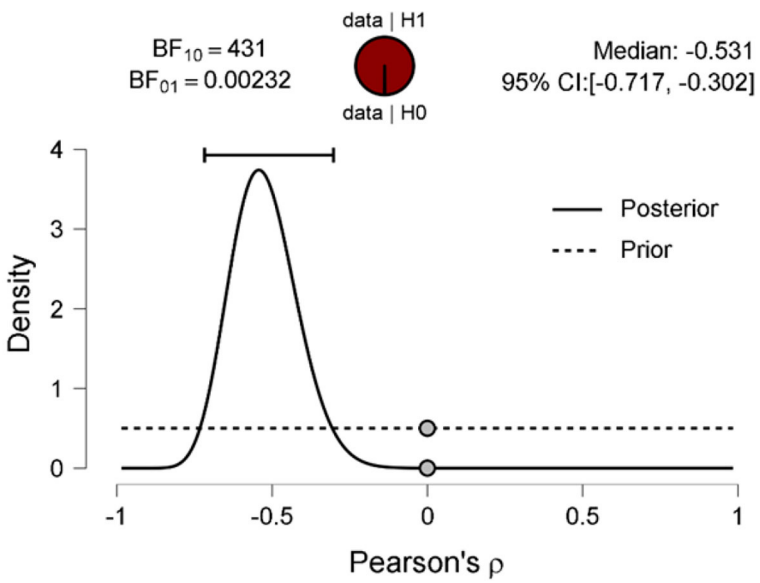

FIGURE 9 | Prior and posterior distributions for the correlation between the proportion of the polarity nouns and fear and disgust. The two-sided Bayes factor is 431 in extreme favor of the alternative hypothesis over the null hypothesis.

in a negative manner more than polarity verbs and negative adjectives. The 95% credible interval for polarity nouns [−0.287, 0.089], polarity verbs [−0.263, −0.049], and negative adjectives [0, 0.053] also provide evidence in favor of the study hypotheses that certain language features are predictive of how writers use certain words to convey sentiments to readers. In **Table 9**, the best model that shows the maximum effect is the sum of all three components, $BF_M = 19.618$, which reveals strong evidence favoring alternative hypotheses. The R^2 of 0.576 indicates a variance of 57.6% in the fear- and disgust-related words due to

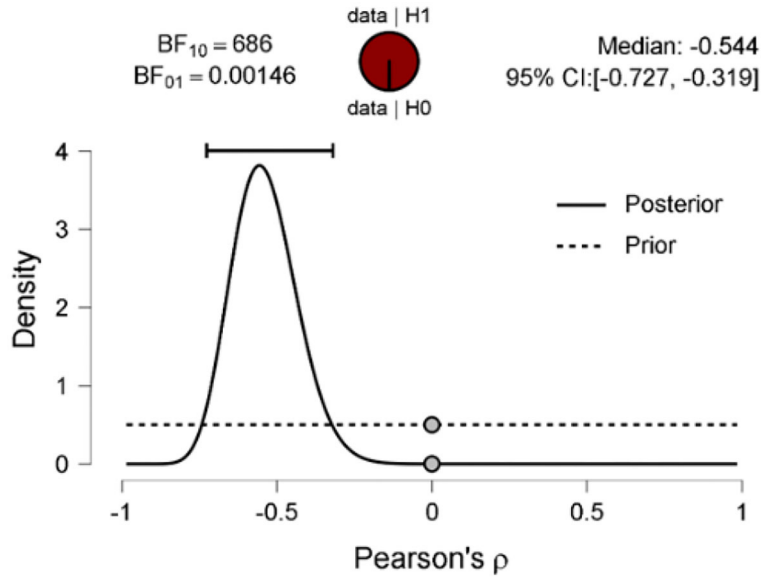

FIGURE 10 | Prior and posterior distributions for the correlation between the proportion of the polarity verbs and fear and disgust. The two-sided Bayes equals 686 and presents extreme support for the alternative hypothesis over the null hypothesis.

TABLE 8 | Posterior summaries of regression coefficients after accounting for the default priors for pronouns and the likelihood of the observed data.

Coefficient	Mean	SD	P(incl)	P(incl/data)	$BF_{inclusion}$	95% credible interval	
						Lower	Upper
Intercept	0.254	0.008	1	1	1	0.24	0.27
Negative adjectives component	0.025	0.015	0.5	0.883	7.541	0	0.053
Polarity nouns component	−0.195	0.05	0.5	0.998	420.722	−0.287	−0.089
Polarity_verbs_component	−0.154	0.052	0.5	0.986	69.295	−0.263	−0.049

a combination of polarity nouns, polarity verbs, and negative adjectives rather than any single factor or sum of two factors.

In this section, verbs refer to the actions and/or behaviors toward others. Negative verbs used in the newspaper articles are indicative of a certain kind of contextually inappropriate behavior (by people other than the family) or action words (awkward, alienating/isolating, and didn't bow) related to death or loss of a closed one when there is no scope for mourning. Polarity verbs and nouns both are two-dimensional. While one dimension represents beliefs, actions, and things that are positive in nature, the other one is indicative of negative features. The abstract features of polarity noun use many words that are synonymous with pain, agony, frustration, and humiliation. Higher use of these words in funeral-related articles has the potential to incite fear and disgust among the readers.

The impact of written texts might have on the sentiments, and future behavior of individuals is an exciting field of study. The way news(paper) articles are written, the context, the meaning, and the inferences drawn need to be explored from an AI perspective given the volume of the text. Shaping the language to influence the audience is considered an essential skill. At the same time, it is important to gauge the sentiment of the public on how the same has impacted them positively or negatively. Similarly, Cambria (2016), in his paper on "affective computing and sentiment analysis," raises concern about extraneous information confusing the global sentiments on the current problem. In the present study, we have attempted to examine the language used in the newspaper articles published on funerals during COVID-19 using LIWC and SEANCE. Our findings suggest that, first, frequent use of function words in funeral-related newspaper articles influences the emotional or affective processes; second, frequent use of pronouns or relationship words heightens apprehensions about the health and well-being of close family members; and third, higher use of polarity nouns in funeral-related articles incites fear and disgust among the readers.

CONCLUSION

The indomitable truth of human life is death. All our behavior and emotions form a part of the journey from birth till death. Death is the culmination of a celebration called life. The undulated journey explains how humans experience their lives differently from each other. The fear of death, which the cessation

TABLE 9 | Bayesian linear regression showing model comparison—fear and disgust component.

Model	P(M)	P(M/data)	BF_M	BF_{10}	R^2
negative_adjectives_component + polarity_nouns_component + polarity_verbs_component	0.25	0.867	19.618	1	0.576
polarity_nouns_component + polarity_verbs_component	0.083	0.116	1.445	0.402	0.52
negative_adjectives_component + polarity_nouns_component	0.083	0.014	0.154	0.048	0.465
negative_adjectives_component + polarity_verbs_component	0.083	0.002	0.019	0.006	0.404
polarity_verbs_component	0.083	5.904e−4	0.006	0.002	0.323
polarity_nouns_component	0.083	3.801e−4	0.004	0.001	0.308
negative_adjectives_component	0.083	6.424e−5	7.066e−4	2.222e−4	0.243
Null model	0.25	3.476e−6	1.043e−5	4.008e−6	0

of the unpredictable ebb and flow of day-to-day challenges, makes human life pleasurable for some and painful for others. As researchers from the field of Psychology, we are intrigued by death as a phenomenon, which binds everything mortal. People live in societies nurturing relationships, to get separated through unforeseen circumstances or foreseen and expected like death over the course of their lifetimes. We are bound and separated by cultures, religions, and customs. Nevertheless, funerals, a custom practiced by all communities, rituals, and traditions, are contrasting. The underlying sensibilities are complex and diverse; one may believe in life after death or rebirth, maybe, as many religions acknowledge reincarnations and faith in God.

For communities, traditional funerals positively channelize human fears and sorrows. The pandemic came as a great leveler with immense turbulence and emotional upheavals, followed by how humans deal with the unfathomable loss of family and friends. Fear of self-protection from an unknown virus changed everything that humans cherished on a social and community frontier. The real fear of an impending danger lingers outside our safe nests overwhelmed with love, warmth, and commitment for each other's safekeeping reflected through our behavior in dealing with the dead. The frequency and manipulation, though may be unintended, in use of language in articles on funerals like "Death had not fazed gravedigger …, a shiver runs up even his spine each time he sees a hearse pull up at the cemetery he tends," published by India Today on May 18, have changed the course of rationality and sentiments of mankind all around the globe. The Guardian Australia published on April 13, commenting on police patrolling a funeral—"It was just disrespectful, to carry a gun in a Greek church, it's totally against our religion. But the way they came in, they didn't bow their heads or anything. They just started speaking to some of the people who were working in the church and taking notes as we're carrying out my dad." An excerpt from a news article written in *USA Today* on April 2, 2020, stated: "Dying alone is the hardest part, but it's also really hard to grieve alone,"… "People think that doing a video conference or talking to the friends on Zoom or Zoom cocktail hour is awkward and alienating, but grieving alone is isolating." A snippet of a news article posted by *Times of India* on April 10, 2020, stated guidelines on COVID funerals by the Government of India: "The crematorium/burial ground staff should be sensitized about Covid-19. The staff will practice standard precautions of hygiene, use of masks and gloves. Relatives may be allowed to see the face of the deceased by unzipping one end of the body bag (by the staff using standard precautions). Rituals such as reading from religious scripts, sprinkling holy water, and any other last rites that do not require touching the body can be allowed. The staff and families should perform hygiene after cremation/ burial."

The conjoined anima and animus digging out of the obscured collective unconscious found its voice through the exaggerations of one-way channels of print and digital media. Here, psychology as a field of study of human cognition and the causality to infer from such a scenario lead us to the research. We wanted to explore how language is used to express emotions, care for society or close ones, and fear of losing them or life. Does the written expression of the media seem exaggerated to seek attention or make us more careful? Looking back, should we have acted in the manner we did? Does the news media influence our thinking style and corresponding action? There are many such tumultuous questions for which there are no answers as the virus still prevails. Have we adapted to the new normal?

LIMITATIONS AND FUTURE IMPLICATIONS

Unlimited possibilities can be explored in the domain of psychological text analysis, about the availability of data and ML tools (technologically advanced open source software) that make analysis swift and simple. Language is the vehicle that psychologists employ to unravel the subliminal mysteries of humans, some of which are not known to them. The tools of AI, probabilistic processing of linguistic dimensions, psychological concepts, and cognitive neuroscience have advanced in combining technology and information across various disciplines. An automated analysis of subjective texts in print media and NLP in the electronic media makes working on big data a lucrative prospect, which was otherwise considered untenable in this work. These methods look promising, but it is easy to get tempted and fall for overgeneralization without verifying prior knowledge and adequate analytical skills. With extensive training and an innovative mind-set, the field of

linguistic analysis using AI provides scope for cutting-edge research in social sciences.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

SS and TS conceptualized the study and prepared the final draft for submission. SS collected and analyzed study data, wrote preliminary results, and wrote the preliminary manuscript draft. TS and RB provided critical feedback, reviewed the draft, and provided valuable inputs. All authors contributed to the article and approved the submitted version.

REFERENCES

Akhtar, M. S., Ekbal, A., and Cambria, E. (2020). How intense are you? Predicting intensities of emotions and sentiments using stacked ensemble. *IEEE Comput. Intelligen. Magazine* 15, 64–75. doi: 10.1109/MCI.2019.2954667

Asghar, M. Z., Khan, A., Bibi, A., Kundi, F. M., and Ahmad, H. (2017). Sentence-level emotion detection framework using rule-based classification. *Cognit. Comput*. 9, 868–894. doi: 10.1007/s12559-017-9503-3

Begley, C. G., and Ellis, L. M. (2012). Raise standards for preclinical cancer research. *Nature* 483, 531–533. doi: 10.1038/483531a

Berry, D. S., and Pennebaker, J. W. (1993). Nonverbal and verbal emotional expression and health. *Psychother. Psychosom*. 59, 11–19. doi: 10.1159/000288640

Bhanot, D., Singh, T., Verma, S. K., and Sharad, S. (2020). Stigma and discrimination during COVID-19 pandemic. *Front. Public Health* 8:577018. doi: 10.3389/fpubh.2020.577018

Boyd, R. L. (2017). "Psychological text analysis in the digital humanities," in *Data Analytics in Digital Humanities*, ed S. Hai-Jew (Cham: Springer), 161–189. doi: 10.1007/978-3-319-54499-1_7

Bradley, M. M., and Lang, P. J. (1999). *Affective Norms for English Words (ANEW): Instruction Manual and Affective Ratings (Vol. 30, No. 1, pp. 25-36)*. Technical report C-1, the center for research in psychophysiology, University of Florida.

Button, K. S., Ioannidis, J. P., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S., et al. (2013). Power failure: why small sample size undermines the reliability of neuroscience. *Nat. Rev. Neurosci*. 14, 365–376. doi: 10.1038/nrn3475

Cambria, E. (2016). Affective computing and sentiment analysis. *IEEE Intell. Syst*. 31, 102–107. doi: 10.1109/MIS.2016.31

Cambria, E., Havasi, C., and Hussain, A. (2012). "Senticnet 2: a semantic and affective resource for opinion mining and sentiment analysis," in *Twenty-fifth International FLAIRS Conference* (Marco Island, FL).

Cambria, E., Hussain, A., Havasi, C., and Eckl, C. (2010a). "Sentic computing: exploitation of common sense for the development of emotion-sensitive systems," in *Development of Multimodal Interfaces: Active Listening and Synchrony*, eds A. Esposito, N. Campbell, C. Vogel, A. Hussain, and A. Nijholt (Berlin, Heidelberg: Springer), 148–156. doi: 10.1007/978-3-642-12397-9_12

Cambria, E., Li, Y., Xing, F. Z., Poria, S., and Kwok, K. (2020). "SenticNet 6: ensemble application of symbolic and subsymbolic AI for sentiment analysis," in Proceedings of the 29*th ACM International Conference on Information and Knowledge Management* (Galway), 105–114.

Cambria, E., Speer, R., Havasi, C., and Hussain, A. (2010b). "Senticnet: a publicly available semantic resource for opinion mining," in AAAI *F*all *S*ymposium: *C*ommon *S*ense *K*nowledge, Vol. 10 (Arlington, VA).

Chaiuk, T. A., and Dunaievska, O. V. (2020). Fear culture in media: an examination on coronavirus discourse. *J. History Cult. Art Res*. 9, 184–194. doi: 10.7596/taksad.v9i2.2636

Commission to Investigate the Introduction and Spread of Severe Acute Respiratory Syndrome (SARS), and Campbell, A. (2006). *Spring of Fear: The SARS Commission Final Report*. SARS Commission.

Crossley, S. A., Kyle, K., and McNamara, D. S. (2015). To aggregate or not? Linguistic features in automatic essay scoring and feedback systems. *J. Writ. Assess*. 8:80.

Crossley, S. A., Kyle, K., and McNamara, D. S. (2017). Sentiment Analysis and Social Cognition Engine (SEANCE): an automatic tool for sentiment, social cognition, and social-order analysis. *Behav. Res. Methods* 49, 803–821. doi: 10.3758/s13428-016-0743-z

Dewey, J. (1910). *How We Think*. Boston. MA: DC Heath. doi: 10.1037/10903-000

Francis, M. E., and Pennebaker, J. W. (1992). Putting stress into words: the impact of writing on physiological, absentee, and self-reported emotional well-being measures. *Am. J. Health Promot*. 6, 280–287. doi: 10.4278/0890-1171-6.4.280

Freud, S. (1953). *On Aphasia: A Critical Study*. International Universities Press.

Gamon, M. (2004). "Linguistic correlates of style: authorship classification with deep linguistic analysis features," in *COLING 2004: Proceedings of the 20th International Conference on Computational Linguistics* (Geneva), 611–617. doi: 10.3115/1220355.1220443

Gigerenzer, G., Krauss, S., and Vitouch, O. (2004). "The null ritual: what you always wanted to know about null hypothesis testing but were afraid to ask," in *Handbook on Quantitative Methods in the Social Sciences*, ed D. Kaplan (Thousand Oaks, CA: Sage), 391–408.

Glasgow, K., Fink, C., and Boyd-Graber, J. (2014). ""Our Grief is Unspeakable": automatically measuring the community impact of a tragedy," *In Eighth International AAAI Conference on Weblogs and Social Media* (Oxford).

Golbeck, J., Robles, C., and Turner, K. (2011). "Predicting personality with social media," in *CHI'11 Extended Abstracts on Human Factors in Computing Systems* (Vancouver BC), 253–262. doi: 10.1145/1979742.1979614

Gortner, E. M., and Pennebaker, J. W. (2003). The archival anatomy of a disaster: media coverage and community-wide health effects of the Texas A and M bonfire tragedy. *J. Soc. Clin. Psychol*. 22, 580–603. doi: 10.1521/jscp.22.5.580.22923

Graesser, A. C., McNamara, D. S., and Kulikowich, J. M. (2011). Coh-Metrix: providing multilevel analyses of text characteristics. *Educ. Res*. 40, 223–234. doi: 10.3102/0013189X11413260

Hamborg, F., Zhukova, A., and Gipp, B. (2019). "Automated identification of media bias by word choice and labeling in news articles," in *2019 ACM/IEEE Joint Conference on Digital Libraries (JCDL)* (Champaign, IL), 196–205. doi: 10.1109/JCDL.2019.00036

Hao, B., Li, L., Li, A., and Zhu, T. (2013). "Predicting mental health status on social media," in *International Conference on Cross-Cultural Design* (Berlin, Heidelberg: Springer), 101–110. doi: 10.1007/978-3-642-39137-8_12

Harlow, L. L., Mulaik, S. A., and Steiger, J. H. (eds.). (2016). What if *T*here *W*ere no *S*ignificance *T*ests? Classic *E*dition. Oxfordshire: Routledge. doi: 10.4324/9781315629049

Hawkins, I. I., R. C., and Boyd, R. L. (2017). Such stuff as dreams are made on: dream language, LIWC norms, and personality correlates. *Dreaming* 27:102. doi: 10.1037/drm0000049

Hu, M., and Liu, B. (2004). "Mining and summarizing customer reviews," in Proceedings of the *Tenth ACM SIGMOD International Conference on Knowledge Discovery and Data Mining* (Seattle, Washington, DC), 168–177. doi: 10.1145/1014052.1014073

Hutto, C., and Gilbert, E. (2014). "Vader: a parsimonious rule-based model for sentiment analysis of social media text," in *Proceedings of the International AAAI Conference on Web and Social Media*, Vol. 8.

Ioannidis, J. P. (2005). Why most published research findings are false. *PLoS Med*. 2:e124. doi: 10.1371/journal.pmed.0020124

Jalilifar, A. R., Varnaseri, M., Saidian, S., and Khazaie, S. (2014). An investigation into the genre features of funeral announcements: people's view in social communications in focus. *Procedia* 98, 747–756. doi: 10.1016/j.sbspro.2014.03.477

Jiang, J. A., and Brubaker, J. R. (2018).Tending unmarked graves: classification of post-mortem content on social media. *Proc. ACM Hum. Comput. Interact*. 2, 1–19. doi: 10.1145/3274350

John, L. K., Loewenstein, G., and Prelec, D. (2012). Measuring the prevalence of questionable research practices with incentives for truth telling. *Psychol. Sci.* 23, 524–532. doi: 10.1177/0956797611430953

Jordan, K. N., and Pennebaker, J. W. (2017). The exception or the rule: using words to assess analytic thinking, Donald Trump, and the American presidency. *Transl. Issues Psychol. Sci.* 3:312. doi: 10.1037/tps0000125

Jordan, K. N., Sterling, J., Pennebaker, J. W., and Boyd, R. L. (2019). Examining long-term trends in politics and culture through language of political leaders and cultural institutions. *Proc. Natl. Acad. Sci. U. S. A.* 116, 3476–3481. doi: 10.1073/pnas.1811987116

JSAP Team (2016). *Jasp. Version 0.8. 0.0* [software].

Kelter, R. (2020). Bayesian alternatives to null hypothesis significance testing in biomedical research: a non-technical introduction to Bayesian inference with JASP. *BMC Med. Res. Methodol.* 20, 1–12. doi: 10.1186/s12874-020-00980-6

Khalil, G. E., Calabro, K. S., Crook, B., Machado, T. C., Perry, C. L., and Prokhorov, A. V. (2018). Validation of mobile phone text messages for nicotine and tobacco risk communication among college students: a content analysis. *Tob. Prev. Cessat.* 4:7. doi: 10.18332/tpc/84866

Kruschke, J. K., Aguinis, H., and Joo, H. (2012). The time has come: Bayesian methods for data analysis in the organizational sciences. *Organ. Res. Methods* 15, 722–752. doi: 10.1177/1094428112457829

Lasswell, H. D., Lerner, D., and Pool, I. D. S. (1952). *Comparative Study of Symbols: An I*ntroduction. Redwood City, CA: Stanford University Press. doi: 10.1037/14763-000

Lasswell, H. D., and Namenwirth, J. Z. (1969). *The Lasswell Value Dictionary*. New Haven: Yale University.

Lee, M. D. (2011). How cognitive modeling can benefit from hierarchical Bayesian models. *J. Math. Psychol.* 55, 1–7. doi: 10.1016/j.jmp.2010.08.013

Li, S., Wang, Y., Xue, J., Zhao, N., and Zhu, T. (2020). The impact of COVID-19 epidemic declaration on psychological consequences: a study on active Weibo users. *Int. J. Environ. Res. Public Health*. 17:2032. doi: 10.3390/ijerph17062032

Li, Z., Zhang, M., Che, W., Liu, T., Chen, W., and Li, H. (2011). "Joint models for Chinese POS tagging and dependency parsing," in *Proceedings of the 2011 Conference on Empirical Methods in Natural Language Processing* (Edinburgh), 1180–1191.

LIWC (2015). *Dictionaries on LIWC*. Retrieved from: http://liwc.wpengine.com/compare-dictionaries/ (accessed February 3, 2020).

Lodewyckx, T., Kim, W., Lee, M. D., Tuerlinckx, F., Kuppens, P., and Wagenmakers, E. J. (2011). A tutorial on Bayes factor estimation with the product space method. *J. Math. Psychol.* 55, 331–347. doi: 10.1016/j.jmp.2011.06.001

Love, J., Selker, R., Marsman, M., Jamil, T., Dropmann, D., Verhagen, J., et al. (2019). JASP: graphical statistical software for common statistical designs. *J. Stat. Softw.* 88, 1–17. doi: 10.18637/jss.v088.i02

Ly, A., Verhagen, J., and Wagenmakers, E. J. (2016). Harold Jeffreys's default Bayes factor hypothesis tests: explanation, extension, and application in psychology. *J. Math. Psychol.* 72, 19–32. doi: 10.1016/j.jmp.2015.06.004

Manning, C. D., Surdeanu, M., Bauer, J., Finkel, J. R., Bethard, S., and McClosky, D. (2014). "The Stanford CoreNLP natural language processing toolkit," in *Proceedings of 52nd Annual Meeting of the Association for Computational Linguistics: System Demonstrations* (Baltimore, MD), 55–60. doi: 10.3115/v1/P14-5010

Marsman, M., and Wagenmakers, E. J. (2017). Bayesian benefits with JASP. *Eur. J. Dev. Psychol.* 14, 545–555. doi: 10.1080/17405629.2016.1259614

McClelland, D. C., Atkinson, J. W., Clark, R. A., and Lowell, E. L. (1953). *Century Psychology Series*. The *A*chievement *M*otive. New York, NY: Appleton-Century-Crofts. doi: 10.1037/11144-000

Mikolov, T., Sutskever, I., Chen, K., Corrado, G. S., and Dean, J. (2013). "Distributed representations of words and phrases and their compositionality," in *Advances in Neural Information Processing Systems* (Montreal), 3111–3119.

Miller, G. A. (1995). WordNet: a lexical database for English. *Commun. ACM* 38, 39–41. doi: 10.1145/219717.219748

Mohammad, S., and Turney, P. (2010). "Emotions evoked by common words and phrases: Using mechanical turk to create an emotion lexicon," in *Proceedings of the NAACL HLT* 2010 *W*orkshop on *C*omputational *A*pproaches to *A*nalysis and *G*eneration of *E*motion in text (Los Angeles, CA), 26–34.

Mohammad, S. M., and Turney, P. D. (2013). Crowdsourcing a word–emotion association lexicon. *Comput. Intell.* 29, 436–465. doi: 10.1111/j.1467-8640.2012.00460.x

Morey, R. D., Hoekstra, R., Rouder, J. N., Lee, M. D., and Wagenmakers, E. J. (2016). The fallacy of placing confidence in confidence intervals. *Psych. Bull. Rev.* 23, 103–123. doi: 10.3758/s13423-015-0947-8

Namenwirth, J., and Weber, R. (1987). *Dynamics of Culture*. Boston, MA: Allen and Unwin.

Nosek, B. A., and Bar-Anan, Y. (2012). Scientific utopia: I. opening scientific communication. *Psychol. Inquiry* 23, 217–243. doi: 10.1080/1047840X.2012.692215

Pal, R., Pandey, R., Gautam, V., Bhagat, K., and Sethi, T. (2020). A cross-lingual natural language processing framework for infodemic management. *arXiv [Preprint]* arXiv:2010.16357.

Pang, B., and Lee, L. (2008). Opinion mining and sentiment analysis. *Foundat. Trends Inform. Retrieval* 2:1135. doi: 10.1561/9781601981516

Pashler, H., and Wagenmakers, E. J. (2012). Editors' introduction to the special section on replicability in psychological science: a crisis of confidence? *Perspect. Psychol. Sci.* 7, 528–530. doi: 10.1177/1745691612465253

Patro, J., Baruah, S., Gupta, V., Choudhury, M., Goyal, P., and Mukherjee, A. (2018). Characterizing the spread of exaggerated news content over social media. *arXiv [Preprint]* arXiv:1811.07853.

Pennebaker, J. W. (2004). Theories, therapies, and taxpayers: on the complexities of the expressive writing paradigm. *Clinical Psychol.* 11, 138–142. doi: 10.1093/clipsy.bph063

Pennebaker, J. W., Boyd, R. L., Jordan, K., and Blackburn, K. (2015). *The Development and Psychometric Properties of LIWC, 2015*. Austin, TX: University of Texas at Austin.

Pennebaker, J. W., Chung, C. K., Frazee, J., Lavergne, G. M., and Beaver, D. I. (2014). When small words foretell academic success: the case of college admissions essays. *PLoS ONE* 9:e115844. doi: 10.1371/journal.pone.0115844

Pennebaker, J. W., and King, L. A. (1999). Linguistic styles: language use as an individual difference. *J. Pers. Soc. Psychol.* 77, 1296–1312. doi: 10.1037/0022-3514.77.6.1296

Plutchik, R. (2001). Integration, differentiation, and derivatives of emotion. *Evol. Cogn.* 7, 114–126.

Poria, S., Gelbukh, A., Hussain, A., Howard, N., Das, D., and Bandyopadhyay, S. (2013). Enhanced SenticNet with affective labels for concept-based opinion mining. *IEEE Intell. Syst.* 28, 31–38. doi: 10.1109/MIS.2013.4

Pozsonyi, F. (1938). Rudolf Carnap: the logical syntax of language. *Athenaeum* 24:115.

Raftery, A. E. (1999). Bayes factors and BIC: comment on "A critique of the Bayesian information criterion for model selection". *Socio. Methods Res.* 27, 411–427. doi: 10.1177/0049124199027003005

Rouder, J. N., Lu, J., Morey, R. D., Sun, D., and Speckman, P. L. (2008). A hierarchical process-dissociation model. *J. Exp. Psychol.* 137:370. doi: 10.1037/0096-3445.137.2.370

Salzmann, Z. (2004). *Language, Culture, and Society: An Introduction to Linguistic Anthropology, 3rd Edn*. Westview Press.

Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Sci. Inf.* 44, 695–729. doi: 10.1177/0539018405058216

Sharpe, D. (2013). Why the resistance to statistical innovations? Bridging the communication gap. *Psychol. Methods* 18:572. doi: 10.1037/a0034177

Stirman, S. W., and Pennebaker, J. W. (2001). Word use in the poetry of suicidal and nonsuicidal poets. *Psychosom. Med.* 63, 517–522. doi: 10.1097/00006842-200107000-00001

Stone, P. J., Dunphy, D. C., and Smith, M. S. (1966). The General *Inquirer: A Computer Approach to Content Analysis*. Cambridge, MA: MIT Press.

Susanto, Y., Livingstone, A. G., Ng, B. C., and Cambria, E. (2020). The hourglass model revisited. *IEEE Intell. Syst.* 35, 96–102. doi: 10.1109/MIS.2020.2992799

Taraban, R., Koduru, L., LaCour, M., and Marshall, P. (2018). Finding a common ground in human and machine-based text processing. *East Eur. J. Psycholinguist.* 5, 83–91. doi: 10.29038/eejpl.2018.5.1.tar

Taraban, R., Pittman, J., Nalabandian, T., Yang, W. F. Z., Marcy, W. M., and Gunturu, S. M. (2019). Creating and testing specialized dictionaries for text analysis. *East Eur. J. Psycholinguist.* 6, 65–75. doi: 10.29038/eejpl.2019.6.1.rta

Tausczik, Y. R., and Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *J. Lang. Soc. Psychol.* 29, 24–54. doi: 10.1177/0261927X09351676

Turney, P. D., Neuman, Y., Assaf, D., and Cohen, Y. (2011). "Literal and metaphorical sense identification through concrete and abstract context," in *Proceedings of the 2011* Conference on the Empirical Methods in Natural Language Processing (Edinburgh), 680690.

van Doorn, J., van den Bergh, D., Böhm, U., Dablander, F., Derks, K., Draws, T., et al. (2020). The JASP guidelines for conducting and reporting a Bayesian analysis. *Psychonomic Bull. Rev.* 1–14. doi: 10.3758/s13423-020-01798-5

Van Swol, L. M., and Kane, A. A. (2019). Language and group processes: an integrative, interdisciplinary review. *Small Group Res.* 50, 3–38. doi: 10.1177/1046496418785019

Vanpaemel, W., and Lee, M. D. (2012).Using priors to formalize theory: optimal attention and the generalized context model. *Psychon. Bull. Rev.* 19, 1047–1056. doi: 10.3758/s13423-012-0300-4

Wagenmakers, E. J., Lodewyckx, T., Kuriyal, H., and Grasman, R. (2010). Bayesian hypothesis testing for psychologists: a tutorial on the Savage–Dickey method. *Cogn. Psychol.* 60, 158–189. doi: 10.1016/j.cogpsych.2009.12.001

Wagenmakers, E. J., Love, J., Marsman, M., Jamil, T., Ly, A., Verhagen, J., et al. (2018b). Bayesian inference for psychology. Part II: example applications with JASP. *Psychonomic Bull. Rev.* 25, 58–76. doi: 10.3758/s13423-017-1323-7

Wagenmakers, E. J., Marsman, M., Jamil, T., Ly, A., Verhagen, J., Love, J., et al. (2018a). Bayesian inference for psychology. Part I: theoretical advantages and practical ramifications. *Psychonomic Bull. Rev.* 25, 35–57. doi: 10.3758/s13423-017-1343-3

Wallace, C. L., Wladkowski, S. P., Gibson, A., and White, P. (2020). Grief during the COVID-19 pandemic: considerations for palliative care providers. *J. Pain Symptom Manage.* 60, e70–e76. doi: 10.1016/j.jpainsymman.2020.04.012

Wardecker, B. M., Edelstein, R. S., Quas, J. A., Cordón, I. M., and Goodman, G. S. (2017). Emotion language in trauma narratives is associated with better psychological adjustment among survivors of childhood sexual abuse. *J. Lang. Soc. Psychol.* 36, 628–653. doi: 10.1177/0261927X17706940

Wetzels, R., Matzke, D., Lee, M. D., Rouder, J. N., Iverson, G. J., and Wagenmakers, E. J. (2011). Statistical evidence in experimental psychology: an empirical comparison using 855 t tests. *Pers. Psychol. Sci.* 6, 291–298. doi: 10.1177/1745691611406923

Wiebe, J., and Mihalcea, R. (2006). "Word sense and subjectivity," in *Proceedings of the 21st International Conference on Computational Linguistics and the 44th Annual Meeting of the Association for Computational Linguistics, ACL-44, 10651072* (Stroudsburg, PA: Association for Computational Linguistics). doi: 10.3115/1220175.1220309

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

PERSPECTIVE
published: 23 February 2021
doi: 10.3389/fpsyt.2021.638940

It's Complicated—Adolescent Grief in the Time of Covid-19

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Presently, there is a real possibility of a second pandemic occurring: a grief pandemic. There are estimated to be over 1 million children and young people experiencing bereavement because of Covid-19. Adolescent grief is unique due to bio-psycho-social factors such as increased risk-taking, identity-formation, and limited capacity for emotional regulation. In this article, we will argue that adolescents are at increased risk of developing complicated grief during the Covid-19 pandemic, and that it is vital that services are improved to recognize and address this need before secondary problems emerge, including anxiety, depression, and substance abuse. Complicated grief in adolescents is widely underrecognized and often misdiagnosed as a range of mental health problems, addictions, and offending behavior. For example, 25% of <20 year olds who commit suicide have experienced childhood bereavement, whilst 41% of youth offenders have experienced childhood bereavement; this is in comparison with only 4% of the general population. Many of the broader risk factors for complicated grief were already increasing prior to the Covid-19 pandemic, including increased loneliness amongst young people, and the collapse of collective structures to help people manage grief. We propose that this pandemic could be a catalyst for mental health professionals to support and nurture the caring communities emerging in this time as an essential resource to prevent the onset of a grief pandemic.

Keywords: adolescent, complicated grief (CG), disadvantage, digital, community

OPEN ACCESS

Edited by:
Virginia Torres-Lista, Catholic University Santa Maria La Antigua, Panama

Reviewed by:
Carlo Antonio Bertelloni, University of Pisa, Italy
Aldana Di Costanzo, Fundacion Aiken, Argentina

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *07 December 2020*
Accepted: *01 February 2021*
Published: *23 February 2021*

Citation:
Weinstock L, Dunda D, Harrington H and Nelson H (2021) It's Complicated—Adolescent Grief in the Time of Covid-19. Front. Psychiatry 12:638940. doi: 10.3389/fpsyt.2021.638940

INTRODUCTION

Currently, Covid-19 has resulted in over 2 million deaths globally (1). Whilst attention has mainly focused on overcoming the virus, there is an urgent need to prepare for the prospect of a "grief pandemic" (2). It is estimated that for every Covid-19 death, 2 children and 4 grandchildren are bereaved (2). Whilst people often show resilience in the face of loss (3), we believe that adolescents—especially those from disadvantaged backgrounds—are at increased risk of developing complicated grief (CG) during this pandemic. A literature review on the impact of loss on disadvantaged groups concluded that "death never occurs in a vacuum but within a social context, the nature of which can influence greatly how the person deals with that loss" (4). This article aims to highlight the current global context that is increasing the risk of CG in adolescents, alongside strategies to reduce this risk.

WHAT IS GRIEF ANYWAY?

Grief is a form of emotional energy that human beings experience following the death of something or someone. Grief is found in all human cultures, and a grief-like response has been identified in some animals too (5). Grief seems to be an emotion for social creatures, particularly those with a limbic system—the area of the brain primarily responsible for emotion and memory (6). For humans, there is a significant opioid response correlated to a heightened social connection with loved ones; some neuroscientists declared that such connections were "... in some fundamental neurochemical sense, opioid addictions" (7). In contrast, when social contact is severed, creatures with a limbic system experience suffering akin to opioid withdrawal. Typically, humans will react by trying to re-establish or repair the contact. This is especially true for the young, and when reconnection is not viable, as with death (8).

How we deal with grief varies between individuals and cultures. In the Orthodox Jewish tradition, sexual activity is forbidden during the mourning period, yet the Cubeo tribe of the northern Amazon include sexual activity as part of the wake (9, 10). In urban Senegal, it is common for the bereaved to be criticized if they display excessive emotion (11). In addition, individual factors such as attachment style, family systems, and type of death, all shape the grieving process (12, 13). A combination of these factors means that an individual's lived experience of loss will suffocate if held too tightly in any universal psychology of grief.

The first diagnostic criteria for a bereavement-related disorder were introduced in 1993 by the psychiatrist Mardi Horowitz. CG described patients who were experiencing intrusive thoughts about the deceased, avoidance, and intense negative emotions (14). Several factors were identified that increased the risk of CG, including social isolation, increased anxiety, and experiencing a sudden and inexplicable loss (15). The Covid-19 pandemic has heightened many of these risk factors. Since the original definition of CG, the ICD-11 has adopted a diagnosis of "Prolonged Grief Disorder" (**Figure 1**).

ADOLESCENCE IN CONTEXT

Adolescence is a unique, highly sensitive developmental stage initiated by puberty. During this time, the biological imperative is to detach from family and move closer to peers. Adolescence is also a particularly high-risk stage for the onset of mental health problems (17). Many cultures developed rites of passage to support this transition, although these are less common in the modern world. Many young people have created their own customs, such as gang initiations (18–20). In more individualistic cultures, a core developmental task of adolescence is to determine "who am I?" Adolescents seek a coherent, integrated, and stable sense of themselves, separate from the identity imposed on them by family. This quest is complicated in the 21st Century, as the range of possible identities continuously expands.

If a significant loss disrupts these developmental tasks, the transition to adulthood becomes complicated (21). Keenan argued that bereaved young people deal with a "double dose" of obstacles: adolescent challenges and bereavement challenges (22). Moreover, research increasingly suggests that adolescents grieve differently to adults, and that adolescent grief is commonly misunderstood (23, 24).

Grief during adolescence can be viewed as an unanticipated rite of passage, an initiation that disrupts the quest for identity and "requires us to die to the old image of who we thought we were and step across the threshold into a radically altered sense of self" (25). Without a solid support system, the initiation of adolescent grief can become troublesome. Adolescents who have experienced loss are more likely to experience difficulties in the work-place and have diminished educational achievements and aspirations (26). They are also at increased risk of psychological disorders (27), particularly depression (28), and physical illness (29). Evidently, loss can seriously hinder quality of life for adolescents.

Adolescents exhibit a distinct pattern of neurological development. Combining the neurological understanding of both grief and adolescence can help identify why grief is problematic during this stage and can establish why adolescents are prone to develop CG. Pain-related and reward-related pathways both contribute to the grieving process (31, 32). As social connections have been compared to opioid addictions, O'Connor et al. conceptualized CG as an addiction. Memories of the deceased activate reward-related pathways, thereby prolonging the grieving process. A recent study found that when patients with CG saw photos of their deceased loved ones, the nucleus accumbens—associated with rewards or longing—was stimulated significantly more than people who experienced "normal" grieving. O'Connor said: "It's as if the brain were saying, "Yes I'm anticipating seeing this person" and yet "I am not getting to see this person...The mismatch is very painful" (32). Adolescents experience high levels of sensation-seeking and activation of reward-pathways, and consequently, they are more vulnerable to risk-taking behaviors (30) and developing addictions (33, 34). Neurologically, adolescents appear more vulnerable to developing CG.

THE CONTEXT OF GRIEF PRE-COVID

There are four core cultural shifts that were existent pre-Covid and were already significantly impacting the grieving process of adolescents: (1) the stigmatization of grief, (2) the fragmentation of traditional community structures and the rise of individualism, (3) the loneliness epidemic, and (4) the proliferation of digital technologies.

The Stigmatization of Grief

Socio-cultural norms around grief influence the grieving process. Over the last two centuries, the average human life-span has increased rapidly, and expectations around death and grief have changed correspondingly (35, 36). In Victorian Britain, grievers would view the body after death. Today, it is normal to have a closed casket at a funeral (35). Additionally, images of mourning proliferated in Victorian Britain; by the 1870s in the USA, girls could order dolls complete with coffins and mourning clothes (36). Traditionally in Judaism, the loss of a parent results in

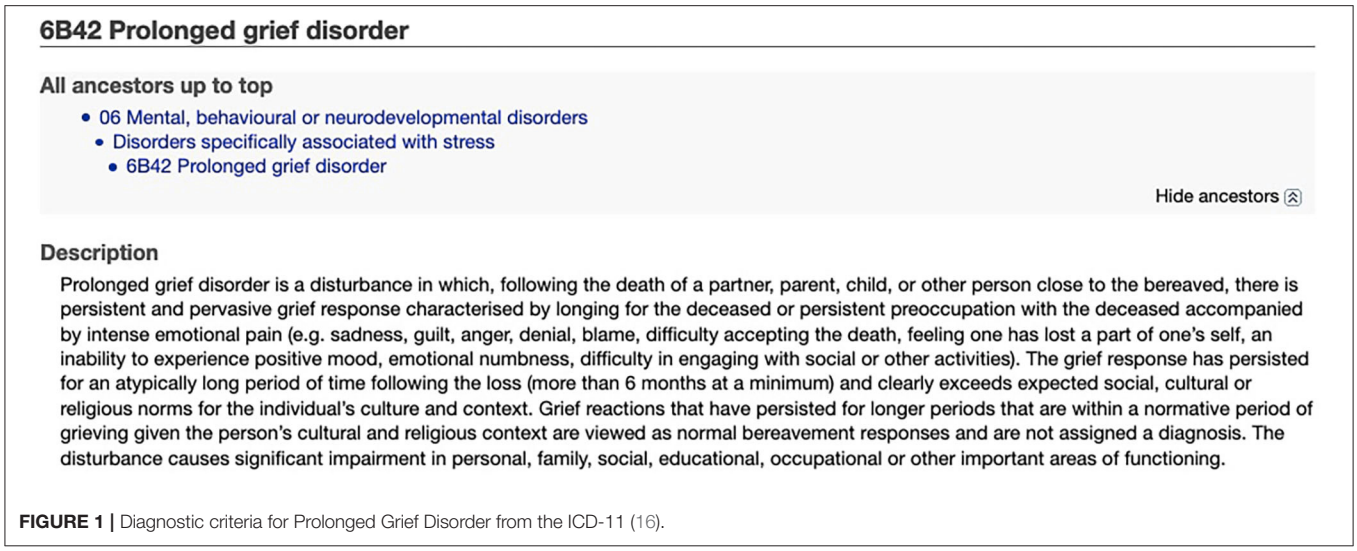

FIGURE 1 | Diagnostic criteria for Prolonged Grief Disorder from the ICD-11 (16).

a year-long grieving process. Yet in the 21st Century, many establishments in the UK and the USA fail to provide any bereavement policies. The average length of compassionate leave in the UK is 2–5 days, but 40% of workers do not receive time off to handle family bereavement (37, 38). It seems the main message around grief in Advanced Capitalist societies is to hurry and get on with it. Research suggests that the new diagnosis of prolonged grief disorder can lead to greater stigmatization. In one study, participants reported increased anger and anxiety, and desired greater social distance when this diagnosis was mentioned (39). One thing grieving adolescents do not need at this time is increased social distance.

Community Fragmentation and Individualism

Over thousands of years and across many cultures, collective structures have evolved to guide humans through grief (40). Yet, in modern, secular societies these structures have been fragmented, leaving populations severed from the language and practices that historically guided them through loss. Individualism is now on the rise globally and is likely a contributor to this structural fragmentation (41). In individualistic cultures, grief is viewed as an intrapsychic phenomenon, as opposed to social or cultural (42). As humans are social creatures, and grief is a social emotion, this trend is problematic. Some researchers suggest that grief counseling is merely a continuation of this trend, another way of sequestering grief into private spaces. Walter proposed that: "Counseling and self-help groups collude with the private modern way of death, keeping grief conveniently out of the everyday way so that life can go on as though death did not exist" (43).

Loneliness Epidemic

In the UK, USA, and parts of Europe, young people feel more alone than any other age groups (44, 45). There is evidence of a positive correlation between the individualistic nature of society and loneliness (46). For young people in modern cultures, grief can be a lonely experience, particularly as conversations about death are often discouraged (47). Loneliness can have devastating consequences; one recent study found that "people who report feeling lonely after a sudden bereavement are more likely to make a suicide attempt after their loss" (48). This sits uncomfortably with the finding that, in the UK, 25% of <20 years old who commit suicide had experienced a childhood bereavement (49).

Proliferation of Digital Technologies

Half of the global population have regular access to a smartphone, especially young people (50, 51). The amount of time spent online is also growing. Over a third of 15-year-olds in the UK are "extreme internet users," online for at least 6 h a day at weekends; in the USA, 95% of teenagers have access to a smartphone, and 45% are online "almost constantly" (52, 53).

Creative examples are emerging of young people expressing their grief online, from memorials in Minecraft to expressions of collective grief on social media, seen most poignantly in the aftermath of the George Floyd killing (54). Social media offers many advantages for grieving adolescents: there is little friction—a young person can announce their grief with a simple status update and instantly receive supportive responses; it is a space they are familiar with; for those who feel marginalized in everyday life, online communities allow them to feel empowered in their grief; and finally, social media provides a platform for creative expressions of grief (55, 56).

However, the expression of grief online also presents limitations. Grief needs to be managed in a safe environment, which is not guaranteed online: a single social media post can create an emotional storm, sending shock-waves throughout our nervous systems (57). The developing brains and nervous systems of young people are constantly exposed to the harsh realities of the world through social media, including death and potential civilizational collapse. It is likely they are significantly affected by this emotional contagion (58).

Individuals with CG exhibit increased neural activity of reward-related pathways. Numerous studies have demonstrated

how social media and other digital platforms are designed to attract us by eliciting our dopamine-fueled, reward-seeking neural pathways (59, 60). Therefore, young people likely find it harder to grieve in this digital age.

When a loved one dies, we have access to photos, videos, and messages that maintain our personal connection with them. However, this can prolong the process of letting go. "Ambiguous loss" describes loss without closure or understanding. In this digital age, the ongoing existence of the deceased's virtual self makes it harder to obtain closure (61).

WHY IS COVID-19 MAKING GRIEF MORE COMPLICATED FOR ADOLESCENTS?

Whilst we cannot confirm the long-term mental health effects of Covid-19 on grieving adolescents, this pandemic has accelerated many of the described risk factors for CG. Social isolation has now become a global policy in the form of social distancing and physical lockdowns, raising concerns about the impact on young people's mental health (62, 63). Collective structures for grieving have been difficult or impossible to access (64). Young people have been forced to say goodbye to loved ones via iPads and have been denied the basic comfort of a hug from anyone outside their immediate family (65).

As young people have spent more time distanced from their peers, one might predict social media usage would skyrocket. However, the reality is complicated. A study of over 1,500 teenagers in the USA showed that social media consumption decreased overall during this pandemic. Furthermore, the teenagers who received more sleep and more family time due to the lockdown measures reported better mental health than pre-Covid (66).

Nonetheless, the same study showed that teenagers whose parents had become unemployed, had financial worries, or were concerned about food supplies, reported far higher levels of depression. The increased mental health burden of Covid-19 on disadvantaged youth is echoed in other studies (67). Pre-Covid, research had established that young people from disadvantaged backgrounds were more likely to lose a parent early in life, and were more likely to suffer from CG due to fewer opportunities "to process immediate difficulties before the next adversity strikes" (4, 68, 69). Covid-19 has impacted disadvantaged communities significantly, regarding morbidity and the economy. Consequently, a significantly elevated risk of CG for young people from disadvantaged backgrounds is expected (70), unless the mental health community can reverse this trajectory.

Given that CG and related grief disorders can only be diagnosed at least 6 months after a loss, it may be too early for data to support our hypothesis. The pressure on the NHS for death prevention may have also distracted from diagnoses. Although we currently do not know how Covid-19 will impact CG levels, given the traumatic and unexpected nature of Covid-19 deaths, it has been predicted that these values will rise (71).

HOPE

Adolescent grief during Covid-19 is certainly complicated, but hope is a critical resource that can turn a traumatic event into an opportunity for post-traumatic growth (72). So, in these most challenging of times, how can we find and nurture hope for bereaved adolescents? Here, we consider two pathways:

Clinical

CG treatments have been developed based on cognitive behavior therapy and interpersonal psychotherapy (73). These therapies aim to free the normal grieving process, rather than free the individual of grief (73). Intervention therapies are promising; a meta-analysis of 14 studies concluded that intervention treatments yielded significantly positive results (74). Contrarily, preventative measures for CG are currently ineffective. Further research into the prevention of CG is essential, focusing on risk and protective factors for which there is good evidence (74).

However, managing these factors in a pandemic requires the adaptation of services, such as offering more services digitally (75). Whilst the ability of digital services to adequately address the risk factors for CG is unknown, it is believed that isolation/loneliness primarily requires face-to-face support. Currently, there is insufficient research to empirically assess the limitations of tele-psychiatry (76).

Encouragingly, the pandemic may alleviate some risk factors, especially in families with positive relationships. A strong relationship with a surviving parent is a protective factor for CG (77); lockdown may have contributed to improving existing parent-child relationships (66). Improved awareness of the risk factors and potential for CG among healthcare professionals will be key to helping those affected both during and after the pandemic.

Social

We have shown that many of the social factors increasing the risk of CG in this pandemic were already increasing pre-Covid-19. This pandemic has exposed the mental health burden that arises in societies where grief is stigmatized, social isolation and digital immersion are pervasive, and collective structures for healing and mutual support are withering.

Just as grief can be seen as an unanticipated initiation for adolescents, this pandemic can be viewed as a collective initiation. Indeed, COVID-19 has been described as "an unprecedented catalyst for social transformation" (78). By revealing these implicit social structures and our shared vulnerabilities, the pandemic has allowed human beings to access deeper levels of compassion—from rainbows in windows and clapping for the NHS, to the rise in volunteering and mutual aid groups. Research shows that compassion, empowerment, and deeper connections to others are common responses to mass emergencies (79).

The psychotherapist Darian Leader stated, "mourning requires other people." A systematic review on loneliness and young people's mental health concluded "finding ways to give children and adolescents a sense of belonging...and to feel that they are part of a wider community should be a priority" (80). This pandemic is providing an opportunity to highlight

community structures to help vulnerable young people grieve. We believe that the "Compassionate Communities" model should be studied to support adolescents at risk of developing CG. Compassionate Communities are a growing movement in the UK and Europe, where palliative care providers engage local communities in conversations about death and grief, promoting a literate culture around these topics. In South London, a hospice invited schoolchildren to visit and encouraged them to ask questions like "what happens to your body when you die?" (80).

It is essential that mental health professionals continue supporting this sense of belonging by advocating mutual aid groups and compassionate communities. Research consistently shows that without systemic or structural change, mental health care is inadequate to reverse the detrimental effects of social disadvantages (81, 82). Professional psychoeducational programming, wellness outreach, fundraising for mental health services, and mental health advocacy are all well-documented strategies that can sustain these communities (78).

Furthermore, communities aiming to help young people grieve should have "critical hope" at their core. The pedagogist Paolo Freire distinguished "naive hope" from "critical hope": a detachment from any sense of agency, empowerment, or political struggle that is likely to disintegrate into hopelessness. "Critical hope" is instead understood as "an action-oriented response to contemporary despair" (83). Initiatives are needed imminently to increase adolescents' critical awareness of social trends that further complicate grief. Such initiatives can alleviate societal pressures to continue as normal, despite facing emotional pain (84). There is increasing evidence for the positive impact of interventions focused on adolescent empowerment and critical consciousness (85–87).

CONCLUSION

Grief can be transformed into a powerful catalyst for social change, political action, and collective well-being (88, 89). The Covid-19 pandemic is a powerful opportunity to reinvigorate collective structures that can help vulnerable young people through their darkest moments. This article has highlighted the increased risk of CG for bereaved young people during this pandemic, especially those from disadvantaged backgrounds. Mental health professionals and organizations need to respond to the "grief pandemic" by nurturing collective structures that can provide grieving young people with a sense of belonging. Future research should include a literature review on CG and young people, alongside research into the communities that can sustainably generate a vital sense of belonging for young people.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

LW, DD, and HH conceptualized and wrote the manuscript. HN contributed to the literature review, and critically reviewed the manuscript. All authors agree to be accountable for the content of the work.

FUNDING

The authors received no funding for this work. We are all volunteers for the charity Apart of Me, whose mission is to support vulnerable bereaved young people around the world.

ACKNOWLEDGMENTS

We would like to thank Dr. Sara Magalhaes for suggesting we submit this article, all Apart of Me supporters and volunteers who keep our mission alive, and all the bereaved young people we work with who inspire us with their courage on a daily basis.

REFERENCES

1. European Center for Disease Prevention and Control. *COVID-19 Situation Update Worldwide*. (2020). Available online at: https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases# (accessed December 07, 2020).
2. Birkner G, Soffer R. *The Covid-19 Pandemic Will Be Outlasted by the Grief Pandemic — and No One Is Preparing for It*. (2020). Available online at: https://www.nbcnews.com/think/opinion/covid-19-pandemic-will-be-outlasted-grief-pandemic-no-one-ncna1242788# (accessed December 07, 2020).
3. Bonanno GA, Wortman CB, Lehman DR, Tweed RG, Haring M, Sonnega J, et al. Resilience to loss and chronic grief: a prospective study from preloss to 18-months postloss. *J Pers Soc Psychol.* (2002) 83:1150–64. doi: 10.1037/0022-3514.83.5.1150
4. De E. *Literature Review Into the Prevalence and Impact of Loss and Bereavement on Individuals Experiencing Severe and Multiple Disadvantages*. London: Lankelly Chase (2018).
5. Monsó S, Osuna-Mascaró AJ. Death is common, so is understanding it: the concept of death in other species. *Synthese*. (2020). doi: 10.1007/s11229-020-02882-y
6. Archer J. Grief from an evolutionary perspective. In: Stroebe MS, Hansson RO, Stroebe W, Schut H, editors. *Handbook of Bereavement Research: Consequences, Coping, and care*. Washington, DC: American Psychological Association (2001). p. 263–83.
7. Panksepp J, Siviy SM, Normansell LA. Brain opioids and social emotions. In: Reite M, editor. *The Psychobiology of Attachment and Separation*. New York, NY: Elsevier (1985). p. 3–49.
8. Panksepp J. Neurocircuitry of cognition, emotion, and behavior. *Dialogues Clin Neurosci.* (2010) 12:533–45. doi: 10.31887/DCNS.2010.12.4/jpanksepp
9. Goldman I. The structure of ritual in the Northwest Amazon. Essays in honor of Julian H. Steward. In: Chapman JW, editor. *Process and Pattern in Culture*. London: Taylor and Francis. (2017) p. 111–22.
10. Magonet J. *Jewish Explorations of Sexuality*. Oxford: Berghahn Books. (1995). p. 10–11.
11. Evans R, Bowlby S, Ribbens McCarthy J, Wouango J, Kebe F. "'It's God's will': consolation and religious meaning-making after a family death in urban Senegal,": Grief and consolation in space and time. In: Jedan C, Maddrell A, Venbrux E, editors. *Consolationscapes in the Face of Loss*. London: Routledge (2018). p. 69–70.

12. Hayslip B, Page KS. Family characteristics and dynamics: a systems approach to grief. *Family Sci.* (2013) 4:50–8. doi: 10.1080/19424620.2013.819679
13. Wayment HA, Vierthaler J. Attachment style and bereavement reactions. *J Loss Trauma.* (2002) 7:129–49. doi: 10.1080/153250202753472291
14. Killikelly C, Maercker A. Prolonged grief disorder for ICD-11: the primacy of clinical utility and international applicability. *Eur J Psychotraumatol.* (2017) 8:1476441. doi: 10.1080/20008198.2018.1476441
15. Mason TM, Tofthagen CS, Buck HG. Complicated grief: risk factors, protective factors, and interventions. *J Soc Work End Life Palliat Care.* (2020) 16:151–74. doi: 10.1080/15524256.2020.1745726
16. *ICD-11 for Mortality and Morbidity Statistics*. Geneva. World Health Organisation (2020). p. 6B42.
17. Kessler RC, Petukhova M, Sampson NA, Zaslavsky AM, Wittchen H-U. Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *Int J Methods Psychiatr Res.* (2012) 21:169–84. doi: 10.1002/mpr.1359
18. Brown GH, Brunelle LM, Malhotra V. Tagging: deviant behavior or adolescent rites of passage? *Cult Psychol.* (2017) 23:487–501. doi: 10.1177/1354067X16660852
19. Diekstra R. The changing face of adolescence. The lengthening of a fascinating developmental phase, its threats and challenges. In: Clouder C, Heys B, Matthes M, editors. *Improving the Quality of Childhood in the European Union. Current Perspectives*. Brussel: Jean Monet publications (2010). p. 127–41.
20. Murer JS, Schwarze T. Social rituals of pain: the socio-symbolic meaning of violence in gang initiations. *Int J Polit Cult Soc.* (2020). doi: 10.1007/s10767-020-09392-2
21. National Academies of Sciences, Engineering, and Medicine, Health and Medicine Division, Committee on the Neurobiological and Socio-behavioral Science of Adolescent Development and Its Applications. Adolescent development. In: Bonnie RJ. Backes EP, editors. *The Promise of Adolescence: Realizing Opportunity for All Youth*. Washington, DC: National Academies Press (US) (2019). p. 1–12.
22. Keenan A. Parental loss in early adolescence and its subsequent impact on adolescent development. *J Child Psychother.* (2014) 40:20–35. doi: 10.1080/0075417X.2014.883130
23. Oltjenbruns K. Developmental context of childhood: grief and regrief phenomena. In: Stroebe MS, Hansson RO, Stroebe W, Schut H, editors. *Handbook of Bereavement Research: Consequences, Coping and Care*. Washington, DC: American Psychological Association (2001). p.169–97.
24. Burlton H. *Risk and resilience in bereaved children with learning and neurodevelopmental disabilities: perceptions of parents, schools and bereavement practitioners*. (Doctoral thesis). Cardiff University, Cardiff, United Kingdom (2018).
25. Weller F. *The Wild Edge of Sorrow: Rituals of Renewal and the Sacred Work of Grief*. Berkeley, CA: North Atlantic Books. (2015). p. 124
26. Brent DA, Melhem NM, Masten AS, Porta G, Payne MW. Longitudinal effects of parental bereavement on adolescent developmental competence. *J Clin Child Adolesc Psychol.* (2012) 41:778–91. doi: 10.1080/15374416.2012.717871
27. Raza S, Adil A, Ghayas S. Impact of parental death on adolescents' psychosocial functioning. *J Psychiatr Res.* (2008) 3:1–11.
28. Ellis J, Dowrick C, Lloyd-Williams M. The long-term impact of early parental death: lessons from a narrative study. *J R Soc Med.* (2013) 106:57–67. doi: 10.1177/0141076812472623
29. Tafà M, Cerniglia L, Cimino S, Ballarotto G, Marzilli E, Tambelli R. Predictive values of early parental loss and psychopathological risk for physical problems in early adolescents. *Front Psychol.* (2018) 9:922. doi: 10.3389/fpsyg.2018.00922
30. Hamdan S, Mazariegos D, Melhem NM, Porta G, Payne MW, Brent DA. Effect of parental bereavement on health risk behaviors in youth: a 3-year follow-up. *Arch Pediatr Adolesc Med.* (2012) 166:216–23. doi: 10.1001/archpediatrics.2011.682
31. Gündel H, O'Connor M-F, Littrell L, Fort C, Lane RD. Functional neuroanatomy of grief: an FMRI study. *Am J Psychiatry.* (2003) 160:1946–53. doi: 10.1176/appi.ajp.160.11.1946
32. O'Connor M-F, Wellisch DK, Stanton AL, Eisenberger NI, Irwin MR, Lieberman MD. Craving love? Enduring grief activates brain's reward center. *Neuroimage.* (2008) 42:969–72. doi: 10.1016/j.neuroimage.2008.04.256
33. Martin CA, Kelly TH, Rayens MK, Brogli BR, Brenzel A, Smith WJ, et al. Sensation seeking, puberty, and nicotine, alcohol, and marijuana use in adolescence. *J Am Acad Child Adolesc Psychiatry.* (2002) 41:1495–502. doi: 10.1097/00004583-200212000-00022
34. Spear LP. Rewards, aversions and affect in adolescence: emerging convergences across laboratory animal and human data. *Dev Cogn Neurosci.* (2011) 1:392–400. doi: 10.1016/j.dcn.2011.08.001
35. Chapple A, Ziebland S. Viewing the body after bereavement due to a traumatic death: qualitative study in the UK. *BMJ.* (2010) 340:c2032. doi: 10.1136/bmj.c2032
36. Stearns PN. Grief in modern history: an ongoing evolution. In: Jacobsen MH, Petersen A, editors. *Exploring Grief: Towards a Sociology of sorrow*. London: Routledge (2019). p. 21–36.
37. Servaty-Seib HL, Liew CH. Advocating for bereavement leave policies for college students. *J College Student Dev.* (2019) 60:240–4. doi: 10.1353/csd.2019.0021
38. van Giezen RW. *Paid Leave in Private Industry Over the Past 20 years*. (Vol. 2, No. 18). Washington, DC: U.S. Bureau of Labor Statistics (2013).
39. Gonschor J, Eisma MC, Barke A, Doering BK. Public stigma towards prolonged grief disorder: does diagnostic labeling matter? *PLoS ONE.* (2020) 15:e0237021. doi: 10.1371/journal.pone.0237021
40. Rosenblatt PC. Grief across cultures: a review and research agenda. In: Stroebe MS, Hansson RO, Schut H, Stroebe W, editors. *Handbook of Bereavement Research and Practice: Advances in Theory and intervention*. Washington, DC: American Psychological Association (2008). p. 207–22.
41. Santos HC, Varnum ME, Grossmann I. Global increases in individualism. *Psychol Sci.* (2017) 28:1228–39. doi: 10.1177/0956797617700622
42. Neimeyer RA, Klass D, Dennis MR. A social constructionist account of grief: loss and the narration of meaning. *Death Stud.* (2014) 38:485–98. doi: 10.1080/07481187.2014.913454
43. Walter JA. *Revival of Death*. London, UK: Psychology Press. (1994). p. 35.
44. Office for National Statistics. *Children's and Young People's Experiences of Loneliness 2018*. (2018). Available online at: https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/childrensandyoungpeoplesexperiencesofloneliness/2018# (accessed December 07, 2020).
45. D'Hombres B, Schnepf Sylke, Barjakovà M, Mendonça FT. *Loneliness-an Unequally Shared Burden in Europe*. Brussel: European Commission. (2018).
46. Barreto M, Victor C, Hammond C, Eccles A, Richins MT, Qualter P. Loneliness around the world: age, gender, and cultural differences in loneliness. *Pers Individ Differ.* (2020) 169:110066. doi: 10.1016/j.paid.2020.110066
47. Fearnley R. Death of a parent and the children's experience: don't ignore the elephant in the room. *J Interprof Care.* (2010) 24:450–9. doi: 10.3109/13561820903274871
48. Pitman AL, King MB, Marston L, Osborn DP. The association of loneliness after sudden bereavement with risk of suicide attempt: a nationwide survey of bereaved adults. *Soc Psychiatry Psychiatr Epidemiol.* (2020) 55:1081–92. doi: 10.1007/s00127-020-01921-w
49. National Confidential Inquiry into Suicide and Homicide by People with Mental Illness. *Suicide by Children and Young People*. Manchester: University of Manchester (2017).
50. O'Dea S. *Smartphone Users Worldwide 2016-2021*. (2020). Available online at: https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/# (accessed December 07, 2020).
51. Silver L. 2. *In Emerging Economies, Smartphone Adoption Has Grown More Quickly Among Younger Generations*. (2019). Available online at: https://www.pewresearch.org/global/2019/02/05/in-emerging-economies-smartphone-adoption-has-grown-more-quickly-among-younger-generations/# (accessed December 07, 2020).
52. Anderson M, Jiang J. *Teens, Social Media & Technology 2018*. (2018). Available online at: https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/# (accessed December 07, 2020).
53. Education Policy Institute. *Social Media and Children's Mental Health (30th 2017)*. Available online at: https://epi.org.uk/publications-and-research/social-media-childrens-mental-health-review-evidence/# (accessed December 07, 2020).

54. McAllister, Ken S.|Ruggill, Judd Ethan. Playing to death. *Am J Play.* (2018) 11:85–103.
55. Riccio J. *Digital native code: An analysis of adolescent identity formation through social media*. (Doctoral thesis). Syracuse University, Syracuse, NY, United States (2020).
56. Sofka C. *Adolescent Use of Social Media to Cope With Grief*. New York, NY: Springer.
57. Steinert S. Corona and value change. The role of social media and emotional contagion. *Ethics Inf Technol.* (2020) 1—10. doi: 10.1007/s10676-020-09545-z
58. Afifi TD, Zamanzadeh N, Harrison K, Acevedo Callejas M. WIRED: the impact of media and technology use on stress (cortisol) and inflammation (interleukin IL-6) in fast paced families. *Comput Hum Behav.* (2018) 81:265–73. doi: 10.1016/j.chb.2017.12.010
59. Priesnitz W. Addicted. *Natural Life.* (2015) 19—23.
60. Zhu Y, Zhang H, Tian M. Molecular and functional imaging of internet addiction. *Biomed Res Int.* (2015) 2015:378675. doi: 10.1155/2015/378675
61. Kasket E. Access to the digital self in life and death: privacy in the context of posthumously persistent Facebook profiles. *SCRIPTed.* (2013) 10:7–18. doi: 10.2966/scrip.100113.7
62. Hwang T-J, Rabheru K, Peisah C, Reichman W, Ikeda M. Loneliness and social isolation during the COVID-19 pandemic. *Int Psychogeriatr.* (2020) 32:1217–20. doi: 10.1017/S1041610220000988
63. Loades ME, Chatburn E, Higson-Sweeney N, Reynolds S, Shafran R, Brigden A, et al. Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *J Am Acad Child Adolesc Psychiatry.* (2020) 59:1218–1239.e3. doi: 10.1016/j.jaac.2020.05.009
64. Burrell A, Selman LE. How do funeral practices impact bereaved relatives' mental health, grief and bereavement? *A mixed methods review with implications for COVID-19. Omega (Westport).* (2020) :30222820941296. doi: 10.1177/0030222820941296
65. Hixenbaugh M, Solon O. *She was dying in a nursing home — alone. Her daughter was fighting to say goodbye.* (2020) Available online at: *https://www.nbcnews.com/news/us-news/death-age-coronavirus-daughter-fights-say-goodbye-her-mother-n1180576*
66. Twenge JM, Coyne SM, Carroll JS, Bradford Wilcox W. *Teens in Quarantine: Mental Health, Screen Time, and Family Connection*. Charlottesville, VA: Institute for Family Studies. (2020).
67. Fegert JM, Vitiello B, Plener PL, Clemens V. Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child Adolesc Psychiatry Ment Health.* (2020) 14:20. doi: 10.1186/s13034-020-00329-3
68. Ribbens McCarthy J, Jessop J. *The Impact of Bereavement and Loss on Young People*. New York, UK: Joseph Rowntree Foundation. (2005).
69. Vaswani N. The ripples of death: exploring the bereavement experiences and mental health of young men in custody. *Howard J Crim Justice.* (2014) 53:341–59. doi: 10.1111/hojo.12064
70. Office for National Statistics. *Deaths Involving COVID-19 by Local Area and Socioeconomic Deprivation: Deaths Occurring Between 1 March and 31 July 2020.* (2020). Available online at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsinvolvingcovid19bylocalareasanddeprivation/deathsoccurringbetween1marchand31july2020
71. Gesi C, Carmassi C, Cerveri G, Carpita B, Cremone IM, Dell'Osso L. Complicated grief: what to expect after the coronavirus pandemic. *Front Psychiatry.* (2020) 11:489. doi: 10.3389/fpsyt.2020.00489
72. Long LJ, Gallagher MW. Hope and posttraumatic stress disorder. In: Gallagher MW, Lopez SJ, editors. *Oxford Library of Psychology. The Oxford Handbook of Hope*. Oxford: Oxford University Press (2018). p. 233–42.
73. Shear MK. Complicated grief treatment: the theory, practice and outcomes. *Bereave Care.* (2010) 29:10–4. doi: 10.1080/02682621.2010.522373
74. Wittouck C, van Autreve S, de Jaegere E, Portzky G, van Heeringen K. The prevention and treatment of complicated grief: a meta-analysis. *Clin Psychol Rev.* (2011) 31:69–78. doi: 10.1016/j.cpr.2010.09.005
75. Di Carlo F, Sociali A, Picutti E, Pettorruso M, Vellante F, Verrastro V, et al. Telepsychiatry and other cutting-edge technologies in COVID-19 pandemic: bridging the distance in mental health assistance. *Int J Clin Pract.* (2021) 75:e13716. doi: 10.1111/ijcp.13716
76. Chen CK, Nehrig N, Wash L, Schneider JA, Ashkenazi S, Cairo E, et al. When distance brings us closer: leveraging tele-psychotherapy to build deeper connection. *Couns Psychol Q.* (2020). doi: 10.1080/09515070.2020.1779031
77. Raveis VH, Siegel K, Karus D. Children's psychological distress following the death of a parent. *J Youth Adolesc.* (1999) 28:165–80. doi: 10.1023/A:1021697230387
78. Domínguez DG, García D, Martínez DA, Hernandez-Arriaga B. Leveraging the power of mutual aid, coalitions, leadership, and advocacy during COVID-19. *Am Psychol.* (2020) 75:909–18. doi: 10.1037/amp0000693
79. Drury J, Carter H, Cocking C, Ntontis E, Tekin Guven S, Amlôt R. Facilitating collective psychosocial resilience in the public in emergencies: twelve recommendations based on the social identity approach. *Front Public Health.* (2019) 7:141. doi: 10.3389/fpubh.2019.00141
80. Breen LJ, Kawashima D, Joy K, Cadell S, Roth D, Chow A, et al. Grief literacy: a call to action for compassionate communities. *Death Stud.* (2020) 1—9. doi: 10.1080/07481187.2020.1739780
81. Bullock HE. Psychology's contributions to understanding and alleviating poverty and economic inequality: introduction to the special section. *Am Psychol.* (2019) 74:635–40. doi: 10.1037/amp0000532
82. Embrett MG, Randall GE. Social determinants of health and health equity policy research: exploring the use, misuse, and nonuse of policy analysis theory. *Soc Sci Med.* (2014) 108:147–55. doi: 10.1016/j.socscimed.2014.03.004
83. Bozalek V, Leibowitz B, Carolissen R, Boler M, editors. *Discerning Critical Hope in Educational Practices*. London: Routledge (2014).
84. Harris D. Oppression of the bereaved: a critical analysis of grief in Western society. *Omega (Westport).* (2009) 60:241–53. doi: 10.2190/om.60.3.c
85. Diemer MA, Blustein DL. Critical consciousness and career development among urban youth. *J Vocat Behav.* (2006) 68:220–32. doi: 10.1016/j.jvb.2005.07.001
86. Godfrey EB, Burson EL, Yanisch TM, Hughes D, Way N. A bitter pill to swallow? Patterns of critical consciousness and socioemotional and academic well-being in early adolescence. *Dev Psychol.* (2019) 55:525–37. doi: 10.1037/dev0000558
87. Grealish A, Tai S, Hunter A, Emsley R, Murrells T, Morrison AP. Does empowerment mediate the effects of psychological factors on mental health, well-being, and recovery in young people? *Psychol Psychother.* (2017) 90:314–35. doi: 10.1111/papt.12111
88. Granek L. Mourning sickness: the politicizations of grief. *Rev Gen Psychol.* (2014) 18:61–8. doi: 10.1037/gpr0000001
89. Holst Warhaft G. *The Cue for Passion: Grief and Its Political Uses*. Cambridge, MA: Harvard University Press. (2000) p.228

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

OPINION
published: 09 March 2021
doi: 10.3389/fpsyt.2021.626831

Hope May Come From Internet in Times of COVID-19: Building an Online Programme for Grief (LIVIA)

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Keywords: internet-based interventions for mental health, coronavirus—COVID-19, interpersonal loss, grief, mourning (bereavement), marital separation/divorce

COVID-19: A BREEDING GROUND FOR A LACK OF CONNECTION IN TIMES OF GRIEF

As we write these lines, the coronavirus-19 (COVID-19) pandemic has reportedly killed over 2'400'000 people, leaving many individuals and families in mourning throughout the world. The current context has put a major strain on people as it has drastically altered our daily lives and caused many societal challenges. We are experiencing much change and multiple losses. In addition to increased unemployment and financial difficulties, COVID-19 has required exceptional sanitary measures such as social distancing, confinement and quarantine, adding a painful sense of isolation to individuals and families in mourning (1). Simultaneously, this context has had a serious impact on couples, many countries reporting a significant increase in separations and divorces due to spending more time together confined and separating as a result of the exacerbation of pre-existing contextual vulnerabilities that were previously milder or latent (2), adding further grief to already distressing circumstances. Isolation and lack of connection are at the center of these life-changing events. They likely make the grieving and separation processes more complicated and difficult for people who are left alone, without the usual opportunities for interpersonal and social support.

Interpersonal loss, by death or separation, is common, but counts among the most stressful and painful life events possible (3). Both involve the loss of a meaningful relationship and may have significant health consequences, such as enhancing mortality risk and fostering mental or physical illnesses (4–6). Accumulating evidence indicates that interpersonal loss in divorce and breakups has numerous similarities with the grieving process after the death of a loved one. In both cases, symptoms of grief may occur, such as intrusive thoughts, ruminations, avoidance of situations or places reminiscent of the lost person, excessive idealization of the ended relationship, significant fatigue, some mental confusion coupled with the feeling of being lost, etc. (7–9).

Given the current circumstances that this could lead in the next few months to a potential explosion of cases of prolonged grief, it may prove relevant to provide easier access to preventive or even therapeutic psychological interventions for bereaved or separated individuals who are struggling with complicated grief symptoms and who feel the need or are seeking help to overcome their difficulties.

FILLING THE "TREATMENT GAP": HOW INTERNET-BASED INTERVENTIONS CAN HELP

The majority of bereaved people rely on family and friends for support (10, 11) and do not seek professional sources of help. Studies have shown that most individuals in need of mental health services will receive no treatment [also known as the "treatment gap," see (12)]. Indeed, professional sources are the least used, due to a reported lack of information (e.g., "I've never heard of them") and availability (e.g., "They're always too busy"). Moreover, professional help is also perceived as

OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *06 November 2020*
Accepted: *16 February 2021*
Published: *09 March 2021*

Citation:
Berthoud L, Efinger L, Kheyar M, Pomini V and Debrot A (2021) Hope May Come From Internet in Times of COVID-19: Building an Online Programme for Grief (LIVIA). Front. Psychiatry 12:626831. doi: 10.3389/fpsyt.2021.626831

highly unhelpful [46% of the respondents found psychiatrists unhelpful, 21% for psychologists; (13)] primarily because of a lack of sensitivity (e.g., "I was told to go sit in the sun and pat the dog"). This highlights the need to improve the dissemination of information and to increase the availability of skilled professionals. Indeed, despite the high probability of experiencing a significant loss in life and the important number of people affected by complicated grief, many professionals do not possess sufficient training and competences (14).

Internet-based interventions (IBIs) represent a promising avenue to address the treatment gap. They are immediately accessible and can reach a large number of individuals. They also diversify the ways to deliver evidence-based treatments (15, 16). IBIs have been shown to be as effective as face-to-face therapies when done with guidance (17). These IBIs generally offer regular but limited personalized support from therapists who guide the patients through the intervention, by email or telephone or video, and rely on psychoeducation and CBT techniques. Guided IBIs, i.e., interventions that offer personalized guidance, are generally more effective than unguided ones [for a systematic review, see (18)]. Nevertheless, guided IBIs require significant human resources, which limits the implementation of the intervention on a large scale.

Although IBIs have only recently started focusing on grief-related symptoms, they have shown promising and stable results, demonstrating their feasibility and efficacy. A recent systematic review and meta-analysis (19) identified 7 RCTs ($N = 1{,}257$) on guided IBIs, all based on CBT, out of over 4,100 studies. Results showed a promising overall effect on grief reduction with significant moderate effects sizes (Hedge's $g = 0.54$; 95% CI: 0.30–0.78), stable over time from post to 3-month follow-up assessment. To the best of our knowledge, two IBIs targeting grief-related symptoms have been tested to date in an unguided format. In the first study, Dominick et al. (20) proposed an unguided intervention based on psychoeducation. The main goal was to normalize the grief reaction. Their intervention showed positive and significant results, but of small magnitude. In the second study, van der Houwen et al. (21) assessed an unguided intervention, in which participants were asked to complete written disclosure tasks. This 7-week intervention showed positive results on emotional loneliness, rumination and positive mood, however not on grief and depressive symptoms. Both studies showed fewer positive results than those obtained with the guided IBIs.

While most of the interventions were developed for people who were bereaved or suffering from PTSD, one study extented this treatment to other types of loss. Indeed, Brodbeck et al. (22) have developed a 10-week guided IBI, named LIVIA, to treat grief-related symptoms for people who lost their partner either by death or by separation/divorce. This program is based on CBT procedures and emphasizes both loss-focused interventions (e.g., exposure, cognitive reframing of the loss, etc.) and restoration-oriented tasks (e.g., selfcare, social reengagement, etc.) in line with the Dual Process Model of coping with bereavement (23, 24). LIVIA is not only demonstrated to be feasible for both grieving and separated or divorced individuals, but is also efficacious (25).

THE LIVIA PROGRAMME

Few psychotherapists are trained in treating complicated grief (14). Given its prevalence, many people are in need of an intervention in their mother tongue. In 2018, French-speakers represented 5% of the world's population, i.e., 300 million people (26). Nevertheless, no empirically-assessed IBI for grief exists in French. Therefore, we translated the LIVIA programme from German into French. This led to the creation of LIVIA-FR (27), which was evaluated in an unguided format because of limited human resources, in order to test its feasibility in French culture and language. Results from a recent pilot study (28) details that out of 138 interested individuals, 39 participants began the study and 22 were selected for the analyses, 17 having dropped out or not completed a single session. The results showed significant reduction in grief symptoms and a tendency to decrease avoidance strategies. However, smaller effect sizes and higher drop-out rates than the original programme prompted us to develop an upgraded version of the programme, based on the LIVIA-FR participants' feedback and on the literature.

The new version of the programme, named LIVIA 2.0, is currently in development. Like its predecessors, it will consist of 10 sessions to be completed over 3 months. In order to improve the effectiveness of and adherence to the programme, which consists of promoting the autonomy of the participants completing it and reducing the risk of avoidance and drop-out due to feelings of failure, LIVIA 2.0 will include the following changes. First, guidance on demand will be implemented as it is a cost-effective alternative to guidance and will help better meet the participants' needs and expectations with the challenge of making the programme as effective as possible while optimizing the use of human resources (29). No research has been conducted to test the efficacy of a guidance on demand design in participants with complicated grief symptoms. Second, participants will experience greater freedom of navigation so as to choose the order in which they wish to complete the programme according to their needs and abilities. Participants will also receive a personalised recommendation based on the assessment of their priorities at the start of the programme. Third, programme interactivity will be enhanced by displaying a more user-friendly layout, as well as audio files, video files and exercises. This will replace the original textual and academic presentation. Fourth, automated emails will be included in the programme as they are beneficial to adherence and outcomes in IBIs (30). Fifth, the structure of the programme will no longer be linear but modular, addressing cognitions, emotions and behaviours. Sixth, a module addressing autobiographical memory and identity will be added (31) which are central processes that are affected by complicated grief (32, 33). Finally, self-assessment and promotion of the participants' resources will be carried out, using the AERES tool (34).

In the coming years, we have planned to compare the efficacy of LIVIA-FR and LIVIA 2.0. This study is supported by the Swiss National Science Foundation. It is hypothesised that LIVIA

2.0 will require less guidance than LIVIA-FR and be at least as efficient. A more refined exploration will be done on the short-term efficacy of each module by monitoring the participants' state throughout the programme. We also hope that this study will show that the envisaged improvements will be effective and will improve not only access but also, and above all, adherence to the programme.

CONCLUSION

Although grief is a natural response to loss, our social context plays a vital role in how we experience these events. Given the circumstances, there is clearly an urgency to offer support to people mourning. IBIs such as LIVIA are promising to meet needs that were already present but are not satisfied or exacerbated by the current sanitary crisis. With such uncertainty and insecurity because of COVID-19, having the support of a programme like LIVIA 2.0 can be "the lifebelt" that can help navigate these turbulent times. Indeed, the current pandemic context has made the grieving process harder. Isolation, social distancing and confinement all have significant effects as we feel as they rob us of relationships crucial to our well-being. The lack of relationships may lead to difficulties in coping with the fear of the unknown in an ambiguous crisis situation as COVID-19. Faced with loneliness, nothing can replace true human contact, but internet-based interventions may serve as an intermediary to build new relationships that may help to overcome mourning. Nevertheless, progress must be made not only in technology but also in the design of programmes to better target needs and offer relevant help to the greatest number. Traditional psychoeducational programmes are perhaps still too standardised and uniform today to respond to the variety of suffering and research has the potential to help guide technology in the right direction. And hopefully, we will be better equipped to support ourselves in times of loss as a result of this pandemic.

AUTHOR CONTRIBUTIONS

LB and AD conceived the work. LB, AD, and LE made the literature search. LB drafted the paper. MK, LE, and VP revised the work. All authors provided approval of the version to be submitted.

FUNDING

This study was supported by the SNSF Grant 100014_182840/1 (AD).

REFERENCES

1. Yahya AS, Khawaja S. Bereavement and grief during the COVID-19 pandemic. *Primary Care Companion CNS Disord*. (2020) 22:20com02661. doi: 10.4088/PCC.20com02661
2. Pietromonaco PR, Overall NC. Applying relationship science to evaluate how the COVID-19 pandemic may impact couples' relationships. *Am Psychol*. (2020). doi: 10.1037/amp0000714
3. Hobson CJ, Kamen J, Szostek J, Nethercut CM, Tiedmann JW, Wojnarowicz S. Stressful life events: a revision and update of the social readjustment rating scale. *Int J Stress Manag*. (1998) 5:1–23. doi: 10.1023/A:1022978019315
4. Bennett KM, Soulsby LK. Wellbeing in bereavement and widowhood. *Illn Crisis Loss*. (2012) 20:321–37. doi: 10.2190/IL.20.4.b
5. Sbarra DA, Hasselmo K, Bourassa KJ. Divorce and health: beyond individual differences. *Curr Dir Psychol Sci*. (2015) 24:109–13. doi: 10.1177/0963721414559125
6. Stroebe M, Schut H, Stroebe W. Health outcomes of bereavement. *Lancet*. (2007) 370:1960–73. doi: 10.1016/S0140-6736(07)61816-9
7. Clulow CF. Divorce as bereavement: similarities and differences. *Fam Concil Courts Rev*. (1990) 28:19–22. doi: 10.1111/j.174-1617.1990.tb01225.x
8. Davis D, Shaver PR, Vernon ML. Physical, emotional, and behavioral reactions to breaking up: the roles of gender, age, emotional involvement, and attachment style. *Soc Pers Soc Psychol*. (2003) 9:871–84. doi: 10.1177/0146167203029007006
9. Field T. Romantic breakups, heartbreak and bereavement. *Psychology*. (2011) 2:382–7. doi: 10.4236/psych.2011.24060
10. Aoun SM, Breen LJ, Howting DA, Rumbold B, McNamara B, Hegney D. Who needs bereavement support? A population based survey of bereavement risk and support need. *PLoS ONE*. (2015) 10:e0121101. doi: 10.1371/journal.pone.0121101
11. Logan EL, Thornton JA, Breen LJ. What determines supportive behaviors following bereavement? A systematic review and call to action. *Death Studies*. (2017) 42:104–14. doi: 10.1080/07481187.2017.1329760
12. Alonso J, Liu Z, Evans-Lacko S, Sadikova E, Sampson N, Chatterji S, et al. Treatment gap for anxiety disorders is global: results of the world mental health survey in 21 countries. *Depress Anxiety*. (2018) 35:195–208. doi: 10.1002/da.22711
13. Aoun SM, Breen LJ, White I, Rumbold B, Kellehear A. What sources of bereavement support are perceived helpful by bereaved people and why? Empirical evidence for the compassionate communities approach. *Palliative Med*. (2018) 32:1378–88. doi: 10.1177/0269216318774995
14. Ober AM, Granello DH, Wheaton JE. Grief counseling: an investigation of counselors' training, experience, and competencies. *J Couns Dev*. (2012) 90:150–9. doi: 10.1111/j.1556-6676.2012.00020.x
15. Andersson G. Internet interventions: past, present and future. *Int Intervent*. (2018) 12:181-8. doi: 10.1016/j.invent.2018.03.008
16. Kazdin AE. Addressing the treatment gap: a key challenge for extending evidence-based psychosocial interventions. *Behav Res Ther*. (2017) 88:7–18. doi: 10.1016/j.brat.2016.06.004
17. Andersson G, Titov N, Dear BF, Rozental A, Carlbring P. Internet-delivered psychological treatments: From innovation to implementation. *World Psychiatry*. (2019) 18:20–8. doi: 10.1002/wps.20610
18. Baumeister H, Reichler L, Munzinger M, Lin J. The impact of guidance on Internet-based mental health interventions: a systematic review. *Int Interv*. (2014) 1:205–15. doi: 10.1016/j.invent.2014.08.003
19. Wagner B, Rosenberg N, Hofmann L, Maass U. Web-based bereavement care: a systematic review and meta-analysis. *Front Psychiatry*. (2020) 11:525. doi: 10.3389/fpsyt.2020.00525
20. Dominick SA, Irvine AB, Beauchamp N, Seeley JR, Nolen-Hoeksema S, Doka KJ, et al. An internet tool to normalize grief. *OMEGA (Westport)*. (2010) 60:71–87. doi: 10.2190/OM.60.1.d
21. van der Houwen K, Schut H, van den Bout J, Stroebe M, Stroebe W. The efficacy of a brief internet-based self-help intervention for the bereaved. *Behav Res Ther*. (2010) 48:359–67. doi: 10.1016/j.brat.2009.12.009
22. Brodbeck J, Berger T, Znoj HJ. An internet-based self-help intervention for older adults after marital bereavement, separation or divorce: study protocol for a randomized controlled trial. *Trials*. (2017) 18:21. doi: 10.1186/s13063-016-1759-5
23. Stroebe M, Schut H. The dual process model of coping with bereavement: rationale and description. *Death Studies*. (1999) 23:197–224. doi: 10.1080/074811899201046

24. Stroebe M, Schut H. The dual process model of coping with bereavement: a decade on. *OMEGA J Death Dying*. (2010) 61:273–89. doi: 10.2190/OM.61.4.b
25. Brodbeck J, Berger T, Biesold N, Rockstroh F, Znoj HJ. Evaluation of a guided internet-based self-help intervention for older adults after spousal bereavement or separation/divorce: a randomised controlled trial. *J Aff Disord*. (2019) 252:440–9. doi: 10.1016/j.jad.2019.04.008
26. Beck B, Marcoux R, Richard L, Wolff A. *Estimation des populations francophones dans le monde en 2018 [Estimates of Francophone populations in the world in 2018]*. Sources et démarches méthodologiques, Québec, Observatoire démographique et statistique de l'espace francophone, Université Laval, Note de recherche de l'ODSEF (2018).
27. Debrot A. *LIVIA-FR: An Online Unguided Self-Help Intervention for People Struggling With Interpersonal Loss*. Grant proposal, Switzerland (2017).
28. Efinger L, Debrot A, Pomini V. *Implémentation et évaluation de LIVIA: Une intervention par internet pour des personnes francophones peinant à surmonter la perte de leur partenaire [Implementation and evaluation of LIVIA: An internet-based intervention for French-speaking people struggling to cope with the loss of their partner]* (submitted).
29. Berger T, Caspar F, Richardson R, Kneubühler B, Sutter D, Andersson G. Internet-based treatment for social phobia: a randomized controlled trial comparing unguided with two types of guided self-help. *Behav Res Ther*. (2011) 49:158–69. doi: 10.1016/j.brat.2010.12.007
30. Titov N, Dear BF, Johnston L, Lorian C, Zou J, Wootton B, et al. Improving adherence and clinical outcomes in self-guided internet treatment for anxiety and depression: randomised controlled trial. *PLoS ONE*. (2013) 8:e62873. doi: 10.1371/journal.pone.0062873
31. Kheyar M. *Intervention psychologique centrée sur la mémoire autobiographique pour les personnes éprouvant des difficultés à surmonter la perte d'un être cher [Psychological intervention focused on the autobiographical memory for people who have difficulty in overcoming the loss of a loved one]*. Unpublished thesis project, Lausanne: University of Lausanne (2020).
32. Boelen PA, Huntjens RJC, van Deursen DS, van den Hout MA. Autobiographical memory specificity and symptoms of complicated grief, depression and posttraumatic stress disorder following loss. *J Behav Ther Exp Psychiatry*. (2010) 41:331–7. doi: 10.1016/j.jbtep.2010.03.003
33. Robinaugh DJ, McNally RJ. Remembering the past and envisioning the future in bereaved adults with and without complicated grief. *Clin Psychol Sci*. (2013) 1:290–300. doi: 10.1177/2167702613476027
34. Bellier-Teichmann T, Golay P, Pomini V. Which are your resources and how do they contribute to your recovery? A new strengths assessment within a clinical population. *Eur Revue Appl Psychol*. (2018) 68:215–26. doi: 10.1016/j.erap.2018.10.004

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

PERSPECTIVE
published: 22 March 2021
doi: 10.3389/fpsyt.2021.624428

Death and Mourning Process in Frontline Health Care Professionals and Their Families During COVID-19

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The COVID-19 epidemic has mushroomed globally, disrupting the existence of millions. Under this current pandemic situation, the frontline health care professionals are looped in the clutch of the virus and are relatively more exposed to the patients infected with the disease. In this precarious situation, the frontline health care professionals have contributed their best to provide utmost care to the patients infected with the ailment. The direct involvement of these professionals, however, has taken a toll on their physical health as well as on their mental well-being. Several studies conducted recently have reported that frontline health care workers engaged in direct diagnosis, treatment, and care of patients with COVID-19 are associated with a higher risk of symptoms of depression, post-traumatic stress disorder and other mental health issues. Lack of personal protection equipment, unreasonable amounts of work, improper medicines, fear of contracting the disease, and lack of skilled training have interposed the frontline health care workers with unimaginable stress. Due to the widespread outbreak, the death count of the frontline health care professionals has also surged. However, studies exploring the physical and mental welfare of the frontline health care professionals and their families are very few and far behind. To address this aperture, the present paper attempts to highlight the psychological and physical impact of the COVID-19 pandemic on the frontline health care professions and to understand the impact of the death of these frontline health care professionals on the psychological well-being, mourning process, and complicated grief among the family members of healthcare professionals. The paper also presents some recommendations for providing psychological support to healthcare professionals and their bereaved families.

Keywords: COVID - 19, death, mourning, frontline health care professionals, grief, psychosocial support

OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *31 October 2020*
Accepted: *22 February 2021*
Published: *22 March 2021*

Citation:
Das S, Singh T, Varma R and Arya YK (2021) Death and Mourning Process in Frontline Health Care Professionals and Their Families During COVID-19. Front. Psychiatry 12:624428. doi: 10.3389/fpsyt.2021.624428

INTRODUCTION

Due to its unprecedented and unforeseeable nature, the COVID-19 virus epidemic has plunged the entire world into an indefinite zone. During this time of predicament, immense pressure has been donned upon the frontline health care professionals (1) who provide necessary services to the populations. They include doctors, nurses, midwives, and pharmacists (2) working in the health sector. Shanafelt et al. (3) have noted that the exponential rise of COVID-19 and the severity of symptoms have taxed the boundary of health industry.

They further outlined eight major sources of anxiety during this pandemic on frontline health care professionals. These are (1) difficulty getting the appropriate amount of personal protective equipment, (2) exposed to vulnerable places and fear of contracting the virus, (3) less access to proper testing for COVID-19 and fear of spreading disease to co-workers and family, (4) uncertainty of who will take care of the family if they contract the virus (5) giving time to their wards and spouses amidst lockdown of work and schools, (6) availability of essential commodities for (e.g., food, water, lodging, logistics), (7) being able to be efficient and provide health care if positioned in a new place and (4) lack of updated information.

During the unprecedented times, health care professionals and non-health care professionals have lost their lives in an unexpected manner. World Health Organization (WHO) have reported that ∼14% of the frontline health care professionals have been infected with COVID-19 and that in the case of countries falling in low- and middle-income strata, this can be as high as 35%. Furthermore, along with the increase of physical hazards due to the virus, the pandemic has also put a bizarre burden of psychological health issues on health care professionals which include, but are not limited to, somatization, obsession, compulsion, anxiety, phobic anxiety, and psychoticism (5). These physical and psychological sufferings among health care professionals have led to the development of constant fear of contracting the disease and taking it back to the family. This becomes more prominent as the COVID-19 pandemic has upraised a novel problem with regards to the clinical methods of conducting cardiopulmonary resuscitation (CPR) with utmost clinical protection (6) and thus health care professionals deployed in emergency care units are more prone to be infected with this disease.

The present paper aims to highlight the psychological and physical impact of the COVID-19 pandemic on the health care professionals and to understand the impact of the death of these frontline health care professionals on the psychological well-being, mourning process, and complicated grief among their family members. The paper also provides some recommendations for providing psychological support to healthcare professionals and their bereaved families.

IMPACT ON PHYSICAL AND MENTAL HEALTH

Jahrami et al. (7) have testified that 3/4th of healthcare workers in COVID-19 care centers have reported disturbances in sleep cycle due to the constant work stress, dealing with death and dying of patients and co-workers, chaotic work schedule and work cycle. Recent studies have established that due to the close contact with patients diagnosed with COVID-19, the frontline health care professionals have developed physical symptoms like fever, headache, cough, hemoptysis, and diarrhea (8, 9). In other studies, skin disease, tightness of skin, nasal bridge, and dryness have been observed in the health care workers who claimed to have worn PPE kits, surgical gloves, and face shields for a long number of hours (9–11). Xiang et al. (12) also reported that frontline health care professionals, especially who are deployed in hospitals as a caregiver of the infected patients, have more plausible chances of contracting the disease.

Earlier studies in epidemic contexts have reported that among the health workers in high-risk clinical settings such as SARS units in Beijing hospital, those with a family history of same illness had more bouts of traumatic flashbacks and more post-traumatic stress symptoms than those without family history. Healthcare professionals working with COVID-19 patients have been shown to display mental health issues such as depression, anxiety, insomnia, and distress (9). Cabarkapa et al. (13) conducted a systemic review of available literature and concluded that frontline nurses frequently report somatization, sleep disorders and insomnia. In addition, they also reported that female nurses who are in close contact with COVID-19 patients have higher mental health issues. Similarly, Kang et al. (14) have reported that about 34.4% of healthcare staff show mild mental health issues and 6.2% have shown severe mental health issues. Studies have also reported burnout and high levels of fear among the healthcare staff (15).

IMPACT OF DEATH OF FRONTLINE HEALTH CARE PROFESSIONALS ON THEIR FAMILY

Due to the unprecedented nature of the pandemic, most countries could not restrict the surge of cases, thus leading to a massive outbreak. At the onset, the workers were devoid of proper training to deal with the unaddressed situation, with a lack of adequate equipment and drugs. Yoshida et al. (16) reported that the spout of confirmed cases and delay in implementing lockdown overtaxed the medical staff with inadequate supplies. Healthcare workers' jobs in such a situation were in the context of high personal risk of becoming infected and their motivation to provide professional services were largely altruistic (17, 18). A large number of health care workers were infected with COVID-19 and a significant proportion among them lost their lives in almost all parts of the world. In September 2020, the Pan American Regional Office of the World Health Organization in Washington reported the death of 2500 health care staff due to COVID-19 (19). The COVID-19 infections and resultant death of health care staff is a major source of grief and other psychological problems for their families and colleagues as well as for local and national healthcare infrastructure (4). In one of the current studies, deaths of frontline health care workers due to COVID-19 has been shown to result in prolonged grief disorder, post-traumatic stress, and other poor bereavement outcomes among their relatives (20).

Holmes and Rahe (21) stated that the deaths of dear ones lead to physical and mental issues due to the loss incurred. Malkinson (22) reported in one of his studies that the coping mechanism of the members of the family depends on a numerous factors which include coping strategy, affiliation with the departed, and the reason for the death caused. Although in most cases the family copes with the bereavement without any grief counseling sessions, Prigerson et al. (23) testified that around 10% of the

bereaved persons are vulnerable to complicated grief after the death of family members and 30% fall in the moderate mental health risks. Additionally, Aoun et al. (24) mentioned that the causal factors that delay the coping consequences may include medical records due to psychiatric issues, lack of environmental upkeep, or a precipitous death (25–27).

Dorothy et al. (28) conducted interviews with trauma survivors over the years and suggested that compared to the grief experienced due to interrupted loss, the multiple losses have a greater impact on the bereaved individuals. They reported that grief experienced by the victim's family is generally complex and lasts longer than expected.

In a pandemic situation, balancing work and life is a very exhausting and stressful task for the frontline health care workers. Therefore, it is very difficult for the spouses of the healthcare professionals to deal with the situation as they are in the constant fear of contracting disease. In the world where social media has taken over everything, and every trivial detail is broadcast on the electronic media, family members are living a life in the constant fear of losing their loved ones and preparing themselves for the irreplaceable losses. To add to their sufferings are their inability to attend burials, cremation, or bid final goodbye to their dear ones due to the contagious nature of the virus (29, 30).

RECOMMENDATIONS FOR HELPING THE MOURNING PROCESS IN HEALTHCARE WORKERS' FAMILIES

The very first thing about which we can talk in the mourning process is the trauma without bereavement. In this process a traumatic event experienced by the person escalates traumatic symptoms which leads to the diagnosis of acute stress disorder or post-traumatic disorder, which are mostly determined by the time frame of the onset of the disorder. Symptoms related to anxiety and depression may also lead to a concomitant diagnosis. The second thing in the mourning process is the bereavement without trauma. Here the person experience traumatic events without the symptoms as they witness the demise of their beloved ones. If there are convolutions after the demise, one of the complex mourning categories would relate to this complication. The third thing is traumatic bereavement that includes few major things which are escalating traumatic symptoms. These are person's own experience of death (often occurring with an altercated relationship with the dead or an unstable attachment) or there is something related to death itself (often brutal deaths) or when the person encounters a death. Parkes (31–33) has explained the mourning process in terms of several phases. In the phase I person feels the numbness that happens nearly from the time of the demise. The numbness helps survivors to forget the loss at least for a short period of time. After that the person enters phase II, defined as period of yearning, in which the person yearns to get back the lost one and does not accept the irreversible loss. Anger acts as the most important part of this phase. In phase III, the period of anguish and chaos, at this point of moment, it is very difficult for the bereaved person to adjust to the environment. In the end, the bereaved person is able to enter phase IV, the period of reconstructed behavior, and begin to stabilize in their life. Bowlby (34), whose interest and work area coincide with those of Parkes, supported the notion of phases and put forward that the bereaved must undergo a similar sequence of phases before mourning is ultimately resolved. Sander (35, 36) also used the notion of phases in her study and reported five of them: (1) shock, (2) awareness of loss, (3) conservation withdrawal, (4) healing and (5) renewal.

The grief and morning processes are humans' natural responses to the deaths of their loved ones (37). Various cultural rituals such as traditional funeral and burial are meant to facilitate this mourning process among the deceased's family members. Death ceremonies play an important role in mourning, bringing together those who recall the dead person to honor their life, and providing an empathetic network for the bereaved family (29, 38). However, during the current COVID-19 pandemic the family members of the deceased healthcare workers were not able to attend and properly perform the funerals and burial of their departing family members. The pandemic interrupted the mourning activity by affecting families' ability to hold funerals and other ceremonies. Also, the much-needed social support is also not available to these members due to the practice of social distancing during COVID-19 pandemic. Thus, the improper grief responses and incomplete mourning process have put these families at the risk of mental health issues, prolonged grief and mourning process, as well as reduced quality of life (39).

RECOMMENDATION TO HELP BEREAVED FAMILIES OF HEALTHCARE PROFESSIONALS

Under the current pandemic situation, due to social distancing norms and several restrictions, families and relatives of the deceased individuals are unable to come together to share their grief, care, and love with each other. This may lead the families of deceased health care providers to develop unresolved prolonged grief and complicated psychological reactions. Under such a situation a comprehensive support mechanism to provide support and counseling to the bereaved families is the need of the hour. Some of the strategies that could be adopted to help these bereaved families are recommended here.

Wallace et al. (29) have stated the major cause for not dealing with the complicated grief experienced is due to the fact that the family members are least prepared for the death of their loved ones. In such a situation, support groups and counseling sessions should be provided to the bereaved families along with the 'clapping campaigns" to reduce stress and overwhelming condition of the family members including spouses and children. Also, regarding the health care professionals, Government and non-government organizations must take responsibility to assure that healthcare staff and their families are prepared for the emotional outcomes of their work and that resources, training, and supervision are in place to safeguard health care providers' health (40). Frontline staff should be seriously monitored by the organizers, must experience effective team cohesion, and must be involved in the execution of the strategies to keep up the everyday

tasks of the team, combined with unconventional debriefing and support from fellow workers. It must also be ensured that the necessary social and mental support are available to these individuals to help them better understand and accept the reality, deal with the resultant stress, re-organize their lives, and reduce their sufferings to compensate the natural mourning process (41). As Brooks et al. (42) suggest, ample amount of training, protection, and assistance could help to keep health care workers away from mental illness.

On the basis of their experiences of supporting 246 families of COVID-19 victims, Borghi et al. (43) have suggested some strategies that were successfully used by family members to deal with the extraordinary mourning process caused by COVID-19. These include organizing alternative good-bye rituals, readdressing their hope and faith, supporting others, and conveying the bad news to others.

The use of advanced information and communication technology such as smartphones, tablets and internet could also be promoted (a) to maintain virtual connections among family members and relatives, (b) to broadcast the traditional rituals and funerals to those members of the family who are not able to attend due to restrictions, and (c) to organize post funeral activities (i.e., commemoration), care and sharing among members of family as well as those in the immediate support system.

CONCLUSION

COVID-19 has left the frontline health care professionals with health uncertainty. The virus has donned upon the frontline health care professionals to a larger extent leaving a deeper impact on their physical and psychological well-being. Forefront medical workers and researchers have played a foremost role in combating against the COVID-19 outbreak (44). The present paper has outlined the stressors which the frontline health care professionals have faced including fear of spreading disease to co-workers and members of the family, irregular sleep patterns, abrupt work cycles, and lack of adequate training skills in dealing with such a novel situation. Many recent studies have highlighted the psychological issues which has impacted the lives of the frontline health care professionals (i.e. depression, anxiety, insomnia (45), and post-traumatic stress symptoms) (46). There are rare evidences of studies that have explored the mourning processes or complicated grief faced by the families of these health care professionals who lost their life fighting the pandemic. The paper has also attempted to make some recommendations to provide psychological support to the bereaved family, to fight the mental health problems encountered after the loss of their loved ones.

LIMITATIONS AND FURTHER SUGGESTIONS

The present paper is an attempt to put forward the psychological problems being faced by frontline healthcare providers and their families amidst the COVID-19 pandemic. However, the present article has some limitations. The present paper lacks the empirical evidence, in the context of COVID-19 pandemic, to support the arguments made. This paper, therefore, calls for the planning and conduction of empirical investigations to understand the issues being faced by the family members of the deceased healthcare professional and to empirically test the effectiveness of the support strategies suggested in this paper. Studies are also needed to understand the changes that have been brought about by this pandemic into the grief and mourning process of the deceased family members and to find strategies to improve the existing support systems so as to address the changes brought about by the present as well as future pandemics.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

SD and TS conceptualized the manuscript theme. SD wrote the first draft. RV and YA reviewed and improvised the draft. SD and TS prepared the final manuscript draft for submission.

REFERENCES

1. Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. *Res. Social Admin Pharm*. (2021) 17:2032–5. doi: 10.1016/j.sapharm.2020.03.015
2. Frontline Health Workers Coalition. *Frontline Health Workers.* (2019). Retrieved from: https://www.frontlinehealthworkers.org/frontline-health-workers (accessed September 16, 2021).
3. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA*. (2020) 323:2133–4. doi: 10.1001/jama.2020.5893
4. Erdem H, Lucey DR. Healthcare worker infections and deaths due to COVID-19: A survey from 37 nations and a call for WHO to post national data on their website. *Int J Infect Dis.* (2021) 102:239–41. doi: 10.1016/j.ijid.2020.10.064
5. Jaiswal A, Singh T, Arya, YK. "Psychological Antibodies" to safeguard frontline healthcare warriors mental health against COVID-19 pandemic-related psychopathology. *Front Psychiatry*. (2020) 11:590160. doi: 10.3389/fpsyt.2020.590160
6. DeFilippis EM, Ranard LS, Berg DD. Cardiopulmonary resuscitation during the COVID-19 pandemic: a view from trainees on the front line. *Circulation.* (2020) 141:1833–5. doi: 10.1161/CIRCULATIONAHA.120.047260
7. Jahrami H, BaHammam AS, AlGahtani H, Ebrahim A, Faris M, AlEid K, et al. The examination of sleep quality for frontline healthcare workers during the outbreak of COVID-19. *Sleep Breath.* (2020) 1–9. doi: 10.1007/s11325-020-02135-9
8. Ran L, Chen X, Wang Y, Wu W, Zhang L, Tan X. Risk factors of healthcare workers with coronavirus disease 2019: a retrospective cohort study in a designated hospital of Wuhan in China. *Clin Infect Dis.* (2020) 71:2218–21. doi: 10.1093/cid/ciaa287

9. Shaukat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: a scoping review. *Int J Emerg Med.* (2020) 13:40. doi: 10.1186/s12245-020-00299-5
10. Agarwal A, Agarwal S, Motiani P. Difficulties encountered while using PPE kits and how to overcome them: an indian perspective. *Cureus.* (2020) 12:e11652. doi: 10.7759/cureus.11652
11. Krajewski, KT, Dever, DE, Johnson, CC, Rawcliffe, AJ, Ahamed, NU, Flanagan, SD, et al. (2020). Load carriage magnitude and locomotion strategy alter knee total joint moment during bipedal ambulatory tasks in recruit-aged women. *J. Biomech.* 105:109772. doi: 10.1016/j.jbiomech.2020.109772
12. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry.* (2020) 7:228–9. doi: 10.1016/S2215-0366(20)30046-8
13. Cabarkapa S, Nadjidai SE, Murgier J, Ng CH. The psychological impact of COVID-19 and other viral epidemics on frontline healthcare workers and ways to address it: a rapid systematic review. *Brain Behav Immunity Health.* (2020) 8:100144. doi: 10.1016/j.bbih.2020.100144
14. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. *Brain Behav Immun.* (2020) 87:11–7. doi: 10.1016/j.bbi.2020.03.028
15. Hu D, Kong Y, Li W, Han Q, Zhang X, Zhu LX, et al. Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: a large-scale cross-sectional study. *EClinicalMedicine.* (2020) 24:100424. doi: 10.1016/j.eclinm.2020.100424
16. Yoshida I, Tanimoto T, Schiever N, Patelli F, and Kami M. Characteristics of doctors' fatality due to COVID-19 in Western Europe and Asia-Pacific countries. *QJM.* (2020) 113:713–4. doi: 10.1093/qjmed/hcaa159
17. Haigh CA. Reconstructing nursing altruism using a biological evolutionary framework. *J Adv Nurs.* (2010) 66:1401–8. doi: 10.1111/j.1365-2648.2010.05274.x
18. Shaw KA, Chilcott A, Hansen E, Winzenberg T. The GP's response to pandemic influenza: a qualitative study. *Family Pract.* (2006) 23:267–72. doi: 10.1093/fampra/cml014
19. PanAmerican Health Organization (PAHO)/World Health Organization (WHO). *COVID-19 has Infected Some 570.000 Health Workers and Killed 2,500 in the Americas.* (2020). Available from: https://www.paho.org/en/news/2-9-2020-covid-19-has-infected-some-570000-health-workers-and-killed-2500-americas-paho (accessed September 27, 2020).
20. Selman LE, Chao D, Sowden R, Marshall S, Chamberlain C, Koffman J. Bereavement support on the frontline of COVID-19: recommendations for hospital clinicians. *J Pain Sympt Manage.* (2020) 60:e81–6. doi: 10.1016/j.jpainsymman.2020.04.024
21. Holmes TH, Rahe RH. The social readjustment rating scale. *J Psychosom Res.* (1967) 11:213–8. doi: 10.1016/0022-3999(67)90010-4
22. Malkinson R. *Cognitive Grief Therapy: Constructing a Rational Meaning to Life Following Loss.* New York, NY: Norton (2007).
23. Prigerson HG, Horowitz MJ, Jacobs SC, Parkes CM, Aslan M, Goodkin K, et al. Prolonged grief disorder: psychometric validation of criteria proposed for DSM-V and ICD-11. *PLoS Med.* (2009) 6:e1000121. doi: 10.1371/journal.pmed.1000121
24. Aoun SM, Breen LJ, Howting DA, Rumbold B, McNamara B, Hegney D. Who needs bereavement support? A population based survey of bereavement risk and support need. *PLoS ONE.* (2015) 10:e0121101. doi: 10.1371/journal.pone.0121101
25. Lobb EA, Kristjanson LJ, Aoun SM, Monterosso L, Halkett GK, Davies A. Predictors of complicated grief: a systematic review of empirical studies. *Death Stud.* (2010) 34:673–98. doi: 10.1080/07481187.2010.496686
26. Lundorff M, Holmgren H, Zachariae R, Farver-Vestergaard I, O'Connor M. Prevalence of prolonged grief disorder in adult bereavement: a systematic review and meta-analysis. *J Affect Disord.* (2017) 212:138–49. doi: 10.1016/j.jad.2017.01.030
27. Wright AA, Keating NL, Balboni TA, Matulonis UA, Block SD, Prigerson HG. Place of death: correlations with quality of life of patients with cancer and predictors of bereaved caregivers' mental health. *J Clin Oncol.* (2010) 28:4457–64. doi: 10.1200/JCO.2009.26.3863
28. Mercer DL, Evans JM. The impact of multiple losses on the grieving process: an exploratory study. *J Loss Trauma.* (2006) 3:219–27. doi: 10.1080/15325020500494178
29. Wallace CL, Wladkowski SP, Gibson A, White P. Grief During the COVID-19 pandemic: considerations for palliative care providers. *J Pain Sympt Manag.* (2020) 60:e70–6. doi: 10.1016/j.jpainsymman.2020.04.012
30. Saraff S, Singh T, Biswal, R. Coronavirus disease 2019: exploring media portrayals of public sentiment on funerals using linguistic dimensions. *Front Psychol.* (2021) 12:626638. doi: 10.3389/fpsyg.2021.626638
31. Parkes CM. *Bereavement: Studies of Grief in Adult Life.* New York, NY: International Universities Press (1972).
32. Parkes CM. A historical overview of the scientific study of bereavement. In: Stroebe MS, Hansson RO, Stroebe W, Schut H, editors. *Handbook of Bereavement Research: Consequences, Coping, and Care.* American Psychological Association (2001). p. 25–45. doi: 10.1037/10436-001
33. Parkes MJ. Breath?holding and its breakpoint. *Exp Physiol.* (2006) 91:1–15. doi: 10.1113/expphysiol.2005.031625
34. Bowlby J. *Attachment and Loss: Vol. 3. Loss, Sadness, and Depression.* New York, NY: Basic Books (1980).
35. Sanders CM. *Wiley Series on Personality Processes. Grief: The Mourning After: Dealing With Adult Bereavement.* John Wiley & Sons (1989).
36. Sanders CM. Grief: the mourning after. Dealing with adult bereavement, 2nd edition. *J Psychiatr Mental Health Nurs.* (1999) 6:406–7. doi: 10.1046/j.1365-2850.1999.00227-5.x
37. Nakajima S. Complicated grief: recent developments in diagnostic criteria and treatment. *Philos Trans R Soc Lond B Biol Sci.* (2018) 373:20170273. doi: 10.1098/rstb.2017.0273
38. Leong IYO, Lee AOK, Ng TW, Lee LB, Koh NY, Yap E, et al. The challenge of providing holistic care in a viral epidemic: opportunities for palliative care. *Palliat Med.* (2004) 18:12–8. doi: 10.1191/0269216304pm859oa
39. Pan H. Deepening the understanding of complicated grief among Chinese older adults: a network approach. *Asian J Psychiatr.* (2020) 50:101966. doi: 10.1016/j.ajp.2020.101966
40. Williamson V, Murphy D, and Greenberg N. COVID-19 and experiences of moral injury in front-line key workers. *Occup Med.* (2020) 70:317–9. doi: 10.1093/occmed/kqaa052
41. Farahmandnia B, Hamdanieh L, Aghababaeian H. COVID-19 and unfinished mourning. *Prehospital Disast Med.* (2020) 35:464. doi: 10.1017/S1049023X20000631
42. Brooks SK, Rubin GJ, Greenberg N. Traumatic stress within disaster-exposed occupations: overview of the literature and suggestions for the management of traumatic stress in the workplace. *Br Med Bull.* (2019) 129:25–34. doi: 10.1093/bmb/ldy040
43. Borghi L, Menichetti J, Vegni E, The Early Bereavement Psychological Intervention Working Group. A phone-based early psychological intervention for supporting bereaved families in the time of COVID-19. *Front Public Health.* (2021) 9:625691. doi: 10.3389/fpubh.2021.625691
44. Jing H, Fangkun L, Ziwei T, Jindong C, Jingping Z, Xiaoping W, Renrong W. *Care for the Psychological Status of Frontline Medical Staff Fighting Against COVID-19.* (2020). Available online at: https://academic.oup.com/cid/advance-articlepdf/doi/10.1093/cid/ciaa385/33004970/ciaa385.pdf (accessed September 23).
45. Tian T, Meng F, Pan W, Zhang S, Cheung T, Ng CH, et al. (2020) Mental health burden of frontline health professionals treating imported patients with COVID-19 in China during the pandemic. *Psychol Med.* 1–2. doi: 10.1017/S0033291720002093
46. Blekas A, Voitsidis P, Athanasiadou M, Parlapani E, Chatzigeorgiou AF, Skoupra M, et al. COVID-19: PTSD symptoms in Greek health care professionals. *Psychol Trauma.* (2020) 12:812–9. doi: 10.1037/tra0000914

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Sociology

POLICY AND PRACTICE REVIEWS
published: 23 March 2021
doi: 10.3389/fsoc.2021.607645

Understanding Grief During the First-Wave of COVID-19 in the United Kingdom—A Hypothetical Approach to Challenges and Support

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Purpose: This article develops immediate understandings of loss and grief at both an individual and collective level following the first-wave of COVID-19 in the UK. This allows for insights into the likely challenges and support for loss and grief in facing unprecedented disruption and uncertainty. Ultimately, it explores avenues for the priorities to inform better bereavement support.

Methods: By examining trusted media data and carefully selected academic literature, we analyse both individual and societal responses to loss and grief in the novel context of the first-wave of COVID-19 in the UK. The discussion relocates the ideas of good and bad deaths in the context of increased social constrains and inequalities. Further, two pairs of contrasting hypotheses are proposed to examine how the UK's first-wave outbreak has shaped policy and practical structures and how these have further impacted experiences of loss and grief both at an individual and collective level.

Findings: The discussion captures a mixed picture of loss and grief in the UK, which highlights the importance of timely, holistic, and continuous support both in social policy and care provision. It is found that individuals and collectives express diverse needs in response to deaths and losses as a process of meaning-making. Further, the significance of socio-cultural environments also become evident. These findings highlight community support during the outbreak and further promote a grief literate culture as imperative to support individual and collective needs when confronted with loss and grief.

Conclusion: This article provides a timely and comprehensive account of possible challenges and support both for individual and collective experiences of loss and grief at a time of unprecedented social restrictions and mass deaths in the UK. These understandings provide a base from which we advocate the priorities for future research into the ongoing impacts of COVID-19 on grief and bereavement.

Keywords: COVID-19, grief, compassionate communities, bereavement support, death, the UK

OPEN ACCESS

Edited by:
Marie-José H. E. Gijsberts, Vrije University Brussel, Belgium

Reviewed by:
Harish Naraindas, Jawaharlal Nehru University, India
Erik Olsman, Protestant Theological University, Netherlands

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Specialty section:
This article was submitted to Medical Sociology, a section of the journal Frontiers in Sociology

Received: *17 September 2020*
Accepted: *04 March 2021*
Published: *23 March 2021*

Citation:
Fang C and Comery A (2021) Understanding Grief During the First-Wave of COVID-19 in the United Kingdom—A Hypothetical Approach to Challenges and Support. Front. Sociol. 6:607645. doi: 10.3389/fsoc.2021.607645

INTRODUCTION

COVID-19 has claimed over 40,000 lives in the first wave outbreak (approximately between March to June, 2020) in the United Kingdom (Office for National Statistics, 2020a). First reported in Wuhan, China in December 2019, this highly infectious new coronavirus was first confirmed in the UK in late January 2020. It soon spread across the country resulting in a sharp increase in the number of hospitalizations and deaths. This has led to an extended national lockdown, causing significant economic disruption, and social restrictions. Meanwhile, the vast number of deaths during this period have also caused tremendous disruption and distress, widely affecting the stability and consistency of individual lives, communities, and society as a whole.

Given the unprecedented challenges, uncertainties and isolation faced in the first wave COVID-19 outbreak, it is not unreasonable to speculate that death, dying and bereavement in the UK could be greatly impacted. As widely reported by media outlets, many patients in Britain and across the world have had to die alone without the company of their loved ones, at home, in hospitals, hospices, or other care facilities (e.g., Sky News, 2020a). Frustration and even desperation may be faced by the survivors who are unable to say goodbye to, care for, or pay their last respects to their loved one. Further, lockdown and social distancing rules may strongly restrict bereaved people's capacity to seek emotional closeness and social connectedness when facing the above experiences of loss and grieving. As such, the painful experiences of loss and powerlessness may trigger unbearable sorrow, regret, and even anger for bereaved people and could cause further difficulties in coping with loss in their ongoing lives (Holst-Warhaft, 2000; Valentine, 2009). Despite the extraordinary levels of social disconnection and constraints seen during the first wave, bereaved people may receive more support, both practical and emotional, from kin, friends, neighbors, and the wider society because of interpersonal bonds and social solidarity. These positive and supportive responses may be also seen at a more collective level through the heroisation of deaths and public mourning. As such, responses to losses and deaths in the context of COVID-19 in the UK are not only individual but also societal.

To begin to develop nuanced understandings of loss and grief during and post the initial outbreak, this article situates a reflexive discussion of experiences and responses to loss and grief in the context of COVID-19. The focus on the first wave is of particular importance as many unprecedented challenges were faced by people in the UK for the first time. Since this article is written throughout the first wave when primary data collection is difficult and secondary academic data is extremely limited, the authors draw upon media coverage from trusted sources to capture an immediate "real-world" picture of dying and grief experiences. By posing two sets of diametrically opposed hypotheses, this paper envisages the challenges and support of dealing with loss and at both an individual and societal level. In so doing, this article aims to critically review the provision of support for loss and grief during the first wave in the UK. Further, it identifies priorities for future research, practice, and policy-making to better support individual loss and mass death as the COVID-19 pandemic continues.

CONCEPTUALIZING GRIEF IN THE BRITISH CONTEXT

The loss of a loved one or a significant member of a collective can be highly distressing and disruptive, often requiring rigorous readjustments (Walter, 1999). Despite the prevalent impacts of loss, people's experiences of it can be extremely diverse and have been studied from a multitude of dimensions. Grief can be understood as complex experiences of "psychological, behavioral, social, and physical reactions following the death of a loved one" (Stroebe, 2018, p. 71). Bereavement is broadly defined in Western writings as "the objective state of having lost someone or something," which acknowledges the sociocultural impacts on bereaved people after losing a loved one in their everyday life (Walter, 1999, p. 4). Compared to notions of grief and bereavement, mourning is rather specific, highlighting rituals, and customs that are deeply rooted in socio-cultural expectations and prescriptions for responding to loss and disruption (Durkheim, 1912; van Gennep, 1960). To capture an immediate picture of experiences of loss during the first COVID-19 outbreak in the UK, we focus on the socio-emotional dynamics of *grief*, exploring how individuals, and wider society have mediated their emotional responses to loss through the available socio-cultural discourses.

Grief discourses in the UK have largely mirrored the prevalent medicalization in contemporary British society, which often emphasizes the clinic lore of pursuing "normal" grieving and "healthy" grief outcomes (Walter, 1999). This uptake in scientific and rationalist understandings of loss and grief has been furthered by the decline of religious influence and other traditional values in how we feel, understand, and interpret loss (Walter, 1996; Hockey, 2001). As such, individuals' grief in Britain has been constructed as a rationalized and regulated process where one can "complete" the experience and as such return to a "normal mental state" (Valentine, 2008). This process is often assisted by psychological coping frameworks and professional interventions such as therapy, counseling, and even medication (Walter, 2007). The medicalization is also evident in so-called "dying trajectories," which highlight the strong involvement and sometimes domination of medicine and professionalization in the dying process in western countries (Strauss, 1971). As such, the dying person and their loved ones may find little space left for them to reaffirm bonds and negotiate meaning for the painful aspects of dying. These highly medicalised and institutionalized experiences (e.g., dying alone in hospital) are also often associated with the construction of bad death, further imposing challenges for the survivors to make sense of loss and grieve in their ongoing lives (Lawton, 2000; Seale, 2004). Despite the prevalent influences of medicalization in British people's experiences of loss and grief, studies have also highlighted the significant roles of everyday interactions and support in helping bereaved people (Walter, 1996; Valentine, 2008; Neimeyer, 2011). Central to this everyday approach is to

understand how bereaved people negotiate with the available socio-cultural discourses to grieve and how everyday interactions can support this meaning-making process without necessarily relying on formalized interventions (Valentine, 2008).

Alongside medicalization, grief in the UK has also been highly individualized (Walter, 1999). Living in an increasingly diversified and individualized society where heterogenous values and norms are no longer predominant, bereaved people are more likely to confront their loss and grief by drawing upon norms from their associated sub-groups and based on their personal interests, religion, race, and so on (Giddens, 1991; Walter, 2007). Studies have found that bereaved people in British society may feel disorientated due to the lack of strong socio-cultural instructions for dealing with loss. Meanwhile, they may also actively adopt, revise, and incorporate varied resources from themselves and wider society to develop a more personalized approach to grieving, such as personally tailored rituals (Bradbury, 2001; Valentine, 2008). The individualization of grief has also paradoxically prompted the increased emphasis on social support for bereaved individuals, often through family, self-help groups, local communities, and the internet (Walter et al., 2017; Breen et al., 2020). As such, the British experience of individual grief increasingly intersects with community and social support which can provide an empathetic and compassionate approach, through which bereaved people's emotions can be understood and shared by others (Kellehear, 2005).

Shared experiences of loss and grief can also give rise to so-called collective grief, a phenomenon that can be seen when facing the death of a public figure or mass deaths in the UK as in many other countries. Often through publicly available mourning rituals or platforms, the British people have assembled to honor and remember the deceased at times when society experiences significant loss, such as the World Wars, terror attacks, and the death of Diana, Princess of Wales (Walter, 2020). These collective responses for expressing grief and pain have helped society as a whole restore stability and solidarity preventing major disruption to social orders (Davies, 1999). Meanwhile, these shared experiences also have particular meaning for British people in the highly individualized context. By symbolically interacting with others in society, collective grief can provide an emotionally mediated and socially constructed means for many British people to reaffirm their collective bonds with wider society (Alexander et al., 2004).

METHODS

By understanding grief as a socio-emotionally challenging experience facing both individuals and wider society, this article presents an immediate response that critically reviews reliable media data regarding the initial impacts of COVID-19 on loss and grief in the UK's first wave outbreak. As such, we aim to explore the experiences of death and grief during the first wave and how these experiences could be shaped by the challenges presented in light of the COVID-19 pandemic. We also analyse the diverse support for grief and grieving, capturing the duality of such experiences. The analysis is further reinforced by a hypothetical lens, actualised via the use of two pairs of diametrically opposed hypotheses, to envisage how existing academic understandings of bereavement can be situated within this novel context. The opposing nature of each pair of hypotheses situates this article to vividly capture the diverse and dynamic nature of responses to loss and grief at both an individual and societal level.

Given the immediate nature of this article, research on the impacts of the COVID-19 pandemic on loss and grief was extremely limited. As such, a rapid review of academic literature was conducted using the search parameters of peer reviewed articles between 1990 and May 2020 following the guidance of the WHO 2017 framework (Tricco et al., 2017). The search terms used were "grief," "bereavement," "mourning," "mass death," and "pandemic." The authors consulted the resulting articles to identify pre-existing theoretical and empirical understandings that are applicable to the experiences of loss and grief during this initial outbreak in the UK.

To further illustrate our findings, we draw upon reliable media reports to explore and further understand attitudes, responses, and practice in the context of the significant numbers of COVID-19 related deaths. In order to ensure the validity of the media data, we only draw upon data from three trusted sources, namely BBC, ITV, and Sky News in alignment with academic analysis of digital news (Kousha and Thelwall, 2017; Newman et al., 2020). All media data used were cross-checked by both authors to ensure that any claims made were not disputed by the publicly available government data. All data sourced from the media was collated daily during manual searches of the three selected trusted media sources throughout the first wave.

By employing a hypothetical approach to frame challenges and support experienced by bereaved individuals and wider society, we identify potential gaps in support for loss and grief during the first wave of COVID-19 in the British context. In so doing, we further conceptualize the priority issues for the ongoing policy agendas in relation to grief and bereavement support during and post the COVID-19 outbreak in the UK, advocating for future research to explore policy agendas that best address the current weaknesses in support.

GOOD AND BAD COVID-19 DEATHS

Exceptional to COVID-19 is the severity of virus transmission, and the unprecedented levels of social restrictions imposed during the outbreak could undermine people's autonomy and the support resources available to them in the face of death and dying. Restrictions of this nature have not been seen in other pandemics and mass death events in the UK. Furthermore, Covid-19 deaths are likely to violate predominant public and healthcare discourses about "good death," which favor a pain-free and smooth dying process emphasizing holistic well-being, family presence, autonomy, and dignity (Meier et al., 2017). Despite "bad death" prevailing in this pandemic, "good death" may be possible as an unforeseen consequence of the increase of home death due to restrictions placed on medical and care facilities. Good deaths have also been constructed in media and public discourses as heroic and thus good, as a collective means to justify losses and alleviate emotional costs during Covid-19.

Painful Death

Contracting COVID-19 may cause debilitating complications with symptoms including pneumonia, dyspnoea, acute cardiac injury, and other secondary infections (Huang et al., 2020). Many patients have reportedly experienced tremendous discomfort, including severe difficulties in breathing, having to rely on ventilators during their final moments (BBC News, 2020g). This suffering could be further exacerbated during the early stages of the first wave when medical resources were extremely limited. In early April 2020, the British Medical Association advised doctors to prioritize ventilators and other care resources to focus on those with the best chance of survival (ITV News, 2020a). As such, this approach could potentially leave older people and fragile patients with little room to seek relief, thus likely dying with extensive physical deterioration, discomfort, and distress. Pain of this nature could also be experienced by non COVID-19 cancer and terminal patients whose life-saving/sustaining care was delayed or canceled due to the disruptions caused by the outbreak (BBC News, 2020h).

Lonely Death

The painful nature of deaths during the first wave outbreak in the UK could be further escalated by forced separation from loved ones resulting from the strict prevention and control measures. As such, dying patients could face increased risk of suffering lonely death, an experience of not only dying physically alone but also in a marginalized status of being socially isolated and emotionally lonely (Turner and Caswell, 2020). When experiencing physical deterioration and having lost the capacity to care for themselves, dying patients could be forcedly barred from seeking and gaining support and care from their loved ones due to COVID-19 quarantine measures. Family support at the deathbed can often forge cherished moments that enable the dying person and their loved ones to gain comfort and to reaffirm their family bonds (Lawton, 2000). These experiences may allow for a meaningful passage to transform and heighten their bonds not only through religious or spiritual norms but also simply by physical contact and language, such as a kiss or the words "I love you" (Pace and Mobley, 2016). These symbolic and intimate interactions may be difficult, even impossible under the contagion control measures evident during the first national lockdown. Although many care providers relied on video calls to help families say farewell to their loved one during the outbreak, these interactions could be greatly limited. A bereaved son from the UK conveyed his frustration with the virtual farewell to his mother (ITV News, 2020c):

> *I wanted to go there but I wasn't allowed and that's the hardest thing, just not to be able to comfort her and stroke her head and kiss her and just to be able to hold her hand.*

Dying with extensive physical pain and emotional distress and also with little support can be extremely undignified (Seale, 2004). Although restrictions were relaxed in the UK post the peak of the first wave allowing family members some access to see their dying relatives in care facilities (BBC News, 2020b), by this point many people had already died unaccompanied by their family.

The risk of experiencing a lonely death could be further amplified for those who had been vulnerable and disadvantaged before the outbreak. People from low-income backgrounds and ethnic minority groups have also been reportedly the worst hit communities by COVID-19 related deaths in the UK (e.g., Bear et al., 2020; Public Health England, 2020). Social inequalities have greatly contributed to the high death rates among those isolated and disadvantaged. Without sufficient policy consideration and social support, these deaths could be both lonely and also marginalized, questioning social responses, and broader structures in the context of the pandemic (Kellehear, 2007).

Unexpected Death

During the first wave of COVID-19 in the UK, many people have died unexpectedly within weeks and even days after contracting the virus. In the face of sudden deaths, bereaved people are often left little time to face and prepare for their loss. Research has found that the tragic and unexpected loss of a loved one could place survivors at increased risk of experiencing a sense of incomprehension, helplessness, and guilt (Holst-Warhaft, 2000; Valentine, 2010). This loss may also acutely question bereaved people's taken-for-granted life, family, and social relationships, further challenging their sense of meaning and identity (Handsley, 2001). The unexpectedness of loss could be even more pronounced in the face of premature deaths. Media and public discourses have strongly portrayed COVID-19 as a serious threat to the lives of the elderly and fragile, despite deaths of children, and those from younger generations being recorded. Child deaths are often considered untimely, unnatural therefore particularly bad, likely leaving the bereaved family and broader society struggling to justify the loss (Walter, 1999). The pain and isolation attributed to COVID-19 could further intensify the debilitating nature of child loss, as conveyed in an interview about a teenage victim who died suddenly after contracting the virus in London (ITV News, 2020b):

> *He was a young boy, 13 without his mother, without any of his siblings on his deathbed in the last moments. That's very hard to understand and digest…*

Home Death

Whilst COVID-19 and its resulting pain and restrictions have given rise to experiences of "bad death" for many in the UK during the first wave, the outbreak has also paradoxically allowed opportunities for some people (e.g., terminally ill patients) to die at home. The place of death has long been used as a key indicator for the quality of end of life care in western countries, suggesting home as an ideal environment for the dying person to receive emotional comfort and dignity (Seale, 2004; Meier et al., 2017). As reported by the Office for National Statistics (2020b), deaths in private home increased 40.3% between 1st March and 30 April 2020, compared to the average of previous the 5 years. This increase in home deaths may have been caused by hospital disruptions and patients' fears for contracting COVID-19. This decision to remain at home could however enable them to spend their last time in a familiar environment and accompanied by

family (from the same household/social bubble). Despite the prospect of experiencing "good" home death, this could only be possible if the patient can receive sufficient palliative care in this environment. Given the delays and cancellation of care faced by many home-bound patients during the first outbreak (BBC News, 2020j), it remains unclear to what extent home deaths were "good" in the context of the first-wave outbreak.

Heroic Death

The good nature of death may also be possible at a more collective level. When facing mass deaths and crises confronted in this pandemic and other catastrophic events in the UK, such as disasters, wars, terror attacks, and pandemics, it could be particularly important to provide meaningful scripts to both support individual losses and reinforce social solidarity (Seale, 1995; Walter, 2020). Heroic deaths have been constructed and promoted by media and public discourses during the outbreak, to honor healthcare and other essential workers (Atlani-Duault et al., 2020). For example, the sacrifices of many other key contributors, who have lost their lives to save and help others, have also been honored in a memorial list in the UK (BBC News, 2020i). The recognition of their professional identity and selfless spirit can offer meaningful reminders of hope and wholeness to society as an entity (Goren, 2007; BBC News, 2020c; Walter, 2020).

CHALLENGES AND SUPPORT IN FACING GRIEF AND BEREAVEMENT

Significant challenges and risks when dealing with death and grief could be expected at both an individual and societal level both during and post the first-wave COVID-19 outbreak in the UK. As outlined above, deaths during this outbreak could often be "bad," violating the modern craft of dying in the UK which emphasizes individual autonomy, holistic support, preparedness, and physical togetherness with family (Walter, 2020). Due to lockdown, social distancing, and other new restrictions, bereaved people may find their needs for grieving and bereavement largely unattended. The increased social inequalities seen during this outbreak may contribute to or even exacerbate barriers for grieving and bereavement. These difficulties could be particularly evident for vulnerable and disadvantaged individuals and is likely to restrict their access to external support (Bear et al., 2020). In contrast, support at a community level may become more available and vibrant during COVID-19 (Office for National Statistics, 2020c). Grassroots support and mutual understandings were seen in local settings, while public mourning has emerged across the UK. Although this increased support may help bereaved people confront and deal with their grief and bereavement, it is unclear to what extent and in what circumstances this support could impact bereavement experiences. Little academic data has been generated during the first wave to gain explicit understandings. To develop the broadest possible picture of COVID-19 related grief in this immediate response to the first wave, we employ two pairs of diametrically opposed hypotheses to evaluate possible challenges and support for grief and bereavement both at an individual and collective level.

INDIVIDUAL GRIEF

Previous pandemics that significantly impacted the UK, such as HIV, not only caused wide spread deaths and fear but also created invisible barriers for survivors to exercise their individual agency to cope with their loss (Sherr et al., 1992; Bristowe et al., 2016)[1]. Similarly, the COVID-19 pandemic could amplify the conflict between individual needs and public health interests due to adverse social restrictions and inadequate support. Some bereaved people may feel more powerless and isolated and as such grieving for their loved one could be difficult or even impossible. However, informal support from kin, friends, neighbors, and colleagues may remain available or become more accessible at this difficult time. Given the large death toll within the UK, victims' families, and friends may also form and share symbolic bonds, as seen in bereaved families of deceased veterans (Walter, 2020). To further explore the possible impacts of COVID-19 on individual grief, two contrasting hypotheses are proposed to examine relevant media coverage and research: COVID-19 can make grieving harder or easier compared to experiences of grief prior to this pandemic.

Hypothesis 1: Grieving and Bereavement Are Harder in the Context of COVID-19

Bereaved people in the first wave may face isolation and inability due to national lockdown and other control measures. As mentioned above, bereaved people could struggle to find meaning while confronting a bad death of their loved one which may be painful, lonely, unexpected, or a combination of these. The increased social restrictions seen during this period could further compound the difficulties in bereaved people's experiences of meaning-making. Thus, grieving for their loved one could be difficult or even impossible. This poses two questions, does this sense of powerlessness and helplessness in grieving persist even after the death? Does it obstruct bereaved people from seeking comfort from others and developing mutual support networks to cope with grief? The following quote from an interview with a bereaved son may allude to one possible answer (ITV News, 2020c):

> *We haven't been able to see each other, we haven't been able to comfort each other, or grieve properly. We are all isolating. We can't go out, can't comfort each other.*

In response to the tight control measures, bereaved people may experience limited agency to deal with their grief following the death of their loved one. Funerals and ceremonies have been canceled, postponed, or significantly altered (e.g., BBC News, 2020o). For example, funerary rites may have to be minimalised or held online. These restricted and virtual interplays could

[1]Deaths in previous pandemics, such as HIV, could be associated with stigma (Bigelow and Hollinger, 1996). While COVID-19 related deaths may be stigmatized in other countries, we have not found this to be a major issue in the UK. However, some racial stigma has been recorded aimed toward Chinese and Asian people in the UK (BBC News, 2020k).

hardly replace normal face-to-face interactions and physical memorial activities, which involve not only close family members but also those from broader social networks. A hug, a conversation with other mourners or a sacred site of religion may allow for and even heighten special emotions and meanings for bereaved people (Walter, 1996; Davies, 2017). Therefore, bereaved people may find the absence or minimality of funerary rites distressing (O'Rourke et al., 2011). What may be more distressing is the absence of an ongoing structure for mourning, such as, not being able to say goodbye to their loved one, agonizing over being separated from others at the funeral and not being able to visit the grave afterwards. Such compounded experiences of powerlessness could further have lasting impacts on their experiences of making sense of loss.

Public recognition of some people's loss and grief may also be absent during the outbreak, as not everyone's loss and grief would be automatically recognized. As such, feeling unentitled and unsupported to publicly share and cope with grief may cause disenfranchisement (Doka, 1989). Healthcare workers, as a result of their increased chances of encountering deaths in the workplace, may experience grief in relation to deaths of individual patients, colleagues, or the loss of life in a more collective sense. As such, they could be at heightened risk of experiencing disfranchisement of grief. Their professional identities may create invisible barriers making them fail to acknowledge and cope with their grief (Aloi, 2011). This may be further exacerbated by the lack of language for grief and concerns regarding professional boundaries (Lathrop, 2017). Their disfranchisement could be further amplified by health workers' agonizing life and death decisions, prioritizing care for limited patients due to restricted medical resources. A doctor conveyed his stress to BBC News (2020e): "*Seeing people die is not the issue. We're trained to deal with death… The issue is giving up on people we wouldn't normally give up on.*" Feelings of guilt, powerlessness and shame may be so strong that individuals' personal psyche, moral values, and professional identities could be severely challenged (Dean et al., 2019). Another high-risk group for disfranchised grief is bereaved family members whose loss and grief are infrequently recognized in public discourses during the outbreak. For example, a bereaved daughter felt forgotten and heartbroken when facing her mother's death only as a "figure" in official data (BBC News, 2020d):

> *She was one of the figures of death. And it's heart-breaking because to everyone else, that's just a number but that number was my mum.*

Some bereaved families could experience more hardship when their loved one's death is not officially recorded in the data of COVID-19 victims (Sky News, 2020b). They may feel they are unentitled to access sympathy, condolence and other resources for COVID-19 victims and as a result, they may experience marginalization in facing their grief.

Marginalization could further exacerbate the difficulties of bereaved people facing disadvantaged deaths. As mentioned above, disadvantaged deaths may grow in black, ethnic minority and older groups as a result of increased inequalities, such as racism and social neglect during COVID-19 (Bear et al., 2020; Public Health England, 2020). According to the Office for National Statistics (2020d), "mortality rates are normally higher in more deprived areas, but COVID-19 appears to be increasing this effect." As a direct result of this disparity in mortality rates, "more than 70 public figures are calling for a full independent public inquiry into deaths from COVID-19 among people from ethnic minority backgrounds" (BBC News, 2020l). This call for a public enquiry aims to help grief-stricken families of these victims who may have to face difficulties in understanding and justifying the death of their loved one. Inept communication and cooperation between care providers and public health authorities may also contribute to disadvantaged deaths, thus bereaved families may further question broader social structures. For example, a growing number of bereaved individuals are calling for a public enquiry into the failures of the response to COVID-19 related deaths in the UK (BBC News, 2020m). How to justify these disadvantaged deaths may remain a challenge for the bereaved in the longer term, requiring further negotiations to contest the meanings of their loss (Holst-Warhaft, 2000).

There may also be marginalization of bereavement in the context of social inequalities, leaving many bereaved people little access to support. One pandemic is essentially many epidemics; thus, challenges and available resources for grief and bereavement during COVID-19 could vary drastically between regions and even across communities, many of which have developed multifaceted responses to offer diverse support for bereaved people. These resources could both continue and further develop during and post the outbreak, including counseling services, psychotherapy, charity support, social policies, and other socio-cultural norms (i.e., Bristih Psychological Association, 2020; Cruse Breavement Care, 2020). Conversely, bereaved people in different regions and communities with limited resources and infrastructures may struggle to comprehend their loss and access relevant support (Fang, 2019).

In addition to increased social restrictions and inequalities, particular types of loss could make grieving and bereavement harder. Child deaths as a result of COVID-19 could be extremely difficult for parents, who may find their grief particularly challenging in the face of unnatural, untimely and bad death. Living in a society where premature deaths are no longer predominant, bereaved families may find limited support from social norms and religious values, to make sense of and give meaning to their child's death (Walter, 1999). The COVID-19 outbreak may further suppress their agency and resourcefulness when dealing with grief. Child deaths could also fundamentally challenge parents' identity and further destabilize family structures (Riches and Dawson, 2000; Fang, 2020). Furthermore, given the highly infectious nature of COVID-19, some people may lose multiple individuals in their family and immediate social circles. Therefore, they may experience even more compounded emotional distresses and other practical or financial issues.

Hypothesis 2: Grieving and Bereavement Are Easier in the Context of COVID-19

Despite numerous issues and risks faced by the bereaved, people experiencing grief and loss may receive more support at this difficult time. There has been significant evidence of increased

support in families, neighborhoods, and wider social and public spheres during the first wave in the UK. This raises a question: does this increased support make grief and bereavement easier compared to the pre-COVID-19 time? The answer to this question is rather complicated in light of bereavement as a diverse experience embedded in one's ongoing life. Central to understanding the diverse experiences of bereaved people in the outbreak is to examine the quality and continuity of support both in the short and longer term.

Some people's family resources and social capital could grow in the face of loss and forced separation during COVID-19. As widely seen, family and friends have provided emotional and social support via video calls and social media. Neighborhoods have also come together to offer practical and emotional support for isolated and vulnerable residents (Office for National Statistics, 2020c). Even when their individual agency was challenged by the lockdown and social distancing rules, some people exploited limited resources to access family bonds and community spirit to cope with loss. Funerals, for example, have had to be minimalised during the outbreak, but some families could have experienced a heightened sense of intimacy and solidarity through smaller family-centered funerals. For some, alternative funeral arrangements such as socially distanced memorials from home were a way to come together to reaffirm family ties in spite of restrictions. For instance, a group of siblings held a "funeral" for their deceased brother in their mother's garden, which "put a smile on my [their] mum's face at such a sad time for her" (BBC News, 2020n). Such intimate experiences may have enabled kin to better support each other to face and make sense of their loss.

In addition, condolence paid to COVID-19 victims from the wider society may have provided bereaved people a sense of sympathy and comfort. The identification with other mourners of COVID-19 victims could also help them enfranchise their grief, further contributing to developing mutual understandings and a sense of belonging in the face of meaninglessness and isolation. For example, a UK family invited other bereaved families of COVID-19 victims to use a yellow heart to visibly signal their loss and share stories of their loved one (BBC News, 2020f). In public domains, governmental bodies and professional organizations also adopted sympathetic and flexible approaches to extend their support for bereaved people. This informative and instructive support could help guide bereaved people to deal with the multifaceted issues associated with loss and grief, including financial difficulties, death registration, emotional stress and other challenges and risks. Nonetheless, not every bereaved person can access increased support and experience positive responses. Their grief and bereavement may reflect their personal circumstances and broader social contexts.

The immediate support seen during the outbreak suggests the importance and the potential of continuous care for bereaved people in the longer-term. After social distancing rules are lifted and typical social order is resumed, informal support from family, friends, colleagues, and neighbors may become more physically accessible for bereaved people. Formalized social and health care systems may continue and even expand their services for supporting bereaved people, especially in the British context where health and social care frameworks are well-established. In the longer-term, it is important to ensure professional care of psychotherapy and clinical interventions remain available where needed, to help bereaved people cope with their loss and grief. It is, however, equally crucial to avoid over-emphasizing pathological aspects of grief and heavy reliance on therapeutic frameworks (Walter, 1999; Valentine, 2008). That said, bereaved people are inherently resilient in responses to loss, tending to adopt and revise the status quo by seeking their own means of grieving (Bonanno, 2004; Valentine, 2009; Fang, 2019). Even in extremely difficult circumstances, they may still be able to transform their grief to challenge and reshape social structures (Holst-Warhaft, 2000). Bereaved people may draw upon various socially accessible tools, such as language, arts and other creative means, to reconstruct meaning as part of their ongoing lives (Walter, 1996; Neimeyer, 2011; DeNora, 2012). Meanwhile, the shared experience of loss may also prompt self-help groups both online and face-to-face in the longer term. This reciprocal support could enable bereaved people with similar experiences during COVID-19 to develop mutual understandings and a sense of belonging, thus helping them better make sense of their loss and rebuild meaningfulness both individually and collectively (Valentine, 2017; Fang, 2019). Such experiences of self-help groups may have specific pertinence for those who may not be able or may be unwilling to access more formalized support.

Discussion: Mixed Experiences of Individual Grief and Bereavement

It is not straightforward to say if the COVID-19 pandemic has made grieving and bereavement harder or easier than before the outbreak. The answer is rather conditional, showing the complexity and fluctuation of such experiences. The COVID-19 outbreak and resultant quarantine enforcements imposed increased social restrictions. These could consequently create new barriers, suppressing bereaved people's autonomy, and restricting the available resources to deal with and recognize loss and grief. Existing issues of inequalities may also be amplified during the pandemic, adding further difficulties for some to justify and adapt to their loss. These new and pre-existing social issues could further debilitate people in the face of particularly "bad" deaths, making their grieving and bereavement even harder. Meanwhile, this difficult time has also seen increased support for bereaved people from both informal and formal sources. The current increase in short-term support as a result of COVID-19 should continue longer-term, highlighting the importance of ensuring available support for bereaved people in ongoing life.

Despite the prospect of having increased and continuing support for bereaved people, the quantity and quality of support could vary across different settings. As well as individual differences, such as individual personality and interpersonal relationships, varied environments could play a significant role in shaping bereaved people's support networks and resources (Valentine, 2008). Regional differences and inequalities between races, classes and age groups could lead to diverse and complicated experiences of grief and bereavement (Bear et al.,

2020). Therefore, it is impossible to find a universal answer to the above two hypotheses. Central to this dilemma, however, is the importance of developing a more sympathetic, inclusive, and interdependent environment with grief literacy (Breen et al., 2020). This approach emphasizes a complex of resources and mechanisms enabling public and professionals to be more knowledgeable and proactively supportive in identifying and dealing with loss and grief. The above discussion, and the scenarios explored in each hypothesis, serve to inform our advocacy for more continuous and integrated support, highlighting areas where future policy and practice research attention should focus. This grief literate environment could empower bereaved people, with different needs and from various backgrounds, to better facilitate grieving and make sense of their loss in community-based and day-to-day settings. The roles of policymakers, care providers, community leaders and social activists would all be indispensable for creating this grief literate culture in communities and wider society both during and post the outbreak (Kellehear, 2005; Breen et al., 2020).

COLLECTIVE GRIEF

Responses to lives lost during COVID-19 may not only be individual but also collective in nature. The shared experience of loss and grief may contribute to the growing collective entities consisting of many thousands of mourners locally, nationally, and even globally. Similar experiences of loss may enable mourners to form symbolic bonds with others, thus enabling grieving in a more collective sense. This sense of belonging could also be experienced in wider society, for both the bereaved and non-bereaved, as a collective response to loss in the face of COVID-19. This collective approach to loss and grief has been widely observed across the UK and globally, ranging from the aforementioned small-scale "yellow heart" movement to public mourning for deceased healthcare workers. To better understand the phenomenon of collective grief in the UK, it is important to ask whether this has to be created through purposive strategies of idealization of deaths and communal rituals directed by the government/other public organizations, or, whether these collective responses happen as intrinsically motivated actions shared by individuals and communities? These questions could further elucidate what is needed to deal with mass deaths and shared traumas in ongoing society.

Hypothesis 3: Collective Grieving Is a Strategic Response Prescribed by Society

Collective responses to loss could be seen as a grieving process, assembling social members to face destruction and impairment and to reaffirm their conformity to society as an orderly and functional state. Society as an entity tends to secure its stability and continuity in the face of mass deaths and social disorder. Public rituals and memorial activities can be prescribed by the government and the public to serve as transitional and functional passages intentionally helping reaffirm shared values and social solidarity among social actors (Hockey et al., 2001; Doss, 2008; Walter, 2020). One example is national mourning for COVID-19 victims held in China on 4th April 2020. This state-led grieving response provided an opportunity to remember those lost and to reunite the country, thus helping it to move forward after the national crisis (BBC News, 2020a). Although national mourning of this kind has not yet been seen in the UK on the same scale as China, it is envisaged that acts of national mourning may surface. This would resonate with the memorialization of other mass-death events, such as Remembrance Day on the 11th November each year, providing collective and symbolic means of recharging the energy and confidence of society.

Such publicly organized commemoration activities are not necessarily temporary but may persist, shaping the continuing existence of society. These events can be purposively repeated in relation to special tempo-spatial elements (Holst-Warhaft, 2000), such as the annual Remembrance Day for victims who died in the wars, organized by the governments and communities across the country. Similarly, significant locations and dates may be hallowed after the COVID-19 pandemic, to collectively, and continuously reconstruct the past and to reinforce a communal sense of belonging for the future of society (Alexander et al., 2004). For example, New York City announced the use of a long-marginalized site, Hart Island, to bury COVID-19 virus victims (BBC News, 2020p). This burial ground may later be promoted as special location because of the associated memories of mass death and crises. In the UK, the arranged annual memorial events on the site of Grenfell Tower in London, where a fire killed 72 people in 2017, continues to play an important role in the ongoing memorialization of those who lost their lives. Similarly, sites, dates and even persons with specific pertinence regarding COVID-19 may also be chosen across the country, to memorialize the mass deaths and trauma. Therefore, how to manage and transform these sites may play a significant role in reshaping the emotions of individual bereaved people and the public, allowing them to further negotiate and contest meanings both personally and collectively. Such publicly visible signs of this pandemic may appear elsewhere, presenting opportunities and challenges for both governments and communities, namely, how to transform collective pain and public emotions into meaningful shared memories of social solidarity and collective confidence.

Hypothesis 4: Collective Grieving Is a Spontaneous Response Shared by Individuals

An alternative approach to public anxiety and tension lies in voluntary individual actions. Given that the pandemic may challenge shared values and beliefs, individuals could spontaneously seek "creative and highly idiosyncratic" ways to grieve their loss and ease their tension (Bradbury, 2001:0.221). That is, those affected by loss and grief can come together to exercise their agency to reshape the form and meaning of grief in wider society, without instructions, or pressure from external forces. These individual reactions may coincide and resonate with each other and thus naturally evolve into shared grassroots grieving activities, such as the yellow-heart movement in the UK. In addition, social media and dedicated memorial websites could provide alternative virtual platforms to create

shared spaces to collectively acknowledge loss and grief during and post the outbreak. These online platforms could empower both the bereaved and non-bereaved to publicly legitimize and collectively alleviate their tension and grief (Harju, 2015). Ultimately, this could empower the public to create an online archive of reflective and meaningful lessons learnt from death and dying to reflect more broadly the resilience shown during this unprecedented pandemic.

Discussion: Need for Collective Responses to Loss

Collective grieving activities may be both extrinsically and intrinsically motivated during this pandemic. Despite this difference, needs for such shared responses to deaths and losses are clearly revealed. Responding to collective grief entails a duality of social functions and individual autonomy, underlining the socially mediated processes to deal with loss and grief at a societal level (Valentine, 2008; Fang, 2019). From a structural perspective, society, especially the authorities, may prescribe norms to allow for and regulate publicly acceptable emotions through public commemorations. These could serve to recover social order and solidarity following aggregate losses during COVID-19. In light of individual agency, social members may coincide or deliberately plan to seek and create platforms to express their sorrow for collective loss and heroic individual deaths, further restoring their social identity. Both externally organized and spontaneous responses to collective grief have been documented during the outbreak and may continue to occur post the outbreak in the UK and elsewhere. Collective grieving may sometimes become difficult and even impossible due to lacking the appropriate resources and structures to support these actions. For example, some local authorities may not be financially able to support public memorial events, while some individuals may feel difficulty in expressing their grief in public due to little emotional support in their community. As such, it is essential to ensure available channels for both society as a whole and its members to restore meaning and an equilibrium in a collective and symbolic sense. The importance of social environments is again evident, calling for a resourceful, supportive and grief literate culture (Breen et al., 2020). An environment of this nature could enfranchise society and individuals to negotiate meaningful ways to respond to the evident need for collective grief. Meanwhile, the shared experience of COVID-19 may further reinforce individual bereavement experiences by providing more established collective norms and values to reaffirm their social membership and enfranchise feelings of loss and grief.

CONCLUDING REMARKS AND AVENUES FOR FUTURE RESEARCH

The primary aim of this article is to adopt a hypothetical approach to explore possible challenges and support experienced by those affected by loss during the first wave of COVID-19 in the UK. By examining trusted media data and carefully selected academic literature, the discussion revisits and further relocates the ideas of good and bad deaths, grieving and bereavement support. These are examined in the context of the changing dynamics of social discourses and individual experiences as a result of the first wave. Both good and bad deaths are explained and analyzed to provide foundational understandings for the challenges and opportunities involved in deaths in this novel context. A largely "bad" nature of deaths is captured, often involving pain, loneliness, isolation and unexpectedness. "Goodness" is also seen through the increased potential of being able to die at home and heroisation of deaths, showing the diverse, and even competing experiences of death and grief that people may confront.

Due to lockdown, social distancing and other new norms developed during the first wave in the UK, pre-existing structures of mourning and grieving may become largely absent. This may require revised, compromised or completely new ways to grieve and to deal with bereavement. Despite lacking primary empirical data, it is still possible to develop a preliminary and exploratory view of loss and grief in this context. By carefully drawing upon media and academic discourses, a mixed picture of both negative and positive experiences of grief are captured at both individual and collective levels. To better understand the complexity, two pairs of contrasting hypotheses are proposed to examine the impacts of COVID-19 on experiences of loss and support. As discussed, bereaved individuals may face both improved support or intensified challenges depending on their individual circumstances and social backgrounds. The social environment for grief and bereavement is found to be particularly important. This is also evident in experiences of collective grief, in which relationships between broad structures and individual agency could powerfully shape the means of shared responses to deaths and losses.

Despite the varied nature of grief reactions captured in the two pairs of hypotheses, two primary findings have become evident. These are: (1) the diverse needs of both individuals and collectives to cope with and make sense of loss and grief, (2) the significance of socio-cultural environment in the process of coping with grief. Furthermore, the question of how to better respond to these varied needs for grief is fundamentally entwined within the social environment in which it is situated. To better support those experiencing loss and grief in an ongoing manner, grief literacy may play a pivotal role in allowing for mutual understandings within the community to better support the everyday lives of those affected by loss (Breen et al., 2020). This idea forms part of a broader framework of compassionate communities and is motivated by the increasing professionalization and inequalities in bereavement care (Kellehear, 2005). A multifaceted approach would be required to foster grief-literate environments across the UK both during and post the outbreak.

The increased awareness of our own mortality as a result of the mass death seen during the COVID-19 pandemic may shape the way in which we view grief and bereavement moving forward. Increased media coverage of the loss of life and bereavement in the UK may contribute to developing the understanding of grief and appropriate support tools, including language, music and other creative means, to help deal with

loss. This may further help facilitate a more compassionate and grief literate society (Breen et al., 2020). It is important to note that despite the current restrictions, specialist support, and guidance regarding grief and bereavement remain available from charities, government organizations, and care providers. However, the significant role played by local communities should not be underestimated as they have continued to help develop appropriate structures and integrate relevant resources for those experiencing loss, in their immediate social networks. Further, situating experiences of loss and grief within their localized contexts can allow for more inclusive and individualized approaches to reinforce community-based support. As such, these embedded approaches would direct resources to more adequately tailor support to respond to the diverse needs for grief and bereavement at both an individual and collective level, better accounting for different social, religious, ethnic, age, and gender groups.

The self-help group model could provide an invaluable framework to highlight the importance of localized support in non-psychotherapeutic settings, uniting people with similar backgrounds and mutual understandings in their bereavement experiences. This framework could also empower people to deal with their loss in a more spontaneous and proactive manner in everyday life, further encouraging grief literacy in wider society. Such integrated and localized approaches could help supplement the support and guidance provided by the government and professional social and health care. Meanwhile, these more formalized support frameworks could also complement and reinforce community-based support. Cooperation between these two avenues could allow for a "new" structure of bereavement support that would more comprehensively address grief and bereavement in light of the significant ongoing challenges posed by COVID-19 in the UK.

Based on the findings of our hypothetical approach, we indicate an agenda for future research that may guide and shape future practice and policy-making for the ongoing battles with COVID-19 and other similar crises. To resonate with the above hypotheses, we suggest that two key questions can be asked in future inquires: (a) what is needed in response to loss and grief at both an individual and collective level when facing significant social restrictions and mass deaths, (b) how do social environments support or undermine these needs in this novel context. Future research should aim to collect empirical data, which was not possible in this immediate response. More specifically, it should employ both quantitative and qualitative approaches to clarify the enablers and barriers in individual and collective grief experiences. These enablers and barriers should also be examined within the context of minority and disadvantaged groups within the broader population. Further investigations on bereavement for particular demographic groups, such as children, adolescents and older people, are both important and necessary to understand the impacts of COVID-19 on the social constructions of loss and grief. Comprehensive research of this nature would further ensure that future support provision is more appropriately tailored to its end-users and is tied to its broader cultural context.

In addition, studies on collective responses to deaths as a result of COVID-19 could offer powerful and creative insights into the ongoing debates on public mourning and memorialization in the UK. The ideas of grief literate societies and compassionate communities are worth further consideration, to explore how community-based support could complement pre-established statutory support during pandemics and other major emergency events. Meanwhile, the importance of language and other socially accessible tools, such as the arts, should also be considered in future policy-making and care provision discussions moving forward. This approach may provide more accessible resources for bereaved people to deal with their loss and grief during and post the outbreak. This article provides a base from which we advocate the priorities for future research into the ongoing impacts of COVID-19 on grief and bereavement on both an individual and collective level. Although this article focuses on the British context, some lessons about the diverse grief needs and compassionate social environments may also be relevant in conducting similar research in other socio-cultural contexts.

AUTHOR CONTRIBUTIONS

CF has taken the responsibility to develop the overall structure of this article, as well as to write the section individual grief. AC has contributed to the section collective grief. Both authors have worked closely to collect data, develop analytical discussions, write up this manuscript, and have jointly written up the remaining sections of this manuscrpit.

ACKNOWLEDGMENTS

This manuscript has been released as a pre-print at Fang and Comery (2020). The authors express their sincere gratitude to Prof. Tony Walter and Dr. Christine Valentine for their valuable comments to an earlier vision of this article.

REFERENCES

Alexander, J. C., Eyerman, R., Giesen, B., Smelser, N. J., and Sztompka, P. (2004). *Cultural Trauma and Collective Identity*. Berkeley, CA: University of California Press. doi: 10.1525/9780520936768

Aloi, J. A. (2011). A theoretical study of the hidden wounds of war: disenfranchised grief and the impact on nursing practice. *ISRN Nurs.* 2011:954081. doi: 10.5402/2011/954081

Atlani-Duault, L., Ward, J. K., Roy, M., Morin, C., and Wilson, A. (2020). Tracking online heroisation and blame in epidemics. *Lancet Public Health* 5, PE137–E138. doi: 10.1016/S.2468-2667(20)30033-5

BBC News (2020a). *Coronavirus: China Mourns Covid-19 Victims With Three-Minute Silence*. Available online at: https://www.bbc.co.uk/news/world-asia-china,-52162004 (accessed April 4, 2020).

BBC News (2020b). *Coronavirus: Close Family to be Allowed to Say Goodbye to the Dying*. Available online at: https://www.bbc.co.uk/news/uk,-52299590 (accessed April 15, 2020).

BBC News (2020c). *Coronavirus: Coming 5,000 Miles to Die for the NHS*. Available online at: https://www.bbc.co.uk/news/health,-52152375 (accessed April 4, 2020).

BBC News (2020d). *Coronavirus: Outbreak "not yet at peak" and Lockdown May Last Another Month*. Available online at: https://www.youtube.com/watch?v=F5L-7p3v,4G.I (accessed April 15, 2020).

BBC News (2020e). *Coronavirus: Why Healthcare Workers are at Risk of Moral Injury*. Available online at: https://www.bbc.co.uk/news/world-us-canada,-52144859 (accessed April 6, 2020).

BBC News (2020f). *Coronavirus: Grieving Together With a Yellow Heart*. Available online at: https://www.bbc.co.uk/news/av/uk-52589050/coronavirus-grieving-together-with-a-yellow-heart (accessed April 16, 2020).

BBC News (2020g). *The Heart-Wrenching Choice of Who Lives and Dies*. Available online at: https://www.bbc.com/future/article/20200428-coronavirus-how-doctors-choose-who-lives-and-dies (accessed April 29, 2020).

BBC News (2020h). *Coronavirus: Cancer Surgery Delays Risk 'thousands' of Deaths*. Available online at: https://www.bbc.co.uk/news/health,-52722150 (accessed May 20, 2020).

BBC News (2020i). *Coronavirus: Remembering 100 NHS and Healthcare Workers Who Have Died*. Available online at: https://www.bbc.co.uk/news/health,-52242856 (accessed April 28, 2020).

BBC News (2020j). *Coronavirus: 'More than two million' Waiting for Cancer Care in UK*. Available online at: https://www.bbc.co.uk/news/health,-52876999-(accessed June 1, 2020).

BBC News (2020k). *Londoners 'experiencing racism over coronavirus'*. Available online at: https://www.bbc.co.uk/news/av/uk-england-london,-51361930 (accessed February 4, 2020).

BBC News (2020l). *Coronavirus: Call for Public Inquiry into BAME Death Risk*. Available online at: https://www.bbc.co.uk/news/health,-52602467 (accessed May 10, 2020).

BBC News (2020m). *Coronavirus: 'Start public inquiry now to prevent more deaths'*. Available online at: https://www.bbc.co.uk/news/uk,-53009946 (accessed June 12, 2020).

BBC News (2020n). *Coronavirus: Self-Isolating Family Holds 'funeral' at Home*. Available online at: http://www.bbc.co.uk/news/uk-england-birmingham,-51978735 (accessed March 20, 2020).

BBC News (2020o). *Coronavirus: No Wake, No Funeral, Just Prayers in a Cemetery*. Available online at: https://www.bbc.co.uk/news/uk-northern-ireland,-52106863 (accessed April 1, 2020).

BBC News (2020p). *Coronavirus: New York Ramps Up Mass Burials Amid Outbreak*. Available online at: https://www.bbc.co.uk/news/world-us-canada-52241221 (accessed April 10, 2020).

Bear, L., Simpson, N., Angland, M., Bhogal, J. K., Bowers, R., Cannell, F., et al. (2020). *'A good death'during the Covid-19 Pandemic in the UK: A Report on Key Findings and Recommendations*. London: London School of Economics and Political Science [Accessed on 27th April 2020]

Bigelow, G., and Hollinger, J. (1996). Grief and AIDS: surviving catastrophic multiple loss. *Hosp. J.* 11. 83–96. doi: 10.1080/0742-969X.1996.11882837

Bonanno, G. (2004). Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *Am. Psychol.* 59. 20–28. doi: 10.1037/0003-066X.59.1.20

Bradbury, M. (2001). "Forget me not: memorialization in cemeteries and crematoria," in *Grief, Mourning and Death Ritual*, eds J. L. Hockey, J. Katz, and N. Small (Buckingham: Open University Press), 218–225.

Breen, L., Kawashima, D., Joy, K., Cadell, S., Roth, D., Chow, A., et al. (2020). Grief literacy: a call to action for compassionate communities. *Death Stud*. doi: 10.1080/07481187.2020.1739780. [Epub ahead of print].

Bristih Psychological Association (2020). *Supporting Yourself and Others: Coping With Death and Grief During the Covid-19 Pandemic*. Available online at: https://www.bps.org.uk/sites/www.bps.org.uk/files/Policy/Policy%20-%20Files/Supporting%20yourself%20and%20others.pdf (accessed January 31, 2021).

Bristowe, K., Marshall, S., and Harding, R. (2016). The bereavement experiences of lesbian, gay, bisexual and/or trans* people who have lost a partner: a systematic review, thematic synthesis and modelling of the literature. *Palliat. Med.* 30, 730–744. doi: 10.1177/0269216316634601

Cruse Breavement Care (2020). *Coronavirus: Dealing With Bereavement and Grief*. Available online at: https://www.cruse.org.uk/get-help/coronavirus-dealing-bereavement-and-grief (accessed May 1, 2020).

Davies, D. (1999). "The week of mourning," in *The Mourning for Diana*, eds (London: Bloomsbury Academic).

Davies, D. (2017). *Death. Ritual and Belief: The Rhetoric of Funerary Rites*. London: Bloomsbury Academic.

Dean, W., Talbot, S., and Dean, A. (2019). Reframing clinician distress: moral injury not burnout. *Fed. Pract.* 36, 400–402.

DeNora, T. (2012). Resounding the great divide: theorising music in everyday life at the end of life. *Mortality* 17, 92–105. doi: 10.1080/13576275.2012.673375

Doka, K. J. (1989). *Disenfranchised Grief: Recognizing Hidden Sorrow*. Lexington, MA: Lexington Books.

Doss, E. (2008). *The Emotional Life of Contemporary Public Memorials: Towards a Theory of Temporary Memorial*. Amsterdam: Amsterdam University Press. doi: 10.5117/9789089640185

Durkheim, E. (1912). *The Elementary Forms of the Religious Life (2nd ed)*. London: Allen and Unwin.

Fang, C. (2019). Exploring social constructions of bereaved people's identity in mainland China: a qualitative approach. *Mortality* 25, 402–417. doi: 10.1080/13576275.2019.1657389

Fang, C. (2020). Dynamics of Chinese shidu parents' vulnerability in old age - a qualitative study. *J. Popul. Ageing*. doi: 10.1007/s12062-020-09293-4. [Epub ahead of print].

Fang, C., and Comery, A. (2020). *Understanding Grief in a Time of COVID-19 - A Hypothetical Approach to Challenges and Support*. Sage Submissions. doi: 10.31124/advance.12687788.v1

Giddens, A. (1991). *Modernity and Self-identity: Self and Society in the Late Modern Age*. Standford, CA: Standford University Press.

Goren, E. (2007). Society' s use of the hero following a national trauma. *Am. J. Psychoanal.* 67, 37–52. doi: 10.1057/palgrave.ajp.3350013

Handsley, S. (2001). "But what about us?" The residual effects of sudden death on self-identity and family relationships. *Mortality* 6, 9–29. doi: 10.1080/13576270020028610

Harju, A. (2015). Socially shared mourning: construction and consumption of collective memory. *N. Rev. Hypermedia Multimedia* 21, 123–145. doi: 10.1080/13614568.2014.983562

Hockey, J. (2001). "Changing death rituals, "in *Grief, Mourning and Death Ritual*, eds J. Hockey, J. Katz, and N. Small (Buckingham, PA: Open University Press) 185–211.

Hockey, J., Katz, J., and Small, N. (2001). *Grief, Mourning and Death Ritual*. Buckingham: Open University Press.

Holst-Warhaft, G. (2000). *The Cue for Passion: Grief and Its Political Uses*. Cambridge, MA: Harvard University Press.

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., et al. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 395, 497–506. doi: 10.1016/S.0140-6736(20)30183-5

ITV News (2020a). *Coronavirus Patients Could Have Treatment Withdrawn to Save Others if Hospitals Become Overwhelmed*. Available online at: https://www.itv.com/news/2020-04-02/covid-19-patients-could-have-treatment-withdrawn-to-save-others (accessed April 2, 2020).

ITV News (2020b). *Coronavirus: 13-Year-Old With Covid-19 'died alone' Without his Family Around him, Friend Says*. Available online at: https://www.itv.com/news/2020-04-01/coronavirus-13-year-old-victim-died-alone-friend-says-ismail-mohamed-abdulwahab-kings-college-hospital (accessed April 3, 2020).

ITV News (2020c). *The Much-Loved Faces Behind The Stats: Families Pay Tribute to UK Coronavirus Vicitms*. Available online at: https://www.youtube.com/watch?time_continue$=$73&v=k9iaK7Bazgg&feature=emb_title (accessed March 31, 2020).

Kellehear, A. (2005). *Compassionate Cities: Public Health and End of Life Care*. London: Routledge.

Kellehear, A. (2007). *A Social History of Dying*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511481352

Kousha, K., and Thelwall, M. (2017). News stories as evidence for research? BBC citations from articles. books, and wikipedia. *J. Assoc. Inform. Sci. Technol.* 68, 2017–2028. doi: 10.1002/asi.23862

Lathrop, D. (2017). Disenfranchised grief and physician burnout. *Ann. Fam. Med.* 15, 375–378. doi: 10.1370/afm.2074

Lawton, J. (2000). *The Dying Process: Patients' Experiences of Palliative Care*. London: Routledge.

Meier, E. A., Gallegos, J. V., Montross-Thomas, L. P., Depp, C. A., Irwin, S. A., and Jeste, D. V. (2017). Defining a good death (Successful Dying): literature review and a call for research and public dialogue. *Am. J. Geriatric Psychiatr.* 24, 261–271. doi: 10.1016/j.jagp.2016.01.135

Neimeyer, R. A. (2011). Reconstructing meaning in bereavement. *Estudos de Psicol.* 28, 421–426. doi: 10.1590/S0103-166X2011000400002

Newman, E., Fletcher, R., Schulz, A., Andi, S., Nielsen, R. (2020). *News Digital Report. Reuters Institute for the Studies of Journalism*. Available online at: https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2020-06/DNR_2020_FINAL.pdf (accessed January 31, 2021).

Office for National Statistics (2020a). *Deaths Due to COVID-19 - Interactive Map*. Avaiable online at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/articles/deathsinvolvingcovid19interactivemap/2020-06-12 (accessd Janaury 31, 2021).

Office for National Statistics. (2020b). *Deaths Involving COVID-19, UK: Deaths Occurring Between 1 March and 30 April 2020*. Avaliable online at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsinvolvingcovid19uk/deathsoccurringbetween1marchand30april2020 (accessed January 31, 2021).

Office for National Statistics. (2020c). *Coronavirus and the social impacts on Great Britain*. Available online at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/bulletins/coronavirusandthesocialimpactsongreatbritain/29may2020 (accessed May 14, 2020).

Office for National Statistics. (2020d). *Deaths Involving COVID-19 by Local Area and Socioeconomic Deprivation: Deaths Occurring Between 1 March and 31 May 2020*. Available online at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsinvolvingcovid19bylocalareasanddeprivation/deathsoccurringbetween1marchand31may2020 (accessed June 30, 2020).

O'Rourke, T., Spitzberg, B., and Hannawa, F. (2011). The good funeral: toward an understanding of funeral participation and satisfaction. *Death Stud.* 35, 729–750. doi: 10.1080/07481187.2011.553309

Pace, J. C., and Mobley, T. S. (2016). Rituals at end-of-life. *Nurs. Clin.* 51, 471–487. doi: 10.1016/j.cnur.2016.05.004

Public Health England (2020). *Disparities in the Risk and Outcomes of COVID-19*. London: Public Health England. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889195/disparities_review.pdf (accessed January 31, 2021).

Riches, G., and Dawson, P. (2000). *An Intimate Loneliness: Supporting Bereaved Parents and Siblings*. Buckingham: Open University Press.

Seale, C. (1995). Heroic death. *Sociology* 29, 597–613. *doi: 10.1177/0038038595029004003*

Seale, C. (2004). Media constructions of dying alone: a form of 'bad death'. *Soc. Sci. Med.* 58, 967–974. doi: 10.1016/j.socscimed.2003.10.038

Sherr, L., Hedge, B., Steinhart, K., Davey, T., and Petrack, J. (1992). Unique patterns of bereavement in HIV: implications for counselling. *Genitourin. Med.* 68, 378–381. doi: 10.1136/sti.68.6.378

Sky News. (2020a). *Coronavirus: Almost 40,000 Deaths with COVID-19 in England and Wales, ONS Says*. Available online at: https://news.sky.com/story/coronavirus-almost-40-000-have-died-with-covid-19-in-england-and-wales-ons-says-11990836 (accessed May 20, 2020).

Sky News. (2020b). *Coronavirus: Govt Urged to Release Care Home Death Figures as Estimate Emerges*. Available online at: https://news.sky.com/story/coronavirus-as-many-as-7-500-may-have-died-from-covid-19-in-care-homes-estimate-11975003 (accessed April 18, 2020).

Strauss, A. (1971). *Anguish: The Case History of a Dying Trajectory*. San Francisco, CA: Sociology Press.

Stroebe, M. (2018). The poetry of grief: beyond scientific portrayal. *OMEGA – J. Death Dying* 78, 67–96. doi: 10.1177/0030222818792706

Tricco, A. C., Langlois, E. V., and Straus, S. E., (eds.) (2017). *Rapid Reviews to Strengthen Health Policy and Systems: A Practical Guide*. Geneva: World Health Organization. Available online at: https://apps.who.int/iris/bitstream/handle/10665/258698/9789241512763-eng.pdf;jsessionid=ADE283C8CB26551A77926CBFF11BBF4D?sequence=1-74 (accessed January 31, 2021).

Turner, N., and Caswell, G. (2020). Moral ambiguity in media reports of dying alone. *Mortality* 25, 266–281. doi: 10.1080/13576275.2019.1657388

Valentine, C. (2008). *Bereavement Narratives: Continuing Bonds in the Twenty-First Century*. OXford: Routledge. doi: 10.4324/9780203893364

Valentine, C. (2009). Negotiating a loved one's dying in contemporary Japanese society. *Mortality* 14, 34–52. doi: 10.1080/13576270802591269

Valentine, C. (2010). Identity and the good death in the narratives of bereaved Japanese people. *Grief Matters* 13, 82–86.

Valentine, C. a (eds). (2017). Families *Bereaved by Alcohol or Drugs: Research on Experiences. Coping and Support*. London: Routledge. doi: 10.4324/9781315670294

van Gennep, A. (1960). *The Rites of Passage*: Chicago, IL: University of Chicago Press. doi: 10.7208/chicago/9780226027180.001.0001

Walter, T. (1996). A new model of grief: bereavement and biography. *Mortality* 1, 7–25. doi: 10.1080/713685822

Walter, T. (1999). *On Bereavement the Culture of Grief*. Buckingham: Open University Press.

Walter, T. (2007). Modern grief. postmodern grief. *Int. Rev. Sociol.* 17, 123–134. doi: 10.1080/03906700601129798

Walter, T. (2020). *Death in the Modern World*. London: Sage Publications.

Walter, T., Ford, A., Templeton, L., Valentine, C., and Velleman, R. (2017). Compassion or stigma? How adults bereaved by alcohol or drugs experience services. *Health Soc. Care Commun.* 25, 1714–1721. doi: 10.1111/hsc.12273

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

ORIGINAL RESEARCH
published: 26 March 2021
doi: 10.3389/fpubh.2021.636089

Major Stress-Related Symptoms During the Lockdown: A Study by the Italian Society of Psychophysiology and Cognitive Neuroscience

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Specialty section:
This article was submitted to Public Health Policy, a section of the journal Frontiers in Public Health

Received: *30 November 2020*
Accepted: *26 February 2021*
Published: *26 March 2021*

Citation:
Invitto S, Romano D, Garbarini F, Bruno V, Urgesi C, Curcio G, Grasso A, Pellicciari MC, Koch G, Betti V, Fiorio M, Ricciardi E, de Tommaso M and Valeriani M (2021) Major Stress-Related Symptoms During the Lockdown: A Study by the Italian Society of Psychophysiology and Cognitive Neuroscience. Front. Public Health 9:636089. doi: 10.3389/fpubh.2021.636089

The clinical effects of the Covid-19 pandemic are now the subject of numerous studies worldwide. But what are the effects of the quarantine imposed by the states that implemented the measures of lockdown? The present research aims to explore, in a preliminary way, the major stress-related symptoms during the lockdown, due to Covid-19, in the Italian population. Subjects were asked to fill out a survey, that traced a line identifying the most relevant psychophysiological symptoms that took into account factors such as perceived stress, body perception, perceived pain, quality of sleep, perceptive variations (i.e., olfactory, gustatory, visual, acoustic, and haptic perception). A network approach formulating a hypothesis-generating exploratory analysis was adopted. Main results of the network analysis showed that the beliefs of having had the Covid-19 was related to individual variables (i.e., gender, working in presence, sleep quality, anxiety symptoms), while the familiarity of Covid-19 disease was related to contextual factors (e.g., number of recorded cases in the Region, working in presence). The self-perception of olfactory and perceptive alterations highlighted a great sensorial cross-modality, additionally, the olfactory impairment was related to the belief of having had the Covid-19. Compared to general network data, BAI, perceived stress, anxiety and chronic pain were in relation to daily sleep disturbance. Main study's results show how the management of the Covid-19 stressful representation, in its cognitive aspects, can modulate the psychophysiological responses.

Keywords: Covid-19, pain, sleep habits, olfactory perception, lockdown, stress, anxiety symptoms

INTRODUCTION

The present work aims to describe the potential long-term psychophysiological effects of the restrictions applied by the Institutions during the Coronavirus pandemic, a world emergency condition that forced the population to go into lockdown or/and quarantine.

The term "quarantine" and the term "lockdown" have become commonly used today. The term quarantine indicates a period of safety, needed to limit the infections, that is imposed on one or more persons who have or may have contracted a highly contagious syndrome that is needed to limit infections. Quarantine differs from isolation which, on the other hand, coincides with the separation of infected individuals from the rest of potentially healthy individuals (1). The term lockdown instead represents a strict limitation of relational, work and social activities (2).

During the Covid-19 pandemic, the governments of many countries imposed a long period of lockdown or quarantine on citizens in order to monitor the epidemic and keep potential infections under control: but there is talk of a measure of social containment to which no one could be prepared for, which upset daily habits and severely impacted psycho-physical well-being (1, 3, 4). The negative psychological effects that the lockdown left on the world population are now documented and space is further opened for new studies that will evaluate the effects over time.

In fact, during the quarantine period there are numerous stressors that, according to the literature, contribute to making us experiencing the period of social distancing in an even more difficult way. In this regard, it was found that the longer the duration of the quarantine, the more likely it is to develop feelings of anger, symptoms of post-traumatic stress disorder and phobic avoidance behaviors (5). Especially, there seems to be fear of developing symptoms of the disease and infecting others (6). The loss of the job, the daily routine and the cancellation of social contact are then often indicated as causes of negative feelings, such as boredom, demoralization, a sense of loneliness and isolation from the rest of the world. It also emerges that the fear of not having supplies available for subsistence, such as food or drugs, is a source of additional stress, which causes anxiety, anger, and frustration in people (5).

The data collected from previous pandemics suggest the probability that during the period of social distancing, phobic or obsessive disorders may develop that persist long after the end of the epidemic. Research conducted on individuals who had been quarantined due to possible contact with the SARS virus found that after the emergency ended, 54% of people who had been placed in isolation avoided coughing or sneezing, 26% avoided closed and crowded places and 21% avoided all public spaces (7). A related long-term study, carried out after the quarantine period, highlighted the presence of behavioral changes aimed at reducing the hypothetical risk of contagion, such as compulsive hand washing and avoidance of crowded places (8). In addition, an analysis conducted on hospital staff who had come into contact with SARS patients, found that acute stress symptoms were reported after the end of the quarantine period, such as severe anxiety, irritability, insomnia, poor concentration and decreased productivity work (9).

In light of this recent literature, this political-health condition could be considered a chronic stressor for the body. In fact, the effects of chronic stress, in this particular Covid-19 pandemic period, are not due exclusively to health aspects, but to political and social indications linked to constraints not only on lifestyle and on the possibilities of movement and social interaction, but also to economic conditions directly caused by the lock down (10, 11). It is well-known that psychological states can influence physiological responses, and more in general, physical health. For example, states of anxiety and stress are accompanied by physiological changes which can be regarded as high arousal (12), with augmented skin conductance response, increased startle reflex and greater pupil dilation (13). The levels of cortisol, the hormone involved in the fight or flight response to potential threats, are characterized by a relatively rapid increase followed by a progressive decline in adaptive responses to stress, while on the contrary, flatter reactivity and recovery is a maladaptive response often called blunted reactivity (14). In general, feelings of anxiety and stress are accompanied by physical signs and symptoms such as palpitations, a sense of constriction in the chest, tightness in the throat, difficulty in breathing, epigastric discomfort or pain, dizziness and weakness in the legs, dryness of the mouth, sweating, vomiting, tremor, running in panic and sudden micturition (15). In the last months, it has been stressed that prolonged home confinement during a disease outbreak may affect people's physical and mental health (16, 17). This can happen by reducing the level of physical activity and the exposure to daylight, and by increasing the level of stress due to social isolation and the impossibility to engage in satisfying activities. The direct effects of these changes are both the disruption of night-time sleep (18) and the increase of the risk of mental health problems (1, 19): usually these effects are very interconnected to each other and might be seen as the potential first steps toward more severe symptomatology, such as post-traumatic stress disorder (PTSD). In fact, increased stress and greater impact of depression and anxiety symptomatology have been reported all around the world as a consequence of the Covid-19 pandemic (20, 21). Recent results from a study carried out in Italy (6) reported that the recent pandemic appeared to be a risk factor for sleep disorders and psychological diseases also in the Italian population, as previously seen in China. Another study (22) showed that during home confinement, sleep timing markedly changed, with people going to bed and waking up later (spending more time in bed) with a paradoxical reduction of sleep quality. The authors claimed that the increase in sleep difficulties was stronger for people with a higher level of depression, anxiety and stress symptomatology. Such individual and gender differences have been confirmed as very relevant, highlighting a different time course of sleep and mental health between genders during the home confinement period, with women showing greater long-term resilience during the lockdown and males as the most vulnerable to the extension of the restraining measures (23).

Furthermore, changes in the amount of physical activity could be considered as a possible factor contributing to changes in perceived stress during the quarantine. Accumulating evidence

suggests that perceived stress is inversely related to the amount of physical activity and positively associated with sedentary time, especially in the young population (24). In this frame of reference, it could be hypothesized that reduced physical activity induced by the lockdown could have an impact on perceived stress (25, 26). However, a study in the Italian population showed that physical activity levels were not reduced during lockdown, but rather slightly increased (27), thus ruling out a role of this factor as potential stressor in our country.

This highly stressful condition, together with the information passed on by the media, on the related Covid-19 symptoms, can strongly change, therefore, not only the condition of perceived stress and the levels of anxiety, but also the body perception, sensory, perceptual and psychophysiological parameters (including nociception). In fact, even purely sensory parameters can vary significantly when associated with stressful situations (28–30). Starting from this literature background, the aim of this research was to explore, in a preliminary way, the major stress-related symptoms during the lockdown, due to Covid-19, in the Italian population. To investigate these psychophysiological variations, we observed, through an exploratory analysis, the networks between heterogeneous aspects. In particular, we identified two main networks. The first network (Network A) aimed at connecting individual differences (e.g., gender, sleep quality, anxiety symptoms), social (e.g., education level, working in presence) and contextual variables (e.g., number of cases recorded in the region) to the belief of having had the Covid-19, or that a family member had it. The second network (Network B) aimed at exploring how belief of having had the Covid-19 was related to perceived sensory modulations and changes (e.g., altered olfactory perception, vision, or taste). The idea of using this network model arose from the fact that we did not have a network baseline among these variables, and we did not have possible control model od Covid-19. The only possibility was to link relational pathways to Covid-19 sensory and psychophysiological aspects, assessed in a pandemic condition, and correlated to the perceived stress.

METHODS

Study Population

In total, 2.992 participants (Mean age = 39.36; sd = 15.06; 75.5%women) were engaged for compilation of the online survey. The survey was available from March to May 2020, during the first Italian lock down. Subjects were recruited through online announcements on the social and official websites of the Society of psychophysiology and cognitive neuroscience (i.e., www.sipf.it; SIPF Twitter, SIPF Facebook) and through the advice on the link of the SIPF members of each research unit included in this study. The participants were not recruited individually but through the online announcements, so we could not quantify the number of people who read the advice but did not participate in the research. The research participation was voluntary, anonymous and did not include study exclusion criteria. Any subject reported a psychiatric diagnosis. An information sheet preceded the survey, including information on what the research was about, the reason for conducting the study, how the data would be used, how privacy of data would be maintained, the benefits and risks of taking part in the survey, along with contact details for further information. Ethical approval was obtained from the local Ethics Committee of the University of Torino (prot. n. 147807, 30.03.2020).

Survey

The Survey had to be filled out anonymously *via* Google Form and was divided into two sections: the first one included personal data (e.g., gender, age, etc.), socio-economic (e.g., smart working, work in presence; no work, etc.), geographic, and medical information (e.g., chronic diseases, Covid-19 disease; the belief to have had Covid-19; familiars affected by Covid-19, etc.); the second section included a series of behavioral questionnaires aimed at investigating the main psychophysiological, emotional and perceptive functioning stress related. In particular, were assessed the following variables: the perceived stress with the Perceived Stress Scale (PSS) (31), the anxiety with The Beck Anxiety Inventory (BAI) (32, 33), the body perception with the Body Perception Questionnaire BPQ (34), the chronic pain with the Von Korff scale (35), the sleep disorders with the Pittsburgh Sleep Quality Index (PSQI) (36) using a revised scoring system has been developed based on a 3-factor model based on perceived sleep quality (F1), sleep efficiency (F2) and daily disturbances (F3) (36, 37); finally the Survey proposed a self-assessment scale of one's perceptual and sensorial sensitivity (sight, hearing, taste, smell, touch), and an item on any perceived variation in eating habits. For the analysis of the psychophysiological data, the geographic-contextual variables (i.e., number of Covid-19 positive cases in the Region, number of Covid-19 deaths in the Region) was also considered.

Descriptive Data

The geographic distribution of the participants was quite heterogeneous: Abruzzo (1%), Basilicata (1%), Calabria (1.5%), Campania (2.3%), Emilia Romagna (2%), Friuli Venezia Giulia (0.4%), Lazio (22.9%), Liguria (3.2%), Lombardia (13.08%), Marche (0.47%), Molise (0.17%), Piemonte (11.8%), Puglia (19.56%), Sardegna (6.47%), Sicilia (3.13%), Toscana (9.4%), Trentino Alto Adige (0.17%), Umbria (0.9%), Valle d'Aosta (0.07%), Veneto (3.24%). During the survey availability all the Italian regions was in lockdown. Only 16 (0.53%) subjects declared they had Covid-19, while 259 (8.7%) subjects said they believed they had Covid-19, 95 (3.2%) subjects declared to have a familiar affected by Covid-19 and 1072 (35.8%) subjects declared to have friends with Covid-19. The education qualification was represented as follow: junior high school diploma 6.9%, high school diploma 37.8%, master's degree 35.9%, post-graduate training 19.4%. Education level was not added to the Network analysis because it is an ordinal variable that can't be modeled appropriately with Gaussian Graphical Model (GGM) (38).

Network Analysis

A network is composed of a set of elements named nodes (i.e., the variables) and their connections named edges (i.e., the relationship). It offers the opportunity of analyzing multiple nodes and the complexity of their edges, giving back a

manageable output. For example, networks have been used to model either personality and attitudes in healthy and pathological situations (39–44), or neuropsychological performances in adults (45).

The edges in networks assessing psychological phenomena can be estimated with different methods according to the different types of data.

Network A

When a mix of dichotomous and continuous variables are included the network, like in our Network A, is typically estimated through the GGM (38). By adopting a GGM, edges indicate regularized partial correlations.

The GGM network estimation employs the "least absolute shrinkage and selection operator" (LASSO); (46) algorithm as the regularization parameter (44). The LASSO reduces small correlations to zero (47, 48), by doing so, it reduces the overfitting and limits the finding of false-positive edges, returning a conservative, replicable and interpretable network (43).

The Extended Bayesian Information Criterion was used to select the LASSO value, a method regulated by a parameter γ, that was set at 0.25, a standard value for the psychological literature (49).

Because of the regularization parameter, this method may have a low sensitivity (i.e., not all real edges are detected) but it has a high specificity (i.e., few false positives) (50).

The strength centrality index quantifies the importance of a node according to the number of its neighbors (i.e., edges connected) and the strength of its connections by summing the absolute value of each edge passing through a node (51).

Network B

When only dichotomous variables are included in the network, a better way to estimate the edges is by using the IsingFit model (50). The Ising algorithm uses LASSO-regularized logistic regressions and it was developed to deal with binary data (52).

The IsingFit network estimates the edges as follows: (a) a series of logistic regressions is run where at different steps one variable is the dependent variable, which is regressed on all the others. (b) each variable is put in the dependent variable spot iteratively; this results in having two parameters of association for every couple of nodes. (c) the LASSO is used as a parameter of regularization, reducing to 0 those coefficients that have little predictive value. (d) the final edge estimation is calculated by using the mean of the two parameters for each edge.

The networks analyses for A and B were performed using the JASP software [JASP Team (2020), Version 0.14].

How to Interpret a Network

Edges have no causal meaning *per se*. Each edge indicates conditional dependence between two variables net of the other variables. Basically, it says if two variables are associated after taking out all the variance explained by the other variables.

Thus, when an edge connects two nodes, it means that they are directly associated. The edge expresses the unmediated relation of the two nodes, the variance uniquely shared by the two. When two nodes are disconnected, it means that there is no variance uniquely shared by the two variables, thus any possible simple correlation observed between the two nodes can be explained by the covariance with the other nodes.

A network can also be seen as a predictive model, in which the neighbors of each node are its predictors. Thus, a central node is also a node highly predictable given the others. This means that a node with high strength centrality is more predictable given the others (51).

RESULTS

Network A

Figure 1 represents the best network estimated from the data. The exact value of all edges is reported in **Table 1**, which also shows the strength centrality index on the diagonal.

We wish to pinpoint here a few critical observations. If we put the focus on the beliefs of having had the Covid-19, we can see that it is associated with the conviction that also a close relative number had it. Interestingly, it is also associated with gender. About gender interpretation, 0 implies that the gender of the participant was not related to the other node under investigation. When an edge was different from 0, means that the gender was associated. Specifically, gender was coded as follow: 0 = male; 1 = female. By adopting this code, a positive edge indicates that women had a positive association with the associated node. A negative edge indicates that men are positively associated. It is then related to the work in presence. Moreover, it is also associated with the quality of sleep, the perceived stress and the somatization. Notably, it is only marginally associated with anxiety state, assessed through the BAI, and with the grade of chronic pain. The contextual level (i.e., number of positive cases in the Region, number of deaths in the Region) is only marginally associated with the belief of having had the Covid-19.

By focusing the observation on the belief that a family member had the Covid-19, we can observe that it is associated with the total number of cases recorded in the Region, suggesting a stronger influence of contextual factors, although the number of deaths is not predictive. Again, a strong predictor is to work in presence that seems the biggest predictor of the beliefs of Covid-19 infection. Interestingly any of the stress, anxiety, or somatization variables are predictive of thinking that the family member has had the Covid-19.

Network B

Figure 2 represents the best network estimated from the data. The exact value of all edges is reported in **Table 2**, the strength centrality index is reported on the diagonal of the same table.

A key observation is that the belief of having had the Covid-19 is directly related to the self-perception of changes in olfactory system. The other senses are not predictive *per se*. This is true still in the presence of the social predictor of having a job that requires to work in presence. Notably, the beliefs that a family member had Covid-19 is not related to any changes of perception in oneself. While this is of course intuitive ("my sensory changes do not predict the probability that you had the Covid-19"), it works somehow as a control result within the model, suggesting the validity of the estimated edges. An

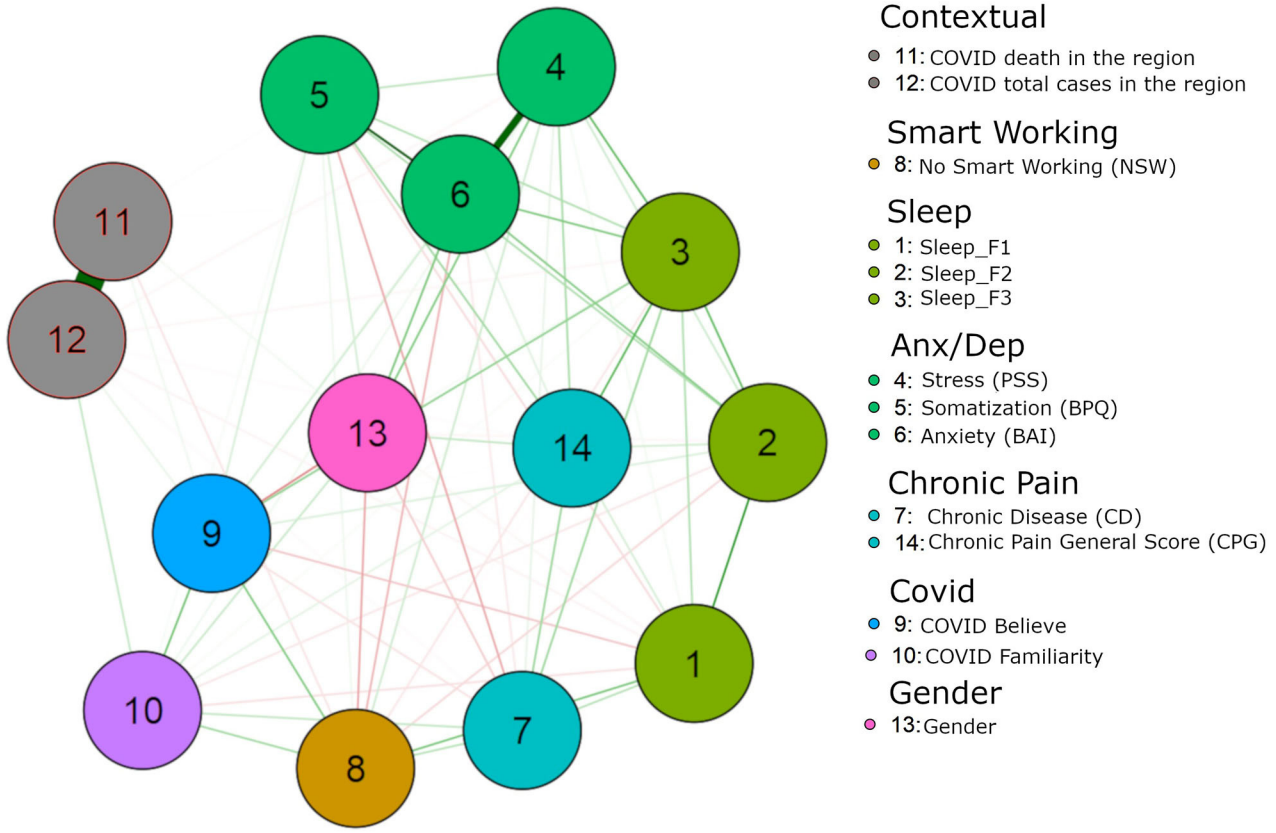

FIGURE 1 | Green lines indicate positive associations. Red lines indicate negative associations. Values are regularized partial correlations. The nodes indicate the variables as follow: 1 Sleep_F1; 2 Sleep_F2; 3 Sleep_F3; 4 PSS (Perceived Stress Scale); 5 BPQ (Body Perception Questionnaire); 6 BAI (Beck Anxiety Inventory); 7 CD (Chronic Disease); 8 NSW (Not Smart Working); 9 Covid B (Covid Believe); 10 Covid F (Covid Familiarity); 11 Covid Death in the Region of the responder; 12 Covid Tot cases in the Region of the responder; 13 Gender; 14 CPG (Chronic Pain General Score).

TABLE 1 | The matrix reports the network weights, which corresponds to regularized partial correlations.

Variable	Sleep_F1	Sleep_F2	Sleep_F3	PSS	BPQ	BAI	CD	NSW	Covid B	Covid F	Covid Death	Covid Tot	Gender	CPG
Sleep_F1	0.813	0.287	0.087	0.01	−0.038	0	0.079	0.154	−0.061	−0.031	0	−0.011	−0.009	0.043
Sleep_F2	0.287	0.913	0.183	0.05	0.09	0.14	0	−0.041	0.037	−0.024	1.655*e*−4	0	−0.009	0.048
Sleep_F3	0.087	0.183	1.174	0.19	0.085	0.147	0.11	−0.025	0.126	0.007	0	−0.009	0.009	0.2
PSS	0.013	0.052	0.186	1.16	0.071	0.446	0.025	0.052	0.048	0.017	0	−0.01	0.146	0.095
BPQ	−0.038	0.09	0.085	0.07	0.911	0.31	−0.095	0.018	0.041	0.01	0.003	3.443*e*−4	0.045	0.106
BAI	0	0.14	0.147	0.45	0.31	1.345	−0.023	−0.082	0.01	0	0.003	0	0.152	0.032
CD	0.079	0	0.11	0.03	−0.095	−0.02	0.675	0.077	−0.03	0.065	0	−0.005	−0.054	0.112
NSW	0.154	−0.041	−0.025	0.05	0.018	−0.08	0.077	0.821	0.142	0.102	−0.027	0	−0.099	−0.002
Covid B	−0.061	0.037	0.126	0.05	0.041	0.01	−0.03	0.142	0.835	0.162	0.017	0.023	−0.136	0.002
Covid F	−0.031	−0.024	0.007	0.02	0.01	0	0.065	0.102	0.162	0.57	0	0.065	0.058	0.028
Covid D	0	1.655*e*−4	0	0	0.003	0.003	0	−0.027	0.017	0	1.035	0.97	0.014	0
Covid Tot	−0.011	0	−0.009	−0.01	3.443*e*−4	0	−0.005	0	0.023	0.065	0.97	1.097	0	−0.004
Gender	−0.009	−0.009	0.009	0.15	0.045	0.152	−0.054	−0.099	−0.136	0.058	0.014	0	0.794	0.064
CPG	0.043	0.048	0.2	0.1	0.106	0.032	0.112	−0.002	0.002	0.028	0	−0.004	0.064	0.736

The diagonal reports the Strength centrality index, which is the sum of all the weights that a node receives. Strength also measures the predictability of a node given the others.

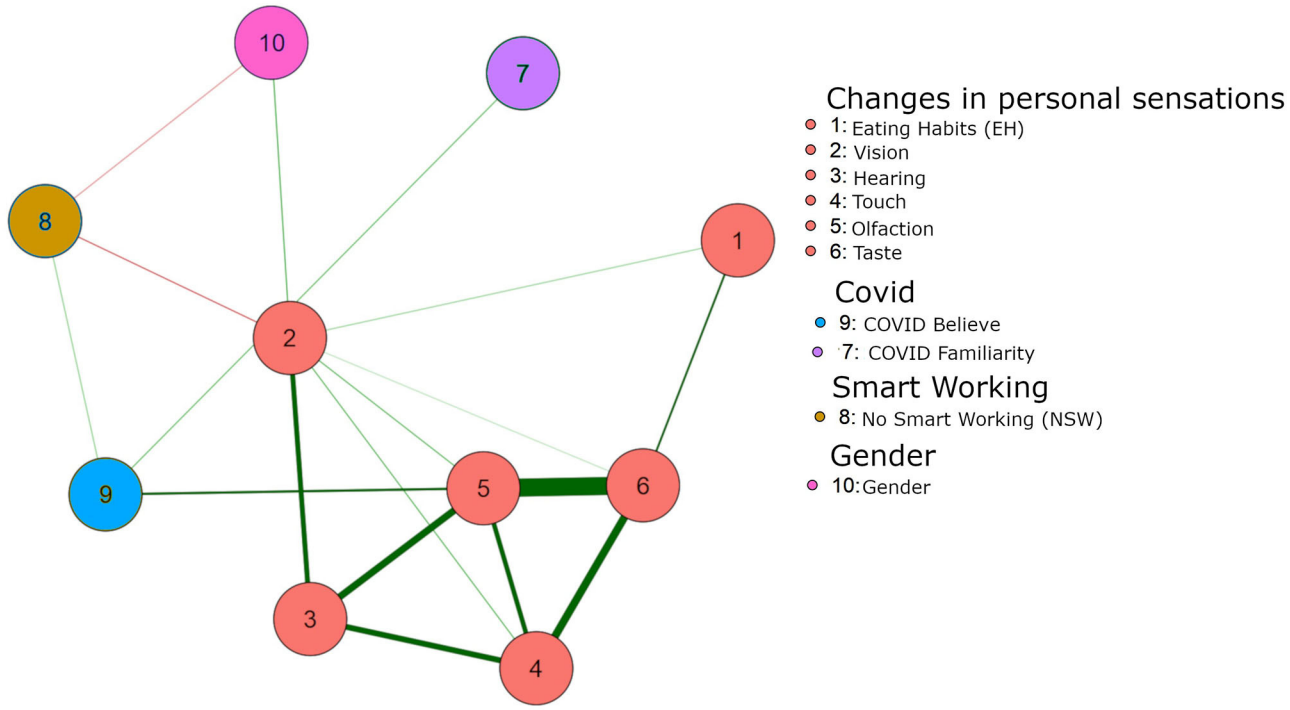

FIGURE 2 | Green lines indicate positive associations. Red lines indicate negative associations. Edges represent the direct association between two edges. The nodes indicate the variables as follow: 1 Eating Habits (EH); 2 Vision; 3 Hearing; 4 Touch; 5 Olfaction; 6 Taste; 7 Covid F; 8 NSW; 9 Covid B; 10 Gender.

TABLE 2 | The matrix reports the network weights, which corresponds to a regularized odd ratio.

Variable	EH (0 = no)	Vision	Hearing	Touch	Olfaction	Taste	Covid F	NSW	Covid B	Gender
EH (0 = no)	−0.84	0.269	0	0	0	0.846	0	0	0	0
Vision	0.269	0.202	1.274	0.473	0.463	0.167	0	−0.496	0	0.536
Hearing	0	1.274	0.447	1.414	1.593	0	0	0	0	0
Touch	0	0.473	1.414	0.673	1.242	1.708	0	0	0	0
Olfaction	0	0.463	1.593	1.242	1.71	3.188	0	0	0.902	0
Taste	0.846	0.167	0	1.708	3.188	1.238	0	0	0.317	0
Covid F	0	0	0	0	0	0	−1.116	0	0.435	0
NSW	0	−0.496	0	0	0	0	0	−0.854	0.298	−0.285
Covid B	0	0	0	0	0.902	0.317	0.435	0.298	−0.5	0
Gender	0	0.536	0	0	0	0	0	−0.285	0	−0.959

The diagonal reports the Strength centrality index, which is the sum of all the weights that a node receives. Strength also measures the predictability of a node given the others.

additional remark can be done on the relations that sensory changes have between themselves that suggests that they go hand-in-hand, so that a change in one sense is predictive of any other sense, although only olfactory perception is related to the Covid-19.

DISCUSSION

The empirical study of the consequences of Coronavirus on the mental health of the world population is attracting the interest of numerous national and international institutions. Several studies investigated the risks for the psychological well-being of individuals in quarantine, the main responses to stress (18), the risk perception (53, 54), the individual emotion (55), and the social behaviors related to the current pandemic and related restrictive measures. In the field of secondary prevention, the collected data may prove useful prospectively to structure *ad-hoc* interventions, aimed at enhancing the adaptation of individuals, improving the quality of life after the emergency and reducing the psychological symptoms deriving from exposure to stress (e.g., anxious, phobic, depressive symptoms, post-traumatic response) (56, 57).

In the field of health sciences, understanding the consequences on mental health in the time of the Coronavirus is becoming an increasingly urgent aspect, which must be contextualized with current events (58). How can we return to a psychosocial adjustment equal to the previous one without an understanding of the psychosocial impact of the crisis? To date, looking at the evidence of studies carried out in China, probably, can give us a chronological advantage in understanding the phenomenon.

Another open question concerns the need to find strategies for managing patients. For example, there are studies on the effects of lockdown in neurological patients, in neurodegenerative disorders (59), in Alzheimer's disease (60), in migraine and headache (61). These studies show us how the symptoms vary according to this new clinical/social situation and how remodeling is necessary to address the request for therapy and the therapeutic offer in a new way.

The Coronavirus and the consequent lockdown have made it so that interest in the importance of psychological well-being re-emerges and, starting from this situation of discomfort, we can only hope that psychological health is the ultimate and definitive goal of a future dedicated to the promotion of human well-being. The data from our study focuses on relevant connections. The first evidence is gender related. There are variations in the responses related to gender aspects, where, for example, women who are in a workplace situation present higher levels of perceptive stress and higher levels of psychophysiological symptoms (i.e., sleep quality, perceived stress, and somatization). These variables seem to be little associated with anxiety levels, which instead are more connected with chronic pain. This result is not in line with literature findings, that described women as more resilient than men during the lockdown (23). We can hypothesize that, given that this greater susceptibility of women is connected to the working condition in presence, probably this greater difficulty is due to seeking a mediation between a family management condition that is not compatible with work in presence.

A particular result is related to the perception of having had Covid-19. This "belief" is connected in an extremely marginal way with the number of positive cases and the number of deaths in the region. Probably this result can be connected to the fact that the perception of the regional situation is only indirectly perceptible. Conversely, the physical symptom connected to changes in breath, in temperature, in psychophysiological aspects such as those assessed (e.g., somatization and perceived stress), can be strongly linked to the idea of being sick, especially in a period in which all media attention is focused on flu symptoms, however frequent and common in the population and not necessarily caused by Covid-19.

Instead, the focus to the belief that a familiar had the Covid-19, is associated with the total number of cases recorded in the Region, suggesting a stronger influence of contextual factors, although the number of deaths is not predictive. This aspect can be due to the different levels between the number of death caused by Covid-19 (in any case passed by the media as "national" and rarely "regional" numbers) and the symptoms experimented within a familiar environment. Interestingly, the perceived stress, the anxiety level, or the somatization is not predictive of thinking that a family member suffered of Covid-19.

Another strong predictor seems to be the work in presence, that is the best predictor of the belief of suffering from Covid-19 infection. This could be motivated by direct contact with several people and by the awareness that the preventive measures used (masks and hand disinfection) are often not so efficient at a preventive level (see the large number of doctors and nurses that were infected in health facilities, where prevention devices are mandatory) (62).

Pointing attention to the perception, a key observation is that the beliefs of having had the Covid-19 is directly related to the self-perception of changes only in olfactory perception and indirectly to gustatory perception and not in another sensorial/perceptive modality. According to our model the gustatory modification could be directly related to the olfactory modification (and not directly related to Covid-19). This is true still in both the social predictors linked to the work (i.e., smart working, work in presence). Notably, the beliefs that a family member got the infection are not related to any changes of perception in oneself. Another interesting relation is the additional remark that sensory modalities can vary together, so that a change in one sensory modality can be predictive of any other sense, although only the olfactory is related to the Covid-19.

We can suppose that this happens for two reasons: both because the information on the Covid-related olfactory symptoms is immediately and massively passed on by the media, and because the sense of smell is strongly modulated by stressful perception (63).

The limitations of the study are strongly connected to the lack of data related to the model at an early stage, in the absence of the pandemic situation. Precisely for this reason, an exploratory model was proposed. In fact, to evaluate the long-term psychophysiological effects due to the pandemic condition, we should evaluate the same proposed model with follow-up.

Other limits are also connected to the correct interpretation of the results.

First, although the sample size is quite large, including people from diverse regions of Italy and is wider than the typical samples of psychology studies, it is important to remember that it cannot be considered representative of the Italian population. Indeed, the sampling strategies available for the study, and adopted, restricted the generalizability of the results.

Second, the edges reflect the unique associations left after conditioning on all the other variables. Thus, it is the association between two variables net of the other variables studied.

It is possible that an unmeasured variable mediates the relation between two edges. This might be unimportant, as it is a feature of any kind of measurement and analysis, but it is important to remind that an association is such only considering the other variables of the network.

Third, all the variables are self-reported, possible biases affecting every self-report measure can potentially affect also our results. For example, sensory changes are not objectively proved, but they are the self-perception of a change. This is not problematic *per se*, but it is a necessary reminder for the proper interpretation of the results.

Nonetheless this, we can conclude that the beliefs of having had the Covid-19 could be related to individual variables, while the familiarity of Covid-19 disease could be linked to contextual factors. Moreover, the self-perception of perceptive modulations, showed that olfactory variations were related to the belief of having had the Covid-19, and that gustatory perception is strictly linked to olfactory one. This point is strictly relevant: by one side because the communication that olfactory impairment is one of the most easy to read Covid-19 symptoms, by the other side why olfactory is one of the most stress-impaired sense (probably this is due to cortical/anatomical olfactory pathways, strictly linked with limbic system). Finally, as also showed in some previous reports, sleep impairment appears to be very relevant in the experience of Covid-19 infection.

This Italian photograph of a particular social-health moment, although it describes, in an exploratory way, the major stress related psychophysiological responses. Furthermore, it allows us to understand how, an altered and not predictable "ecological" system, our psychophysiological responses can be related to cognitive aspects. In this case, the management of the stressful representation is fundamental and is certainly mediated by communication systems. A communication that allows the correct evaluation of events and the correct value of prevention would probably allow a better management of the stressful representations. The connection between communication aspects, stressful representation and psychophysiological variables could also be investigated in a future study.

DATA AVAILABILITY STATEMENT

The original contributions generated in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethical approval was obtained from the local Ethics Committee of the University of Torino (prot. n. 147807, 30.03.2020). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SI conception and design of the study, descriptive data analysis, drafting of the manuscript, survey dissemination, and data interpretation. DR data analysis, data interpretation, drafting the manuscript. FG design of the study and drafting of the manuscript. VB, CU, GC, MP, GK, VB, MF, MT, and MV drafting of the manuscript, contribution to the design of the study and survey dissemination. AG survey editing and dissemination. ER contribution to the design of the study, survey dissemination and manuscript revision. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

The authors acknowledge all the members of Society of Psychophysiology and Cognitive Neuroscience who contributed to the online recruitment of subjects.

REFERENCES

1. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* (2020) 395:912–20. doi: 10.1016/S0140-6736(20)30460-8
2. Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Bania J, et al. The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. *J Travel Med.* (2020) 27: taaa037. doi: 10.1093/jtm/taaa037
3. Saurabh K, Ranjan S. Compliance and psychological impact of quarantine in children and adolescents due to covid-19 pandemic. *Indian J Pediatr.* (2020) 87:532–6. doi: 10.1007/s12098-020-03347-3
4. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis.* (2004) 10:1206–12. doi: 10.3201/eid1007.030703
5. Fawaz M, Samaha A. COVID-19 quarantine: post-traumatic stress symptomatology among Lebanese citizens. *Int J Soc Psychiatry.* (2020) 66:666–74. doi: 10.1177/0020764020932207
6. Casagrande M, Favieri F, Tambelli R, Forte G. The enemy who sealed the world: effects quarantine due to the COVID-19 on sleep quality, anxiety, and psychological distress in the Italian population. *Sleep Med.* (2020) 75:12–20. doi: 10.1016/j.sleep.2020.05.011
7. Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R. Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect.* (2008) 136:997–1007. doi: 10.1017/S0950268807009156
8. Cava MA, Fay KE, Beanlands HJ, McCay EA, Wignall R. The experience of quarantine for individuals affected by SARS in Toronto. *Public Health Nurs.* (2005) 22:398–406. doi: 10.1111/j.0737-1209.2005.220504.x
9. Bai YM, Lin CC, Lin CY, Chen JY, Chue CM, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatr Serv.* (2004) 55:e1055. doi: 10.1176/appi.ps.55.9.1055
10. Tisdell CA. Economic, social and political issues raised by the COVID-19 pandemic. *Econ Anal Policy.* (2020) 68:17–28. doi: 10.1016/j.eap.2020.08.002
11. He H, Harris L. The impact of Covid-19 pandemic on corporate social responsibility and marketing philosophy. *J Bus Res.* (2020) 116:176–82. doi: 10.1016/j.jbusres.2020.05.030
12. Lader M. The psychophysiology of anxiety. *Encephale.* (1983) 9:205B—10B.
13. Hyde J, Ryan KM, Waters AM. Psychophysiological markers of fear and anxiety. *Curr Psychiatry Rep.* (2019) 21:56. doi: 10.1007/s11920-019-1036-x
14. Schumacher S, Kirschbaum C, Fydrich T, Ströhle A. Is salivary alpha-amylase an indicator of autonomic nervous system dysregulations in mental disorders?-A review of preliminary findings and the interactions with cortisol. *Psychoneuroendocrinology.* (2013) 38:729–43. doi: 10.1016/j.psyneuen.2013.02.003
15. Lader M. Some psychophysiological aspects of anxiety. In: *Current Themes in Psychiatry 1*. London: Palgrave Macmillan Education UK. p. 70–82.
16. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health.* (2020) 17:1729. doi: 10.3390/ijerph17051729

17. World Health Organization. *Mental Health and Psychosocial Considerations During COVID-19 Outbreak. World Heal Organ.* (2020). Available online at: https://apps.who.int/iris/handle/10665/330893 (accessed February 09, 2021).
18. Altena E, Baglioni C, Espie CA, Ellis J, Gavriloff D, Holzinger B, et al. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *J Sleep Res.* (2020) 29:e13052. doi: 10.1111/jsr.13052
19. Rubin DB, VanHooser SD, Miller KD. The stabilized supralinear network: a unifying circuit motif underlying multi-input integration in sensory cortex. *Neuron.* (2015) 85:402–17. doi: 10.1016/j.neuroN.2014.12.026
20. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatr.* (2020) 52:e102066. doi: 10.1016/j.ajp.2020.102066
21. Vindegaard N, Benros ME. COVID-19 pandemic and mental health consequences: systematic review of the current evidence. *Brain Behav Immun.* (2020) 89:531–42. doi: 10.1016/j.bbi.2020.05.048
22. Cellini N, Canale N, Mioni G, Costa S. Changes in sleep pattern, sense of time and digital media use during COVID-19 lockdown in Italy. *J Sleep Res.* (2020) 29:e13074. doi: 10.1111/jsr.13074
23. Salfi F, Lauriola M, Amicucci G, Corigliano D, Viselli L, Tempesta D, et al. Gender-related time course of sleep disturbances and psychological symptoms during the COVID-19 lockdown: a longitudinal study on the Italian population. *Neurobiol Stress.* (2020) 13:100259. doi: 10.1016/j.ynstr.2020.100259
24. Tan SL, Jetzke M, Vergeld V, Müller C. Independent and combined associations of physical activity, sedentary time, and activity intensities with perceived stress among university students: internet-based cross-sectional study. *JMIR Public Heal Surveill.* (2020) 6:e20119. doi: 10.2196/20119
25. Panahi S, Tremblay A. Sedentariness and health: is sedentary behavior more than just physical inactivity? *Front Public Heal.* (2018) 6:e00258. doi: 10.3389/fpubh.2018.00258
26. Ingram J, Maciejewski G, Hand CJ. Changes in diet, sleep, and physical activity are associated with differences in negative mood during COVID-19 lockdown. *Front Psychol.* (2020) 11:e588604. doi: 10.3389/fpsyg.2020.588604
27. Di Renzo L, Gualtieri P, Pivari F, Soldati L, Attinà A, Cinelli G, et al. Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *J Transl Med.* (2020) 18:229. doi: 10.1186/s12967-020-02399-5
28. Rolls ET. The functions of the orbitofrontal cortex. *Brain Cogn.* (2004) 55:11–29. doi: 10.1016/S0278-2626(03)00277-X
29. Invitto, Grasso. Chemosensory perception: a review on electrophysiological methods in "cognitive neuro-olfactometry." *Chemosensors.* (2019) 7:45. doi: 10.3390/chemosensors7030045
30. Trachtman JN. Post-traumatic stress disorder and vision. *Optometry.* (2010) 81:240–52. doi: 10.1016/j.optm.2009.07.017
31. Siqueira Reis R, Ferreira Hino AA, Romélio Rodriguez Añez C. Perceived stress scale. *J Health Psychol.* (2010) 15:107–14. doi: 10.1177/1359105309346343
32. Beck AT, Steer RA. Beck anxiety inventory manual. *Evol Ecol.* (1990) 15:501–20.
33. Starosta A.J, Brenner LA. Beck anxiety inventory. In: Kreutzer J, DeLuca J, Caplan B, editors. *Encyclopedia of Clinical Neuropsychology*. Cham: Springer (2017).
34. Porges SW. *Body Perception Questionnaire*. College Park, MD: Laboratory of Developmental Assessment, University of Maryland (1993).
35. Von Korff M, Ormel J, Keefe FJ, Dworkin SF. Grading the severity of chronic pain. *Pain.* (1992) 50:133–49. doi: 10.1016/0304-3959(92)90154-4
36. Curcio G, Tempesta D, Scarlata S, Marzano C, Moroni F, Rossini PM, et al. Validity of the Italian version of the pittsburgh sleep quality index (PSQI). *Neurol Sci.* (2013) 34:511–9. doi: 10.1007/s10072-012-1085-y
37. Curcio G, Ferrara M, De Gennaro L. Sleep loss, learning capacity and academic performance. *Sleep Med Rev.* (2006) 10:323–37. doi: 10.1016/j.smrv.2005.11.001
38. Epskamp S, Waldorp LJ, Mõttus R, Borsboom D. The gaussian graphical model in cross-sectional and time-series data. *Multivariate Behav Res.* (2018) 53:453–80. doi: 10.1080/00273171.2018.1454823
39. Schmittmann VD, Cramer AOJ, Waldorp LJ, Epskamp S, Kievit RA, Borsboom D. Deconstructing the construct: a network perspective on psychological phenomena. *New Ideas Psychol.* (2013) 31:43–53. doi: 10.1016/j.newideapsych.2011.02.007
40. Dalege J, Borsboom D, van Harreveld F, van den Berg H, Conner M, van der Maas HLJ. Toward a formalized account of attitudes: the causal attitude network (CAN) model. *Psychol Rev.* (2016) 123:2–22. doi: 10.1037/a0039802
41. Borsboom D. A network theory of mental disorders. *World Psychiatry.* (2017) 16:5–13. doi: 10.1002/wps.20375
42. Cramer AOJ, van der Sluis S, Noordhof A, Wichers M, Geschwind N, Aggen SH, et al. Dimensions of normal personality as networks in search of equilibrium: You can't like parties if you don't like people. *Eur J Pers.* (2012) 26:414–31. doi: 10.1002/per.1866
43. Costantini G, Epskamp S, Borsboom D, Perugini M, Mõttus R, Waldorp LJ, et al. State of the aRt personality research: a tutorial on network analysis of personality data in R. *J Res Pers.* (2015) 54:13–29. doi: 10.1016/j.jrp.2014.07.003
44. Costantini G, Richetin J, Preti E, Casini E, Epskamp S, Perugini M. Stability and variability of personality networks. A tutorial on recent developments in network psychometrics. *Pers Individ Dif.* (2017) 136:68–8. doi: 10.1016/j.paid.2017.06.011
45. Tosi G, Borsani C, Castiglioni S, Daini R, Romano D. Complexity in neuropsychological assessments of cognitive impairment: a network analysis approach. *Cortex.* (2020) 124:85–96. doi: 10.1016/j.cortex.2019.11.004
46. Tibshirani R. Regression shrinkage and selection *via* the lasso. *J R Stat Soc Ser B.* (1996) 58:267–88.
47. McNeish DM. Using Lasso for predictor selection and to assuage overfitting: a method long overlooked in behavioral sciences. *Multivariate Behav Res.* (2015) 50:471–84. doi: 10.1080/00273171.2015.1036965
48. Epskamp S, Fried EI. A tutorial on regularized partial correlation networks. *Psychol Methods.* (2018) 23:617–34. doi: 10.1037/met0000167
49. Epskamp S. *Regularized Gaussian Psychological Networks: Brief Report on the Performance of Extended BIC Model Selection*. Ithaca, NY (2016).
50. Epskamp S, Kruis J, Marsman M. Estimating psychopathological networks: be careful what you wish for. *PLoS ONE.* (2017) 12:1–13. doi: 10.1371/journal.pone.0179891
51. Barrat A, Barthélemy M, Pastor-Satorras R, Vespignani A. The architecture of complex weighted networks. *PNAS.* (2004) 101:3747–52. doi: 10.1073/pnas.0400087101
52. van Borkulo CD, Borsboom D, Epskamp S, Blanken TF, Boschloo L, Schoevers RA, et al. A new method for constructing networks from binary data. *Sci Rep.* (2014) 4:5918. doi: 10.1038/srep05918
53. Motta Zanin G, Gentile E, Parisi A, Spasiano D. A preliminary evaluation of the public risk perception related to the covid-19 health emergency in italy. *Int J Environ Res Public Health.* (2020) 17:3024. doi: 10.3390/ijerph17093024
54. Dryhurst S, Schneider CR, Kerr J, Freeman ALJ, Recchia G, van der Bles AM, et al. Risk perceptions of COVID-19 around the world. *J Risk Res.* (2020) 23:994–06. doi: 10.1080/13669877.2020.1758193
55. Mazza C, Ricci E, Biondi S, Colasanti M, Ferracuti S, Napoli C, et al. P. A nationwide survey of psychological distress among italian people during the covid-19 pandemic: Immediate psychological responses and associated factors. *Int J Environ Res Public Health.* (2020) 17:3165. doi: 10.3390/ijerph17093165
56. Harper CA, Satchell LP, Fido D, Latzman RD. Functional fear predicts public health compliance in the COVID-19 pandemic. *Int J Ment Health Addict.* (2020). doi: 10.1007/s11469-020-00281-5. [Epub ahead of print].
57. Kim SJ, Bostwick W. Social vulnerability and racial inequality in COVID-19 deaths in Chicago. *Heal Educ Behav.* (2020) 47:509–13. doi: 10.1177/1090198120929677
58. de Lima CVC, Cândido EL, da Silva JA, Albuquerque LV, Soares L de M, do Nascimento MM, et al. Effects of quarantine on mental health of populations affected by Covid-19. *J Affect Disord.* (2020) 275:253–4. doi: 10.1016/j.jad.2020.06.063
59. Ferini-Strambi L, Salsone M. COVID-19 and neurological disorders: are neurodegenerative or neuroimmunological diseases more vulnerable? *J Neurol.* (2021) 268:409–19. doi: 10.1007/s00415-020-10070-8
60. Muntsant-Soria A, Gimenez-Llort L. Impact of social isolation on the behavioral and functional profiles and hippocampal atrophy asymmetry

in dementia in times of coronavirus pandemic (COVID-19): A translational neuroscience approach. *Front Psychiatry.* (2020) 11:572583. doi: 10.3389/fpsyt.2020.572583

61. Dallavalle G, Pezzotti E, Provenzi L, Toni F, Carpani A, Borgatti R. Migraine symptoms improvement during the COVID-19 lockdown in a cohort of children and adolescents. *Front Neurol.* (2020) 11:e579047. doi: 10.3389/fneur.2020.579047
62. WHO. Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19). *World Heal Organ.* (2020) 27:1–7.
63. Hoenen M, Wolf OT, Pause BM. The impact of stress on odor perception. *Perception.* (2017) 46:366–76. doi: 10.1177/0301006616688707

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

CORRECTION
published: 11 June 2021
doi: 10.3389/fpubh.2021.711132

Corrigendum: Major Stress-Related Symptoms During the Lockdown: A Study by the Italian Society of Psychophysiology and Cognitive Neuroscience

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Keywords: Covid-19, pain, sleep habits, olfactory perception, lockdown, stress, anxiety symptoms

OPEN ACCESS

Approved by:
Frontiers Editorial Office, Frontiers Media SA, Switzerland

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Specialty section:
This article was submitted to Public Health Policy, a section of the journal Frontiers in Public Health

Received: *18 May 2021*
Accepted: *20 May 2021*
Published: *11 June 2021*

Citation:
Invitto S, Romano D, Garbarini F, Bruno V, Urgesi C, Curcio G, Grasso A, Pellicciari MC, Koch G, Betti V, Fiorio M, Ricciardi E, de Tommaso M and Valeriani M (2021) Corrigendum: Major Stress-Related Symptoms During the Lockdown: A Study by the Italian Society of Psychophysiology and Cognitive Neuroscience. Front. Public Health 9:711132. doi: 10.3389/fpubh.2021.711132

A Corrigendum on

Major Stress-Related Symptoms During the Lockdown: A Study by the Italian Society of Psychophysiology and Cognitive Neuroscience
by Invitto, S., Romano, D., Garbarini, F., Bruno, V., Urgesi, C., Curcio, G., et al. (2021). Front. Public Health 9:636089.doi: 10.3389/fpubh.2021.636089

An author name was incorrectly spelled as **Giacomo Kock**. The correct spelling is **Giacomo Koch**.

In the published article, there was an error in affiliation **7**. Instead of "Dipartimento di Neuroscienze, Policlinico Tor Vergata, Rome, Italy," it should be "**Fondazione Santa Lucia IRCCS Rome, Italy and Dipartimento di Neuroscienze e Riabilitazione, Università di Ferrara, Ferrara, Italy**".

In the published article, there was an error regarding the affiliation(s) for **Giacomo Koch**. As well as having affiliation(s) **7**, they should also have affiliation **8**.

The authors apologize for this error and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 01 April 2021
doi: 10.3389/fpsyt.2021.626944

Spiritual Well-Being and Mental Health During the COVID-19 Pandemic in Italy

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During the COVID-19 pandemic in Italy, people and families experienced a new and sudden situation that forced them to stay in their homes for a long period (February 25- May 26). In this context, many people found themselves in great difficulty, not only because of the fear of contagion or the economic problems deriving from the closure of production activities but also because the virus profoundly changed the way of life in society. The "Social distancing" concept became central in all personal relationships, including close family relationships. In this situation, our paper seeks to understand the role of spirituality and religiosity in reacting to this difficult situation and in particular on the physical and psychological health of the people involved. The data we present here are part of a multidisciplinary research with a quantitative theoretical framework. As the data was collected during the first Italian lockdown, a total of 1,250 adults from all over Italy participated in the on-line questionnaire. Among the main results it emerged that the participants perceived lower levels of spiritual well-being and mental health than the pre-pandemic situation with a significant gender difference; in fact, women perceived lower mental health than men. At the same time, it is evident that spirituality and religious practices are a protective factor connected not only with psychological and mental but also physical health. Finally, it appears evident that the family is a protective factor with respect to mental health, even in a period so full of stress factors, those who did not live alone and especially those who had to take care of small children reported higher perceived mental health and a greater ability to activate coping resources.

Keywords: COVID-19, spiritual well-being, mental health, Italy, religious ritual, mourning process

OPEN ACCESS

Edited by:
Sara Invitto,
University of Salento, Italy

Reviewed by:
Jesús Saiz,
Complutense University of Madrid, Spain
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *07 November 2020*
Accepted: *19 February 2021*
Published: *01 April 2021*

Citation:
Coppola I, Rania N, Parisi R and Lagomarsino F (2021) Spiritual Well-Being and Mental Health During the COVID-19 Pandemic in Italy. Front. Psychiatry 12:626944. doi: 10.3389/fpsyt.2021.626944

INTRODUCTION

The catastrophic and unstoppable nature of COVID-19 has produced a series of devastating effects from an economic, social and psychological point of view at a global level. At different times and with different strategies, the whole world is tackling the challenges dictated by the pandemic, implementing physical distancing and the partial or general closure of shops, sports centers, schools, community centers and religious institutions, also encouraging, where possible, smart-working (1). In this way, points of reference and crucial meeting places for socialization and also for the performance of religious functions, which are such necessary pillars for mutual support in general, and even more fundamental in this complex period, have been lacking. Despite this, the population, demonstrating resilience and marked adaptation skills, immediately implemented

compensatory strategies to cope with the social isolation into which they were forced: in fact, innumerable initiatives were created online to offer solidarity physical, psychological and spiritual well-being. Online communities came together to practice recreational, sports and spiritual-religious activities "together." Moreover, Yang et al., for example, argue how the use of 360° virtual tour offer a tourist experience in a moment in which the directives are to stay at home; this type of activity can, therefore, help reduce the stress caused by the pandemic (2).

These activities, particularly of a religious nature, made it possible to reduce the physical distances imposed by forced isolation without putting people's health at risk (3, 4), helping to reduce the negative effects of isolation, particularly in older people (5, 6). For many people, spiritual and religious practices give meaning, purpose and constitute a supportive community (7, 8). While, on the one hand the online initiatives managed to mitigate the negative effects of this situation, on the other, the restrictions adopted, while managing to slow down the infection, did not lead to the reduction of deaths, at least in some areas of the world where they continue to be high: today there are 1.18 million victims worldwide, of which 277.135 in Europe alone and unfortunately the statistics vary considerably day after day (9).

Although death is the natural conclusion of the life cycle, the suddenness of this event, its mass diffusion and the consequent interruption of socially shared funeral rituals and practices, on the other hand, have certainly limited the functional capacity of the victims' relatives to process death (10, 11); this has contributed to prolonged pain, thus increasing the risk of complicated bereavement (10) which can result in prolonged bereavement disorder (12). This situation has undoubtedly contributed to compromising essential areas of mental and physical functioning (13).

RELIGION AND SPIRITUALITY: SAME CHROMATIC SCALE?

As Thunè-Boyle et al. (14) underline, religion and spirituality appear as parts of the same chromatic scale. Although religion and spirituality represent, in fact, two different constructs, they are nevertheless strictly interconnected and difficult to separate (15). Furthermore, the literature highlights how they are the reference point for the life of many people, especially in times of difficulty (16–20). Religiosity has been defined as a multidimensional construct, oriented toward institutions and traditions (21), considered as a system of beliefs and practices (22) and defined by norms, rules, dogmas and rituals, uniting people who share the same creed (18).

Many authors have highlighted how those who are faced with adverse personal life situations such as a disease like cancer (23, 24) or the death of a loved one (25–27), particularly troubled migration paths (28, 29) or events involving the wider community such as earthquakes, tsunamis (30) tend to be more religious. As reported by Galen (31), the effects of religiosity on well-being seem to be related more to social support, a healthy lifestyle and the idea of existential certainty, than to the religious content of the beliefs in themselves; it would seem, in fact, that a large part of the advantage of religious individuals derives from being members of social groups. Spirituality, on the other hand, is seen as a more intimate dimension (18), a larger construct, an individual effort to discover the sacred or meaning of life (22) without confessional constraints (21, 32). Furthermore, it is defined by Puchalski et al. (33) as essential for humanity, a dimension, therefore, which contains within it philosophical, cultural and religious beliefs and practices.

SPIRITUAL WELLBEING AND MENTAL HEALTH

Spirituality, a source of comfort, support and meaning (7), instills the idea of a sense of belonging and existential interconnectedness, promoting mental health (34). In the literature, in fact, the accent has been placed on the association that exists between having spirituality and having a greater perception of well-being, physical and mental health (7, 19, 34, 34–37). A particularly important aspect is related to coping, or the function performed by spiritual well-being in the management of stressful events. Spiritual coping can be understood as cognitive and behavioral efforts to find or maintain meaning, purpose and connection in the face of difficult situations (38).

Furthermore, some authors over the years have argued that faith and spirituality can also be perceived as a source of resilience both from a physical, psychological and mental point of view (7, 39).

Especially in stressful situations, faith and spirituality seem to also act positively (3, 40, 41) on the immune system, particularly for older people (3, 40) who are also those most involved in religious and/or spiritual activities (15). Furthermore, spiritual well-being is defined as a state that connects the mind and body of the individual, society, intelligence and health, supporting the individual in his/her attitudes and life goals (42). According to Ellison (43), moreover, spiritual well-being includes both a psycho-social dimension and a more religious dimension, a unifying force that aims to integrate the physical, emotional and social dimensions of health. A study by Saiz et al. (44) demonstrated that spirituality in people with heart failure has broader associations with measures of psychosocial and physical symptoms than belonging to a religious organization and that religious affiliation alone did not emerge as a reliable predictor for health benefits. Indeed, it was even counterproductive: in fact they found that those who belonged to a religious organization, but with a low level of spirituality, perceived a state of anxiety and greater emotional fatigue. The literature also highlights how spiritual well-being is significantly higher in women than in men (34, 45).

Closely connected to spiritual well-being, there are spiritual needs, which include everything that refers to the need to find meaning, value in one's life, peace and a sense of connection. These needs are not necessarily exclusively religious; in fact, even those who do not have a religious faith still refer to systems of beliefs that provide feelings of meaning and purpose (46). In this period of the COVID-19 pandemic they seem to assume a role

and an even deeper meaning in relation to the bewilderment that people are confronted with when faced with such a pervasive, disruptive event, creating daily fragility, fear and uncertainty. In particular, the spiritual distress in those people going through adverse situations, such as that caused by COVID-19, should not be underestimated. By spiritual distress we mean suffering connected to the impossibility of feeling meaning in life, a state of anguish that occurs when an individual experience suffering that in some way undermines their personal identity, for example by raising existential questions about the reason for that particular suffering (47, 48).

Religion and spirituality, therefore, are particularly fundamental and worthy of study in this highly complex period: COVID-19 and its physical, social and psychological consequences represent a challenge for the mental well-being of the entire world population (37, 49).

DEATH IN MODERN SOCIETY AND ITS RITUALS: FROM THE RELIGIOUS DIMENSION TO PSYCHOLOGICAL WELL-BEING

In contemporary society characterized by a process of individualization of subjects who experience a social condition of extreme loneliness, as well as isolation, the experience of death is also progressively isolated (50) when not, tragically, removed (51, 52). There are many strategies for concealing death, some are its spectacularization and mediatic overexposure (51), others offer the solution of a "cosmic" death (52). In the latter case, the anguish of death is resolved by removing it from the individual experience. Elias (50) underlines how the loneliness of the dying person begins with their progressive isolation and has, among its consequences, the loss of the ability to empathize both with the suffering and the mourning event. In a certain sense, death is no longer part of contemporary society, which prefers to represent itself in the power of youth frozen in suspended time.

Each society has tried and tries to make sense of the human story starting from the most tragic experience of the end, which interrupts the flow of earthly life, as we know it. For many scholars, the experience of death is the central cultural theme of various societies, from ancient (53) to contemporary (54) to peasant societies in southern Italy (51). Specifically, the rituals of death give meaning to the cultural representations of the living-dead relationship (51), which are expressed through rituals organized in different practices, temporalities and aesthetics (55, 56) but all marked by the centrality of the body of the deceased and of the community committed to overcoming the mourning event.

The cultural shaping of this event, through the ritual that accompanies mourning, serves to allow the passage of the dead from the world of the living to the afterlife and, at the same time, guarantees the recovery of the community of the living (51, 57). In this perspective, the importance of the celebration of rites and of the community dimension of this celebration is clear, with a progression from the family community of loved ones (51, 55, 57) up to including the collectivity of acquaintances or an entire community. Ultimately, the death rituals that accompany mourning allow us to transcend the risk of a second and more tragic death, namely the risk for survivors of getting entangled in the mournful tragedy of the loss of a loved one and forever losing their ability to "Be stronger in the world" the closer they were to the missing person (57).

Loewenthal and Dein (58) emphasize how religious rituals offer a range of positive mental health benefits, from reduced anxiety to meaning in life and a sense of community. Moreover, as reported by Willard et al. (59), institutional religious practices sometimes affect subjective well-being even more than personal belief or individual spirituality. Finally, the lack of rituals can compromise the ability to connect with the deceased (10), strongly affecting the restoration of well-being in those who remain and who must face mourning their loss without moments of sharing with a wider relational network. which can offer support. "The absence of ritual, such as a funeral, often results in disenfranchised grief, and lacking social or cultural recognition impairs support resources that assist the grieving process" [(13). p. 80]. The process of mourning requires a complex convergence of affective responses, cognitive, behavioral, physical and spiritual adaptations that take shape through rituals and flow into an individualized equilibrium that is a source of well-being.

THE PANDEMIC IN ITALY: IMAGES OF COLLECTIVE DEATH AND MISSED RITES

The pandemic has produced a shock of reality, progressively exposing us to the awareness of an extreme risk, that of death, as a collective community experience, typical of situations of war and natural catastrophes, as opposed to an individual one, in which the experience of passing away acquired the tragedy of an individual and family history.

The death curve in the representation of the disease by experts has become the daily account of the pandemic. In just 1 day, on March 28, 2020, in Lombardy alone, the most affected region of northern Italy, there were 542 deaths from COVID-19. The idea of the end took possession of us with an unprecedented emotional impact through the images from the city of Bergamo, the epicenter of one of the worst affected areas of Italy, of the dead closed in anonymous coffins, without names, without flowers, lined up in church on their last journey in solitude to the afterlife. Coffins, also in Bergamo, transported on military trucks in convoy through the streets of the deserted city, where the living were forced to stay at home, experiencing physical and spiritual distancing from loved ones who were denied the last farewell, so as to safeguard public health, eliminating the rite of the public and collective funeral that restores humanity to such a painful moment for families.

Above all, the silence and emptiness in which this convoy took place was striking. The sense of suspension of time, of loneliness, of lack of reality burst into our lives through the images that came to us from TV and social media and embody that fear, which progressively, starting from the onset of the pandemic, has turned into terror and bewilderment. The pandemic, from being a word of difficult scientific meanings, now acquires a precise, full and absolute meaning: Death.

The people who die, as well as the people who remain, relatives, family members, friends and the many spectators who feel part of an "existential community of destiny" (60), are all condemned to isolation, besides loneliness, faced with the triumph of the deadly virus. According to Migliorati (61), death in the first period of the pandemic broke out as "aseptic death," separated from the individual experience and projected into an anonymous dimension of collective death. In the first period of lockdown, in fact, the dead and their relatives were out of the narrative. In this way, the narrative of death reduced the mournful event, albeit in its tragic nature, to a "side effect" of the pandemic, one of the many dimensions, perhaps even negligible. After all, "they are all elderly, the average age is 81 years old, they all had previous pathologies" [(61). p 40]. The most effective symbolic image of this narrative was the juxtaposition between COVID-19 and war. The pandemic was recounted as a war with its victims (especially the elderly), its heroes (especially the health personnel), its generals, ready to save us with their field strategies (the government, virologists, experts). In short, in the pandemic, death essentially broke into an interpretative scheme that saw a shift of death along the nature-culture continuum toward nature in the sign of the removal of the corpse, away from culture, capable of transcending death through ritual (57).

What happens when funerals are suspended? When the dead and their relatives go through the tragic passing alone? Because this is what happened during the lockdown in Italy: the dead were taken away alone, without a worthy accompaniment, and the living locked in their homes could not meet for worthy rituals that could ease that sudden and devastating pain and share it with people who cared. Thus, it follows that pain has no right of expression through those socially and culturally shared rituals (13); and it is precisely the absence of rituals that contributes to aggravating both the experience of mourning (13, 62) and the feelings of guilt and responsibility dictated by the conflict between what the victim's wishes were and what the state allowed (63).

The experience of death during COVID-19 goes far beyond situations of death by natural catastrophe in which the bodies are missing. In our case the relatives, reduced to members of the larger community that mourned their dead, witness the death of loved ones shut away in their homes. The tragedy of the suspension of rituals in the period of COVID-19 crossed with the tragedy of having to overcome the event alone, at home.

The pandemic has pushed the condition of loneliness, not only of the dying but also of the relatives, toward the most tragic of its epilogs. Experiments were attempted to alleviate the sense of loneliness and isolation in the face of death. For example, the creativity of a hospital chaplain in one of the most affected cities in northern Italy (Bergamo) allowed many relatives to participate remotely in the funeral ceremony via mobile phones. A coffin, a parish priest, a cell phone. All that remains of funeral participation in a period of forced isolation and media coverage of reality. As Dei (64) states "perhaps the most inhuman aspect of this experiment of suspended sociality to which we are forced, even more cruel than the dystopian imaginary fanned by those philosophers who fear our reduction to bare life, is the denial of the rituals appointed to accompany the condolences" [(64). p 2].

A cruelty that became more and more specific in the tragedy of a mourning event suspended, not overcome, entangled in the event of death, when with the passing of the weeks, toward the end of the lockdown period, from the indistinct magma of a collective death the personal stories, the family tragedies, the many faces of the dead and the remaining relatives emerged. At this point it was clear that the patriotic community which mourns its dead is unable to give meaning to the pain of the proximate community of family members, friends for the loss of a loved one.

AIMS

Given the large number of people infected and of deaths in Italy caused by the COVID-19 pandemic, this research focuses on the spiritual well-being and psychological impact of the general population during the lockdown. We believe that is important to deepen our knowledge of the perception of spiritual well-being and mental health so as to develop interventions and support people, to be ready for similar future events in order to reduce the negative consequences of a possible second wave of the virus.

We wish to pursue two main objectives. The first is to further investigate how spiritual well-being dimension was faced by Italian adults during the first weeks of lockdown subsequent to the COVID-19 outbreak. The second is to explore psychological mental health in terms of the psychological impact of the pandemic. We also set out to analyze if there were differences in the perception of spiritual well-being and mental health compared to the pre-pandemic data in the general population. The relationships between spiritual and psychological aspects were also investigated and how these two dimensions are associated with demographic variables (such as age, gender, level of education, marital status), socio-relational variables (such as people lived with, work situation, presence of children, religious beliefs) and the nearness with the COVID-19 disease, for example knowing someone who was infected or who died of coronavirus. We also assume that as spiritual well-being increases the perception of positive mental health increases and that socio-demographic variables, such as gender and age affect spiritual well-being and mental health.

MATERIALS AND METHODS

Measure

The protocol included some questions created *ad hoc* by the research team following several focus groups, which made it possible to identify the areas to be investigated, listed below:

- Spiritual well-being: Jarel Spiritual Well-Being Scale (JSWB) (65, 66). Italian version validated by Magnano et al. (45) composed of 21 items with a five-point Likert scale from 1=strongly disagree to 5=strongly agree. The scale is composed of three factors: Faith and belief (e.g., "Prayer is an important part of my life"), Meaning of life (e.g., "I find meaning and purpose in my life"), and Quality of relationships (I am able to appreciate differences in others). The scale showed a good internal consistency ($\alpha = 0.82$). The higher the scores, the greater the spiritual well-being.

- Mental health: General Health Questionnaire-12 items (GHQ-12): this scale measures the state of mental health over the past few weeks and was developed by Goldberg in the 70s and validated in Italy by Piccinelli et al. (67). The 12-item version, GHQ-12, was the most widely used (68). Participants had to report whether they experienced a particular symptom of mental distress according to a four-point Likert-type scale ("not at all", "less than usual", "more than usual", "rather more than usual"). The six positive items were corrected. Participants who answered "somewhat more than usual" or "more than usual" scored 1, while those who answered "less than usual" or "not at all" scored 0 (the so-called "0-0-1-1 method") (68). A total score ranged from 0 to 12 points; higher scores indicate worse health. The scale showed a good internal consistency ($\alpha = 0.73$).
- Knowledge of people (acquaintance, friend, relative) who had contracted COVID-19 and/or someone who had died from COVID-19.
- Compilation of a socio-demographic data sheet which was included in the questionnaire. The variables taken into consideration are: age, educational qualification, marital status, current job situation, people with the subject lives, children/no children, religious belief.

Procedure

This is a multidisciplinary research which is part of a quantitative theoretical framework. As the data was collected during the lockdown, the questionnaire was administered online. The research was proposed via a link with access to the questionnaire sent by email, WhatsApp, discussion forums and social networks such as Facebook. The platform used for the questionnaire is Microsoft Forms. Before compiling, participants read the aims of the study, the themes proposed, the type of reconstruction, the informed consent stating that participation was voluntary and that they could withdraw at any time by closing the browser window. The inclusion criteria were being at least 18 years old and living in Italy during the lockdown due to the COVID-19 pandemic disease. The convenience sample was recruited through a random cascade sampling, starting from some subjects known by the research team. The research, having an exploratory character, does not want to restore a representative image of the Italian population but rather give a picture of the perceptions of the population during the lockdown in relation to their spiritual and mental health. The compilation of the protocol lasted on average about 22 min per participant.

The data were collected in compliance with the privacy and the research ethics code of the Italian Association of Psychology, after the protocol was approved by the ethics committee of the Department of Education Sciences of the University of Genoa. The research lasted 10 days and was carried out after the first 2 weeks of lockdown. About two thirds of the questionnaires were compiled on the first day of the questionnaire launch, in line with recent and similar studies during the pandemic crisis (49, 69).

Participants

A total of 1,250 adults from all over Italy participated in the on-line questionnaire. Most respondents were women (77.3%), young adults (age M = 42.6 years, SD = 15.7; range 19–88), married or cohabiting with partner (48.3%) or single (41.5%), without children (54.71%), living in a large center (47.9%), employed or self-employed (53.2%), and high education levels (59.8% hold at least a University degree). Participants were born mostly in Italy (96.9%), with the rest indicating 23 different countries of birth. Ecuador, Germany and Romania were the most prevalent. In **Table 2** we report the socio-demographic characteristics in detail.

With regard to religious belief, 40.9% of the participants declared that they were agnostic/atheist or did not have any religious beliefs; 57.4%, on the other hand, declared that they referred to a religious belief, of which the majority (53%) were Catholic Christians.

Data Analysis

Descriptive statistics were calculated for sociodemographic characteristics and information about variables, consisting of frequencies and percentages, while the scores of Jarel Spiritual Well-Being Scale (JSWB) and, General Health Questionnaire (GHQ-12) were expressed as means and standard deviations. Moreover, for JSWB and GHQ-12, skewness and kurtosis values were obtained, with no further interpretation due to the large sample size (70, 71). To investigate the dichotomic variable (gender differences, have children/no children, religious belief and the closeness with the COVID-19 disease such as knowing someone who was infected or died from coronavirus) in relation to JSWB and GHQ-12, *t*-tests were used for independent samples. To compare the differences between our participants and the Italian normative sample and therefore in relation to the pre-pandemic data for JSWB (45) and GHQ-12 (79), *t*-tests were conducted for single samples. While variance analysis was used to investigate the differences between groups (age, marital status, work situation, people lived with) in relation to JSWB and GHQ-12, with *post-hoc* Tukey (for homogeneous variances) or Games-Howell (for non-homogeneous variances) between group comparisons in case of a significant overall F-value. Appropriate effect size statistics that adjust for differences in group sizes were obtained of Cohen's *d* for *t*-tests and η2 for ANOVAs. To explore the relationship between JSWB and GHQ-12 scales, correlation analyses (Pearson correlation coefficient r for GHQ-12 and JSWB and continuous variables) were conducted. We used multiple linear step way regressions to calculate the univariate associations

TABLE 1 | Skewness and Kurtosis values.

	M	SD	Skewness		Kurtosis	
			Value	SE	Value	SE
GHQ-12	6.35	3.05	−0.116	0.072	−0.708	0.143
Jarel SWB scale (JSWB)	52.64	10.33	0.230	0.074	−0.449	0.148
Faith and belief (JSWB)	17.05	7.20	0.041	0.072	−1.127	0.143
Meaning of life (JSWB)	17.71	3.8	−0.294	0.072	−0.176	0.143
Quality of relationships (JSWB)	18.03	2.98	0.020	0.071	−0.361	0.142

TABLE 2 | Spiritual Well-Being Scale (SWBS) and General Health Questionnaire-12 (GHQ-12) comparison between participants and Italian normative sample.

SWBS					GHQ-12				
Participants	**Italian normative sample**	**t (df)**	***P***	**Cohen's *d***	**Participants**	**Italian normative sample**	**t (df)**	***P***	**Cohen's *d***
M (SD)	M (SD)				M (SD)	M (SD)			
52.64 (10.33)	55.03 (9.38)	−7.65 (1, 095)	0.000	0.24	6.35 (3.05)	1.8 (2.3)	50.90 (1,161)	0.000	1.68

TABLE 3 | Descriptive data for all demographic variables, associations between variables and Spiritual well-being and General Health.

Demographic variables	***N***	**%**	**JSWB**				**GHQ-12**			
			M (SD)	**t/F**	***p***	**Cohen's d/η^2_p**	**M (SD)**	**t/F**	***P***	**Cohen's d/η^2_p**
Gender										
Male	278	22.70	51.35 (10.81)	−2.21	0.03	0.16	6.01 (3.07)	−2.08	0.038	0.14
Female	944	77.30	53.01 (10.17)				6.45 (3.04)			
Age										
18-24	192	15.60	49.94 (9.80)	8.9	0.000	0.040	7.35 (3.05)	6.20	0.000	0.026
25-34	295	24.00	51.03 (10.05)				6.38 (3.11)			
35-44	154	12.50	51.42 (9.55)				6.30 (2.97)			
45-54	233	18.90	55.64 (9.82)				5.73 (3.08)			
55-64	265	21.50	54.00 (10.25)				6.11 (2.96)			
≥65	91	7.40	52.79 (11.34)				6.37 (2.74)			
Educational qualification										
Juniorhigh school	31	2.50	51.04	1.33	0.27		7.41 (3.38)	1.29	0.278	
Secondary school	466	37.60	52.48				6.39 (3.00)			
Graduation	544	43.90	52.39				6.30 (3.05)			
Postgraduate specialization	197	15.90	54.01				6.21 (3.09)			
Marital status										
Unmarried/Single	515	41.50	51.55 (10.64)	4.01	0.007	0.010	6.85 (3.04)	8.00	0.000	0.020
Married/Cohabiting	600	48.30	53.66 (10.11)				6.00 (2.97)			
Separated/Divorced	101	8.10	53.18 (8.44)				6.07 (3.39)			
Widower	26	2.10	50.13 (11.46)				5.33 (2.04)			

between sociodemographic characteristics and JSWB and GHQ-12 scales. All tests were two-tailed, with a significance level of $p < 0.05$. Statistical analysis was performed using SPSS Statistic 18.0.

RESULTS

Spiritual Well-Being and General Health: Descriptive Statistics

In **Table 1**, although not necessary given the size of the sample, the skewness and kurtosis analyses are reported, which show that there is a normal distribution of the data.

Spiritual well-being during the COVID-19 pandemic in Italy, measured through the JSWB scale, revealed a sample mean score of 52.64 (SD = 10.33, see **Table 1**). As regards the JSWB Faith and belief dimension the data shows an average of 17.05 (SD = 7.20); with regard to the Meaning of life dimension the average is 17.71 (SD = 3.8) and finally, with regard to the Quality of relationships the average is 18.03 (SD = 2.98).

While the psychological impact, measured through the GHQ-12 scale, revealed a sample mean score of 6.35 (SD = 3.05; see **Table 1**). A total of 932 respondents (80.2%) showed common mental disorder, including adjustment disorders or stress reactions, therefore they were at risk of anxiety/depression (score ≥4), while 230 (19.8%) reported a low psychological impact (score <4).

Regarding the perceived level of spiritual well-being a significant difference between those who participated in the research (M = 52.64, SD = 10.33) and the normative sample emerged (M = 55.03, SD = 9.38) ($t(1095) = -7.65$, $p < 0.001$, Cohen's $d = 0.24$) (45) (see **Table 2**). Also, with regard to mental health from a comparison with the normative sample (M = 1.80, SD = 2.3) (72) a significant difference emerges from the average obtained by the participants in the research (M = 6.35, SD = 3.05, $t(1161) = 50.90$, $p < 0.001$, Cohen's $d = 1.68$) (see **Table 2**).

Spiritual Well-Being and General Health: Demographics Variables

Table 3 shows the descriptive data for all demographic variables as well as the associations between such variables and Spiritual well-being and General Health. Women showed significantly higher levels in both variables.

Through the test for independent samples it emerged that there is a significant difference both as regards the Spiritual Well-Being Scale and as regards the GHQ-12 scale in relation to

TABLE 4 | Descriptive data for Socio-relational variables and associations between variables and Spiritual well-being and General Health.

Socio-relational variables	*N*	%	JSWB				GHQ-12			
			M (SD)	t/F	*p*	Cohen's d/η_p^2	M (SD)	t/F	*P*	Cohen's d/η_p^2
People with the subject lives										
Alone	142	11.50	53.67 (10.85)	3.86	0.009	0.011	5.87 (3.05)	2.21	0.085	
In the family (parents, children, brothers/sisters	705	57.10	53.09 (10.45)				6.50 (3.13)			
with partner	312	25.30	52.15 (9.79)				6.13 (2.82)			
With friends/roomates	76	6.20	49.04 (9.86)				6.55 (3.08)			
Current job situation										
Unchanged from before	169	22.40	53.46 (10.06)	8.38	0.000	0.025	6.00 (2.90)	0.07	0.936	
Smart working	430	57.00	54.39 (10.02)				6.10 (3.08)			
Lost job/layoffs	156	20.00	50.36 (9.55)				6.11 (3.23)			
Children										
No children	677	54.70	51.50 (10.28)	−4.34	0.000	0.27	6.60 (3.03)	2.99	0.003	0.18
Children	561	45.30	54.22 (10.20)				6.06 (3.05)			
Religious belief										
Atheists/agnostics/no beliefs	502	40.90	45.70 (7.56)	−24.24	0.000	1.46	6.23 (3.16)	−1.11	0.268	
Believers	724	57.40	57.85 (8.95)				6.43 (2.97)			

gender: in particular, as shown in the **Table 3**, it emerged that on average women perceive a higher level of spiritual well-being and a lower level of mental health than men.

Moreover, through the univariate ANOVA it emerged that both as regards the JSWB scale ($F(5, 1078) = 8.89$, $p < 0.01$, $\eta_p^2 = 0.040$) and as regards the GHQ-12 scale ($F(5, 1144) = 6.20$, $p < 0.01$, $\eta_p^2 = 0.026$) there is a significant difference in relation to age; in fact, compared to the JSWB scale, *post-hoc* testing revealed significant differences between those aged 18–24 (M = 49.94, DS = 9.80) and 25–34 (M = 51.03, SD = 10.05) and those aged 45-54 (M = 55.64, DS = 9.82) and 55–64 (M = 54.00, DS = 10.25), who have a higher level of spiritual well-being than those who are aged 18–24 years. These findings indicated that younger participants have lower levels of spiritual well-being; also as regards the GHQ-12 scale, those aged between 18 and 24 (M = 7.35, SD = 3.05) have a statistically significant different level of perceived mental health compared to the other age groups (25–34, 35–44, 45–54, 55–64). These findings indicated that younger participants have a lower level of perceived mental health compared to the older participants.

Regarding the educational qualification variable, no significant differences emerged either in relation to spiritual well-being or in relation to mental health.

Regarding marital status, significant differences emerged both in the JSWB scale $F(3, 1090) = 4.01$, $p < 0.01$, $\eta_p^2 = 0.010$, and in the GHQ-12 scale ($F(3, 1157) = 8.00$, $p < 0.01$, $\eta_p^2 = 0.020$). Regarding the JSWB scale, *post-hoc* testing revealed significant differences between the unmarried (M = 51.55, SD = 10.64) and married or cohabiting (M = 53.65, SD = 10.11). These findings indicate that singles have a lower level of spiritual well-being than married or cohabiting participants. Also, for GHQ-12, *post-hoc* testing revealed significant differences between the unmarried (M = 6.85, SD = 3.04) and married or cohabiting participants (M = 6.01, SD = 2.97). These findings indicate that singles have a worse mental health than married participants.

Spiritual Well-Being and General Health: Socio-Relational Variables

In **Table 4** we report the data for some relational variables and the two scales of Spiritual well-being and General Health.

In relation to the variable *people with the subject lives* $F(3, 1083) = 3.86$, $p < 0.01$, $\eta_p^2 = 0.011$, and work situation ($F(2, 658) = 8.38$, $p < 0.01$, $\eta_p^2 = 0.025$) significant differences emerge in the JSWB scale alone. *Post-hoc* testing revealed significant differences between those who live with friends and roommates (M = 49.04, SD = 9.86) and those who live alone (M = 53.67, SD = 10.85) or with families (M = 53.09, SD = 10.45). These findings indicate that those who live with friends or roommates have a lower level of spiritual well-being than those who live alone or in families. Instead, with regard to the work situation variable during the lockdown, *post-hoc* analysis showed that there is a significant difference between those who have jobs or are on layoffs (M = 50.36, SD = 9.55) and those in an unchanged work situation compared to before (M = 53.46, SD = 10.06) or working in smart working (M = 53.39, SD = 10.02). These findings indicate that those who lost their jobs or were laid off perceived a lower level of spiritual well-being than those in unchanged work situations or in smart working.

Conversely, there is no significant difference between the work situations and the perceived level of mental health.

Moreover, with regard to the children/no children variable, those who do not have children declared a perceived worse mental health (GHQ-12) (M = 6.60, SD = 3.03) compared to those with children (M = 6.06, SD = 3.05) ($t(1, 156) = 3$, $p < 0.01$, Cohen's $d = 0.27$).

Finally, with regard to the religious belief variable, the analysis carried out shows that between those who declared themselves as atheists/agnostics or with no religious belief and those who declared a religious belief there is no significant difference in the level of perceived mental health, while there is a significant difference with respect to the perceived level of spiritual

TABLE 5 | Associations between "No contact with COVID-19- contact with COVID-19" and Spiritual well-being and General Health.

Variable	*N*	%	JSWB				GHQ-12			
			M (SD)	T	*p*	Cohen's *d*	M (SD)	t	*P*	Cohen's *d*
No contact with COVID-19	492	39.7	51.86 (10.66)	−2.190	0.03	0.18	6.43 (2.96)	0.576	0.565	
Contact with death	233	18.8	53.81 (10.42)				6.28 (3.21)			

TABLE 6 | Descriptive data for Demographic variables and associations between variables and Spiritual well-being dimension: Faith and belief, Meaning of life, Quality of relationships.

Demographic variables	*N*	%	JSWB Faith and belief				JSWB Meaning of life			
			M (SD)	t/F	*p*	Cohen's *d*/ η_p^2	M (SD)	t/F	*P*	Cohen's *d*/ η_p^2
Gender										
Male	278	22.70	16.08 (7.43)	−2.52	0.01	0.18				
Female	944	77.30	17.35 (7.09)							
Age										
18-24	192	15.60	15.51 (6.73)	8.20	0.000	0.35	16.76 (3.68)	6.31	0.000	0.027
25-34	295	24.00	16.05 (6.95)				17.10 (3.87)			
35-44	154	12.50	16.22 (6.95)				17.76 (3.60)			
45-54	233	18.90	19.01 (6.87)				18.45 (3.68)			
55-64	265	21.50	18.21 (7.44)				18.10 (3.66)			
≥65	91	7.40	16.10 (8.15)				17.65 (3.76)			
Marital status										
Unmarried/Single	515	41.50	16.46 (6.97)	3.07	0.027	0.008	17.20 (3.98)	5.27	0.003	0.013
Married/Cohabiting	600	48.30	17.69 (7.3)				18.04 (3.51)			
Separated/Divorced	101	8.10	16.72 (7.31)				18.33 (4.18)			
Widower	26	2.10	15.39 (8.06)				17.80 (3.84)			

The table shows only the significant analyzes in relation to the variables considered.

well-being (those who declared themselves as atheists/agnostics or with no religious belief = M = 45.70, SD = 7.56, score lower than those who declared a religious belief = M = 57.85, SD = 8.95, $t(1,\ 074) = -24.24$, $p < 0.001$, Cohen's d= 1.46).

Spiritual Well-Being and General Health: Closeness to COVID-19

The closeness with the COVID-19 disease variable is presented in **Table 5**.

It was verified that there is a significant difference between people who know someone who died from COVID-19 (18.8%) and who had no contact with COVID-19 (39.7%): in fact the results show that those who know people who died from COVID-19 perceive higher levels of spiritual well-being compared to those who have not had contact with COVID-19 (M = 53.81, SD = 10.42, M = 51.86, SD = 10.66, $t(631) = -2.19$, $p < 0.05$). It emerged, however, that in relation to this variable there are no significant differences as regards the GHQ-12 scale.

Spiritual-Well-Being Scale: Faith and Belief, Meaning of Life, Quality of Relationships

Further analyzes were made to understand how the sub-dimensions of Jarel Spiritual Well-Being affect demographic and socio-relational variables differently. **Tables 6**, **7** show only the significant analyzes in relation to these variables.

The **Table 6** shows how there is a significant difference in relation to gender regarding the dimension Faith and belief ($t(1142) = -2.52$, $p < 0.05$, Cohen's $d = 0.018$): women perceive greater Faith and belief than men. Moreover, the table shows that both as regards the Faith and Belief dimension ($F(5,\ 1147) = 8.20$, $p < 0.001$, $\eta_p^2 = 0.035$) and as regards the Meaning of life ($F(5,\ 1148) = 6.31$, $p < 0.001$, η_p^2 =0.027) there is a significant difference in relation to age; in fact, compared to the Faith and Belief dimension, *post-hoc* testing revealed significant differences between those aged 18-24, 25-34 and those aged 45-54, 55-64, who have a higher level of Faith and belief and Meaning of life than those who are aged 18-24 and 25-34 years. These findings indicated that younger participants have lower levels of Faith and belief and Meaning of life.

Finally, with regard to the marital status, the results highlight how there is a significant difference both as regards the Faith and belief dimension ($F(3,\ 1159) = 3.07$, $p < 0.05$, $\eta_p^2 = 0.008$), and the Meaning of life dimension ($F(3,\ 1161) = 5.27$, $p < 0.01$, $\eta_p^2 =$ 0.013): in particular from the *post-hoc* it emerges how those who are unmarried/single perceive a lower level of Faith and belief and Meaning of life than those who are married/cohabiting.

TABLE 7 | Descriptive data for Socio relational variables and associations between variables and Spiritual well-being dimension: Faith and belief, Meaning of life, Quality of relationships.

Socio-relational variables	*N*	%	JSWB Faith and belief				JSWB Meaning of life				JSWB Quality of relationships			
			M (SD)	t/F	*p*	Cohen's d/η_p^2	M (SD)	t/F	*p*	Cohen's d/η_p^2	M (SD)	t/F	*p*	Cohen's d/η_p^2
People with the subject lives														
Alone	142	11.5					18.19 (4.03)	4.57	0.003	0.012				
In the family (parents, children, brothers/sisters)	705	57.1					17.70 (3.79)							
with partner	312	25.3					17.87 (3.72)							
With friends//roomates	76	6.2					16.24 (3.64)							
Current job situation														
Unchanged from before	169	22.4	17.73 (7.08)	4.94	0.007	0.014								
Smart working	430	57	17.87 (7.07)											
Lost job/layoffs	156	20	15.80 (6.78)											
Children														
No children	677	54.7	16.2 (6.9)	−4.63	0.000	0.27	17.31 (3.93)	−4.09	0.000	0.24				
Children	561	45.3	18.17 (7.43)				18.22 (3.57)							
Religious belief														
Atheists/agnostics/no beliefs	502	40.9	10.95 (4.81)	−36.56	0.000	2.16	17.07 (3.78)	−4.91	0.000	0.29	17.83 (2.93)	−2.01	0.04	0.12
Believers	724	57.4	21.58 (5.02)				18.17 (3.76)				18.18 (2.96)			

The table shows only the significant analyzes in relation to the variables considered.

With regard to the socio-relational variables, the **Table 7** shows that as regards the variable *people with the subject lives,* significant differences emerge in Meaning of life ($F(3, 1154) = 4.57$, $p < 0.01$, $\eta_p^2 = 0.012$). As for the Meaning of life dimension, *post-hoc* show how those who live with friends and roommates perceive lower levels of Meaning of life than those who live alone, with family or with a partner.

With regard to the Current job situation variable, as reported in **Table 7**, a significant difference emerges in Faith and belief dimension ($F(3, 706) = 4.94$, $p < 0.01$, $\eta_p^2 = 0.014$). From the *post-hoc* it emerges that those who have declared that their work situation has remained unchanged or have switched to smart-working perceive a higher level of Faith and belief than those who have lost their jobs or are on layoffs.

Regarding the variable children (no children/children) significant differences emerge both in the dimension of Faith and belief ($t(1159) = -4.63$, $p < 0.001$, Cohen's $d = 0.27$) and the dimension of Meaning of life ($t(1160) = -4.053$, $p < 0.001$, Cohen's $d = 0.24$): those with children report higher levels of Faith and belief and Meaning of life than those who do not. Finally, with regard to the religious belief variable, from the *t*-test it emerges, as reported in **Table 7**, that there is a significant difference between those who declared to have a religious belief and those who do not with respect to all three dimensions: Faith and belief ($t(1158) = -36.33$, $p < 0.001$, Cohen's $d = 2.16$), Meaning of life ($t(1156) = -4.91$, $p < 0.001$, Cohen's $d = 0.29$) and Quality of relationships ($t(1168) = -2.02$, $p < 0.05$, Cohen's $d = 0.12$): those who have declared to have a religious belief perceive greater levels of Faith and belief, Meaning of life and Quality of relationships than those who have declared not to have religious belief.

Association Between Variables, Correlations and Regression

Pearson's correlational analyses revealed that during the lockdown there was a positive correlation between the perception of spiritual well-being and the age of the participants: with increasing age of the participants, the perceived spiritual well-being increased ($r = 0.153$, $p = 0.01$). Furthermore the psychological impact of the COVID-19 crisis has had a negative impact as regards mental health especially on younger people (r =-0.106, $p = 0.01$): in fact there is a negative relationship between the level of perceived mental health and the age of the participants: the risk of anxiety and stress decreases with increasing age. There is also a significant relationship between the GHQ-12 and the JSWB scale ($r = -0.28$, $p < 0.05$) and also in two of the three sub-dimensions, the Meaning of life ($r = -0.17$, $p < 0.05$) and Quality of relationships ($r = -0.19$, $p < 0.05$) in particular, there is a negative correlation between GHQ-12 and spiritual well-being: as perceived spiritual well-being decreases, perceived mental health malaise increases perceived by the participants, who are more at risk of anxiety and depression.

Further investigation highlighted the factors affecting Jarel Spiritual well-being and general health scale. The stepwise model selection in multiple linear regression analysis that considered JSWB scale as a dependent variable is presented in **Table 8**.

TABLE 8 | Regression model: Jarel spiritual well-being scale (JSWB) as dependent variable.

Variables*	B	SE	Beta	t	R^2Adj
GHQ-12	−0.621	0.102	−0.186	−6.062	0.061
Age	0.097	0.020	0.147	4.766	
Gender	2.346	0.739	0.098	3.175	

**There are no excluded variables in the model.*

TABLE 9 | Regression model: General Health (GHQ-12) as dependent variable.

Variables*	B	SE	Beta	t	R^2Adj
JSWB	−0.059	0.009	−0.198	−6.416	0.044
Gender	0.706	0.222	0.098	3.176	

**In the model the variable age is excluded.*

The model has an $R^2 = 0.062$, which means that 6% of the variance in JSWB scale is explained by the model. The R^2-value was statistically significant. Mental health seems to be the biggest predictor (ß $= -0.621$, $p < 0.01$). While age (ß $= 0.097$, $p < 0.01$) and gender (ß $= 2.346$, $p < 0.01$) are moderate predictors.

Table 9 presents the stepwise model selection in multiple linear regression analysis, in which GHQ-12 was used as a dependent variable.

The model has an $R^2 = 0.04$, which means that 4% of the variance in mental health is explained by the model. The R^2-value was statistically significant. The JSWB scale seems to be the biggest predictor (ß $= -0.059$, $p < 0.001$). While gender (ß $= 0.23$, $p < 0.001$) is a moderate predictor.

DISCUSSION

This research, carried out during the lockdown period in Italy, has highlighted, in accordance with research carried out before the pandemic emergency event due to COVID-19 (19, 34, 34–36, 41) how there is a connection between perceived spiritual well-being and mental and psychological health. Furthermore, the research by González Sanguino et al. (73) has shown how spiritual well-being has been found to be a protective factor for depression and anxiety.

The data presented here show how our participants perceive both lower levels of spiritual well-being (45) and lower perception of positive mental health (72, 74) compared to the situation existing pre-pandemic. Furthermore, the period of the first lockdown in Italy seems to have had more significant effects on the mental health of the population than in other countries: Italians, in fact, record lower levels of mental health compared to those that emerged in a research conducted in the same period in the United Kingdom, where generalized lockdown was not in effect (75). However, these results are in line with previous research (76) which highlights how experiencing situations of crisis and bereavement can lead to the perception of poor spiritual well-being and greater psychological distress.

With regard to demographic variables, in relation to gender, it emerges that women perceive higher levels of spiritual well-being, in line with previous research (34, 45). In particular, women perceive greater Faith and belief than men. According to some authors, the higher scores of women's spiritual well-being could be linked to the fact that women have different experiences and coping strategies to men and also to the fact that religious norms and beliefs are more compatible with roles, characteristics and behaviors socially attributed to women (34, 77, 78). In relation, instead, to mental health, women show a lower perceived level of mental health, which confirms a constant of the previous literature (79–81) and also relates to the period COVID-19 (49, 82–84).

With regard to the age variable, the data showed that the younger participants (18–24 years old) experienced a lower level of spiritual well-being, in particular Faith and belief and Meaning of life than people belonging to other age groups. In fact, from the literature it emerges that elderly people in particular benefit from religious practices and spiritual activities that positively affect their general well-being (3, 41).

Also, with regard to the perception of mental health, the data showed that the participants between 18 and 24 years old, the youngest participants, were the ones who were most affected by the lockdown situation, as also found in recent literature linked to the pandemic (85, 86). This condition of malaise could be due to the fact that young people suffered more from the lockdown restrictions because they are more used to living outside the home environment and according to González-Sanguino et al. (73) this could also be due to the fact that younger participants have fewer resources and strategies to deal with crisis situations.

With regard to the marital status variable, the research also shows that singles have a lower level of spiritual well-being (in particular Faith and belief and Meaning of life) and mental health than those who are married or living together. This may be dictated by the fact that living as a couple can be considered a source of support in a lockdown situation in which social relations are limited to mere electronic contact (87, 88).

Analyzing the socio-relational variables, it emerged that those who live with friends and/or roommates perceive a lower level of spiritual well-being and in particular Meaning of life, than those who live alone or with family. This could also be due to age, a variable that was found to be negatively correlated with spiritual well-being; in fact, those who lived with friends or roommates were university students. Still in relation to the variable people with the subject lives, as regards mental health no significant differences emerged; this may be due to the fact that compared to the pre-pandemic period all the participants, regardless of the people they lived with during the lockdown, were significantly affected by the situation.

Instead, in relation to the current job situation, it emerged that those who lost their jobs or had been laid off perceived lower levels of spiritual well-being, and in particular of Faith and belief, than those whose work situation had remained the same as before the lockdown or had switched to smart working. This is in line with that strand of literature which argues that people living in crisis situations perceive a low level of spiritual well-being (76). The fact that a difference with respect to mental health does not emerge may be due to the fact that the pandemic emergency situation led the participants to share the same destiny as regards

their state of health, in which the working variable did not assume a significant weight at least in the initial stages of the emergency; an aspect that now, on the other hand, appears decidedly more salient and that the ever-increasing riots and protests in various countries are highlighting as a problematic condition.

Furthermore, with respect to the children/no children variable, it emerged that those who do not have children perceive lower levels of spiritual well-being, in particular Faith and belief and Meaning of life than those who have children, this may be due to the fact that those who have children rely more on faith and spirituality. Carter (89) argues that for many families being involved in the congregation and their own spirituality are a source of strength, support and social support in the path of life together. Indeed, in the literature it has been found that the majority of families in the world, both within and beyond religious belief systems, use different forms of expression to satisfy their spiritual needs, particularly when facing adversity (20). Although spirituality and religion are two different constructs, literature shows strong correlations and overlaps; therefore, especially considering the high percentage of believers in our sample, it is evident that religion and church attendance in Italy, despite having decreased from the 1960s to today (90) still has a significant role and is probably even more fundamental for coping with this pandemic period (30), which may be more evident in families with children. Furthermore, the data also showed that those who do not have children have perceived lower levels of mental health than those who have.

This could be due to the fact that having to take care of a child leads to an increase in coping and resilience strategies, which positively affect psychological well-being (91). Furthermore, even though families faced numerous stresses during the lockdown (92, 93) they still reported a perception of greater mental health than singles who had to go through this period alone, in quarantine at home, inevitably perceiving less material and emotional support.

From the analysis of the results, it also emerged that those who declared they had a religious belief perceived a higher level of spiritual well-being and reports higher levels in all its dimensions (Faith and belief, Meaning of life and Quality of relationships) than those who declared that they were atheist/agnostic or did not have a belief. This can be explained by the fact that, as previously seen, religion and spirituality are two closely related constructs (16–18, 22) thus making it very likely that those who reported a religious belief benefited most in terms of perception of spiritual well-being. However, our data does not reveal a relationship between religious belief and mental health.

This finding is not confirmed in the research carried out in this pandemic situation by Pirutinsky et al. (37), who found that positive religious coping, intrinsic religiosity and trust in God were strongly correlated with less stress and more positive impact; Bentzen again (30), argues how people use religion to cope with the emotional stress caused by COVID-19, arguing how religiosity increases in response to unpredictable natural disasters, such as the COVID-19 crisis.

With respect to proximity to death, the data showed that those who know people who died from COVID-19 perceive higher levels of spiritual well-being precisely because, as also emerged in the literature (3, 7, 26), spirituality is considered a possible factor of resilience, which by positively affecting mental health, is crucial for those who are going through a grieving process, and who are also, in a similar situation, deprived of the possibility of implementing the typical rituals, such as the holding of funerals that were banned during the lockdown period, and which allowed people to accompany the deceased to burial, surrounded by the affection of friends and family and which contributed to the processing of the loss and mourning itself (13, 63).

Finally, just as also found in the literature (3, 30, 34, 35, 41) the data showed that there is a relationship between spiritual well-being and mental health: from the analysis, in fact, it emerged that those who reported a lower level of spiritual well-being perceived a worse level of mental health. Finally, with regard to spiritual well-being, the data showed that mental health is the major predictor, while gender and age are moderate predictors. In fact, as also seen from the data reported previously and from the literature, age (3) and gender (34) have a significant impact on the perception of spiritual well-being.

Mental health, on the other hand, appears to be affected to a greater extent by spiritual well-being and to a lesser extent by gender. These data are confirmed by previous research which highlighted how spirituality and religious practices are a protective factor and closely connected to physical and mental health (3, 35, 41), as well as being a source of physical and psychological resilience (7, 39) and helping the development of coping strategies in people who experienced stressful life situations (34, 41), mitigating mood disorders such as depression and anxiety (19, 39).

The data presented give us a significant picture of the mental health situation experienced by the Italian population during the first lockdown and confirm the value of spiritual well-being as a protective factor of people's general well-being. However, we would like to outline some limitations of the research. Due to the contextual situation that involved a forced physical distance, the online questionnaire method seemed, despite the limits that this entails, the only possible strategy to reach a large number of subjects. Some limitations of the online questionnaire include the non-completion rate caused by the lower level of engagement than the paper questionnaire and the high number of questionnaires in circulation; moreover, a bias may be dictated by the type of careless response also highlighted in the literature (94). This choice of data collection was also confirmed by other researchers in relation to the COVID-19 epidemic (82). Furthermore, another limit, again related to data collection, is the type of sampling used: a random cascade sampling. Despite the research team's efforts to reach a large and diverse number of participants, use of the online questionnaire may not have allowed the involvement of some target populations. In spite of the weaknesses highlighted, this work has among its strengths the fact of being one of the first research studies conducted on the lockdown period related to COVID-19 in Italy which tries to investigate the role of spiritual well-being and its effects on individual well-being in the population with a multidisciplinary approach. This distance also led to a change in the outlook of some disciplines with a predominantly ethnographic approach,

to try to get closer to the issues dealt with in a period such as that of the lockdown in which it was important that research continued to have its role of investigating and seeking knowledge despite non-essential activities having been stopped.

CONCLUSION

During the COVID-19 pandemic, people and families experienced a new and sudden situation that forced them to stay indoors for a long period of time. In this context, many people and their families experienced situations of great discomfort, stress and fear related not only to the fear of contagion but also to the economic difficulties for those who saw their income reduced due to the closure of production activities or who experienced situations of loneliness, isolation or conflicts within the home. The pandemic has profoundly changed the way of life in society, starting from the need for "social distancing" even among close relatives (87).

In this context it is very interesting to investigate if and how spirituality has been a form of emotional and psychological support useful for dealing with the loss and anguish of critical moments in life like this. This appears particularly dramatic for the families of those who died in hospital without being able to have their loved ones near them and without the latter being able to celebrate the funeral rites. The data from our study show that in the period of the lockdown those who were able to count on important forms of religiosity and spirituality drew mental well-being from these beliefs. Spirituality helped them to make sense of what was happening and not to feel lost in the face of the radical change in the way of living and conducting social relationships.

Loss, grief, mental health, and spiritual well-being emerge as familiar themes in the lives of many individuals, families, and communities in different contexts. According to Zhai and Du (13) recognizing these individual experiences can enable healthcare professionals to develop personalized strategies to facilitate better adaptation to the situation and therefore promote mental health.

If looked at from the point of view of clinical practice, therefore, it can be seen that dealing with spirituality becomes fundamental; in fact, this aspect needs to be considered to really provide adequate support to individuals, especially those who manifest themselves as strong and solid.

In this regard, the consideration of spiritual needs is necessary to provide a holistic and people-centered intervention (95). By spiritual needs we mean everything that refers to the need to find meaning, value in one's life, peace and a sense of connection. These needs are not necessarily exclusively religious, even those who do not have a religious faith still refer to belief systems that provide feelings of meaning and purpose (46) which in this period of the COVID-19 pandemic seem to assume a role and an even deeper meaning in relation to the bewilderment that people are confronted with in the face of such a pervasive, disruptive event creating fragility, fear and daily uncertainties.

In a certain sense it is precisely at the moment of greatest difficulty that the need for support in spiritual terms becomes stronger, in the hope of finding comfort in one's faith and beliefs. Very often, however, we are faced with inadequate preparation in responding to this type of need (96). In fact, the importance of training health professionals so that they possess the skills to identify and support the spiritual discomfort of patients is increasingly evident (97). A distress which can lead to suffering, a state of anguish due to not being able to feel meaning in life in particular adverse moments, which in some way undermines personal identity (47, 48). Addressing psychosocial and spiritual needs can really contribute to the improvement (98) in the quality of life and well-being of individuals, especially at a time like the one the whole world is now facing and in which diagnostic and medical certainties become increasingly unsure and unconsolidated.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Department of Education Sciences of the University of Genoa. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

IC, NR, RP, and FL conceived the original idea of the study and supervised the findings of this work. NR and IC contributed to data processing and analysis and all wrote and organized the manuscript, in particular NR. IC developed the introduction, the first, and second paragraph. RP and FL wrote the third and four paragraph. While NR and IC presented the methodology, procedure, and data section. All authors discussed the results, presented the conclusion and writer reviewed the document, and approved the final version for submission.

REFERENCES

1. Lagomarsino F, Coppola I, Parisi R, Rania N. Care tasks and new routines for Italian families during the COVID-19 pandemic: perspectives from women. *Italian Sociol Rev.* (2020) 10:847–68. doi: 10.13136/isr.v10i3s.401
2. Yang T, Lai I, Fan ZB, Mo QM. The impact of a 360° virtual tour on the reduction of psychological stress caused by COVID-19. *Tech Soc.* (2021) 64:101514. doi: 10.1016/j.techsoc.2020.101514
3. Koenig HG. Maintaining health and well-being by putting faith into action during the COVID-19 pandemic. *J Relig Health.* (2020) 59:2205–14. doi: 10.1007/s10943-020-01035-2
4. Frei-Landau R. When the going gets tough, the tough get—creative": israeli jewish religious leaders find religiously innovative ways to preserve community members' sense of belonging and resilience during the COVID-19 pandemic. *Psychol Trauma.* (2020) 12:S258–60. doi: 10.1037/tra0000822

5. Ishikawa RZ. I may never see the ocean again: loss and grief among older adults during the COVID-19 pandemic. *Psychol Trauma.* (2020) 12:S85–6. doi: 10.1037/tra0000695
6. Von Humboldt S, Neyda M, Mendoza-Ruvalcaba, Merino EDA, Costa A, Cabras E, et al. Smart technology and the meaning in life of older adults during the COVID-19 public health emergency period: a cross-cultural qualitative study. *Int Rev Psychiatr.* (2020) 32:713–22. doi: 10.1080/09540261.2020.1810643
7. Gray AJ. Resilience, spirituality and health. *Psyche Geloof.* (2017) 28:32–40.
8. DeFranza D, Lindow M, Harrison K, Mishra A, Mishra H. Religion and reactance to COVID-19 mitigation guidelines. *Am Psychol.* (2020). doi: 10.31234/osf.io/zvyc2. [Epub ahead of print].
9. Ministero della salute. Available online at: http://www.salute.gov.it/portale/home.html
10. Mayland CR, Harding AJE, Preston N, Payne S. Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J Pain Symptom Manage.* (2020) 60:e33–9. doi: 10.1016/j.jpainsymman.2020.05.012
11. LeRoy AS, Robles B, Kilpela LS, Garcini LM. Dying in the face of the COVID-19 pandemic: contextual considerations and clinical recommendations. *Psychol Trauma.* (2020) 12:S98–9. doi: 10.1037/tra0000818
12. Singer J, Spiegel JA, Papa A. Preloss grief in family members of COVID-19 patients: recommendations for clinicians and researchers. *Psychol Trauma.* (2020) 12:S90–3. doi: 10.1037/tra0000876
13. Zhai Y, Du X. Loss and grief amidst COVID-19: a path to adaptation and resilience. *Brain Behav Immun.* (2020) 87:80–1. doi: 10.1016/j.bbi.2020.04.053
14. Thuné-Boyle IC, Stygall J, Keshtgar MR, Davidson TI, Newman SP. Religious/spiritual coping resources and their relationship with adjustment in patients newly diagnosed with breast cancer in the UK. *Psychooncology.* (2013) 22:646–58. doi: 10.1002/pon.3048
15. Zimmer Z, Jagger C, Chiu CT, Ofstedal MB, Rojo F, Saito Y. Spirituality, religiosity, aging and health in global perspective: a review. *SSM Popul Health.* (2016) 2:373–81. doi: 10.1016/j.ssmph.2016.04.009
16. Milner K, Crawford P. 2020 The experiences of spirituality among adults with mental health difficulties: a qualitative systematic review. *Epidemiol Psichiat S.* (2020) 29:1–10. doi: 10.1017/S2045796019000234
17. Zinnbauer BJ, Pargament KI. Religion and spirituality: unfuzzying the fuzzy. *J Sci Stud Relig.* (1997) 36:549–64. doi: 10.2307/1387689
18. Cavanna D, Bizzi F, Charpentier-Mora S. Percorsi individuali e spirituali nella risposta al cancro. *Salute e società* . (2015) 2:143–57. doi: 10.3280/SES2015-002011
19. Perez JF, Laudadio A. Benessere psicologico e spiritualità (2010). Available online at: https://www.researchgate.net/publication/264346303
20. Walsh, F. Spirituality, healing, and resilience. In: McGoldrick M, Hardy KV e, *Re-Visioning Family Therapy: Race, Culture, and Gender in Clinical Practice* 3rd. New York, NY: The Guilford Press. (2019). p. 61–75.
21. Unterrainer HF, Lewis AJ, Fink A. Religious/Spiritual Well-being, personality and mental health: a review of results and conceptual issues. *J Relig Health.* (2014) 53:382–92. doi: 10.1007/s10943-012-9642-5
22. Zenkert RL, Brabender V, Slater C. Therapists' responses to religious/spiritual discussions with trauma versus non-trauma clients. *J Contemp Psychoter.* (2014) 44:213–21. doi: 10.1007/s10879-014-9264-1
23. Rania N, Migliorini L, Zunino A, Bianchetti P, Vidili MG, Cavanna D. La riabilitazione oncologica: qualità della cura e benessere psicologico del paziente. *Salute e Società.* (2015) 2:60–73. doi: 10.3280/SES2015-002005
24. Rania N, Migliorini L, Vidili MG, Bianchetti P, Forno G, Cavanna D. Exploring well-being and satisfaction with physiotherapy efficacy: an Italian study of cancer patients. *Mediter J C Psychol.* (2018) 6:1–21. doi: 10.6092/2282-1619/2018.6.1841
25. Ano GG, Vasconcelles EB. Religious coping and psychological adjustment to stress: a meta-analysis. *J Clin Psychol.* (2005) 61:461–80. doi: 10.1002/jclp.20049
26. Pargament KI. *The Psychology of Religion and Coping: Theory, Research, Practice.* New York, NY: Guilford Press (2001).
27. Bentzen JS. Acts of god? Religiosity and natural disasters across subnational world districts. *Econ J.* (2019) 129:2295–321. doi: 10.1093/ej/uez008
28. Menjívar C. Religion and immigration in comparative perspective: catholic and evangelical salvadoransin San Francisco, Washington, DC, and Phoenix. *Sociol Relig.* (2003) 64:21–45. doi: 10.2307/3712267
29. Schaffhauser P. "La religiosité des sans papiers mexicains de Deer Canyon, États-Unis", *Amérique Latine Histoire et Mémoire. Les Cahiers ALHIM [En línea], 20.* (2010). Available online at**:** http://journals.openedition.org/alhim/3609
30. Bentzen JS. In crisis, we pray: religiosity and the COVID-19 pandemic. *Cepr Discussion Paper No. DP14824.* (2020). Available online at: https://ssrn.com/abstract=3615587
31. Galen LW, Kloet JD. Mental well-being in the religious and the non-religious: evidence for a curvilinear relationship. *Mental Health Religion Culture.* (2011) 14:673–89. doi: 10.1080/13674676.2010.510829
32. Sulmasy D. A biopsychosocial-spiritual model for the care of the patients at the end of life. *Gerontologist.* (2002) 42:24–33. doi: 10.1093/geront/42.suppl_3.24
33. Puchalski CM, Blatt B, Kogan M, Butler A. Spirituality and health: the development of a field. *Acad Med.* (2014) 89:10–6. doi: 10.1097/ACM.0000000000000083
34. Jafari E, Dehshiri GR, Eskandari H, Najafi M, Heshmati R, Hoseinifar J. Spiritual well-being and mental health in university students. *Procd Soc Behv.* (2010) 5:1477–81. doi: 10.1016/j.sbspro.2010.07.311
35. Koenig H, King D, Carson VB. *Hand- Book of Religion and Health* 2nd ed. New York, NY: Oxford University Press (2012).
36. Ghaderi A, Tabatabaei SM. Explanatory definition of the concept of spiritual health: a qualitative study in Iran. *Med Ethics Hist Med.* (2018) 11:1–7.
37. Pirutinsky S, Cherniak AD, Rosmarin DH. COVID-19, mental health, and religious coping among american orthodox jews. *J Relig Health.* (2020) 59:2288–301. doi: 10.1007/s10943-020-01070-z
38. Clark CC, Hunter J. Spirituality, spiritual well-being, and spiritual coping in advanced heart failure. *J Holist Nurs.* (2019) 37:56–73. doi: 10.1177/0898010118761401
39. Levin J. The faith community and the SARS-CoV-2 outbreak: part of the problem or part of the solution. *J Relig Health.* (2020) 59:2215–28. doi: 10.1007/s10943-020-01048-x
40. Koenig HG, Cohen HJ. *The Link Between Religion and Health: Psychoneuroimmunology and the Faith Factor*. New York, NY: Oxford University Press. *(*2002).
41. You S, Yoo JE, Koh Y. Religious practices and mental health outcomes among Korean adults. *Pers Indiv Differ.* (2019) 142:7–12. doi: 10.1016/j.paid.2019.01.026
42. Chou, MJ, Tsai, SS, Hsu, HM, Ho-Tang W. Research on correlation between the life attitude and wellbeing—with spiritual health as the mediator. *Eur J Res Soc Sci.* (2016) 4:76–88. Available online at: www.idpublications.org
43. Ellison CW. Spiritual well-being: conceptualization and measurement. *J Psychol Teol.* (1983) 11:330–8. doi: 10.1177/009164718301100406
44. Saiz J, Pung MA, Wilson KL, Pruitt C, Rutledge T, Redwine L, et al. Is belonging to a religious organization enough? Differences in religious affiliation versus self-ratings of spirituality on behavioral and psychological variables in individuals with heart failure. *Healthcare (Basel).* (2020) 8:129. doi: 10.3390/healthcare8020129
45. Magnano P, Zammitti A, Dibilio R, Faraci P. Italian validation of the jarel spiritual well-being scale. *Mental Health Religion Culture.* (2019) 22:626–44. doi: 10.1080/13674676.2019.1594740
46. Büssing A. Spirituality as a resource to rely on in chronic illness: the SpREUK questionnaire. *Religions.* (2010) 1:9–17. doi: 10.3390/rel1010009
47. Timmins F, Caldeira S. Assessing the spiritual needs of patients. *Nursing Standard.* (2017) 31:47–53. doi: 10.7748/ns.2017.e10312
48. Caldeira S. Clinical validation of the nursing diagnosis spiritual distress in cancer patients undergoing chemotherapy. *Int J Nurs Knowl.* (2017) 28:44–52. doi: 10.1111/2047-3095.12105
49. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 Coronavirus Disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health.* (2020) 17:1729. doi: 10.3390/ijerph17051729
50. Elias N. *La Solitudine Del Morente*. Bologna: Il Mulino. (2011). p. 112.
51. Lombardi Satriani LM, Meligrana M. *Il Ponte di San Giacomo. L'ideologia della morte nella società contadina del Sud*. Palermo: Sellerio. (1989). p. 492.
52. Morin E, Manghi S. *L'uomo e la Morte Libro*. Trento: Erickson. (2014). p. 370.
53. Assmann J. *La Morte Come Tema Culturale. Immagini e riti Mortuari nell'Antico Egitto*. Torino: Einaudi. (2002). p.95.
54. Bauman Z. *Paura Liquida*. Bari: Editori Laterza. (2008). p. 240.

55. Favole A. *La Famiglia e la Morte in Italia: Nuovi Orizzonti Etnografici e Teorici, in A. Favole (a cura di) La Famiglia di fronte alla morte. Etnografie, narrazioni, trasformazioni, Torino: Fondazione Fabretti*. (2015) p. 9-18.
56. Favole A. *Resti di umanità. Vita sociale del corpo dopo la morte*. Bari-Roma: Laterza. (2003). p. 216.
57. De Martino E. *Morte e Pianto Rituale Nel Mondo Antico*. Torino: Einaudi. (1958). p. 374.
58. Loewenthal, K, Dein S. Religious ritual and wellbeing. In: Ben-Avie M, Ives Y, Loewenthal K, editors. *Applied Jewish Values in Social Sciences and Psychology*. Switzerland: Springer Nature (2016). doi: 10.1007/978-3-319-21933-2_8
59. Willard AK, Legare CH. Ritual wellbeing: a simplified model. *Religion Brain Behav*. (2016) 7:262–5. doi: 10.1080/2153599X.2016.1156563
60. Beck U, Beck-Gernsheim E. *L'amore a Distanza. Il Caos Globale Degli Affetti*. Bari: Editori Laterza. (2012).
61. Migliorati L. *Un Sociologo Nella Zona Rossa. Rischio, Paura, Morte e Creatività ai Tempi di COVID-19*. Milano: Franco Angeli. (2020). p. 95.
62. Crepaldi MA, Schmidt B, Noal DS, Bolze SDA Gabarra LM. Terminalidade, morte e luto na pandemia de COVID-19: demandas psicológicas emergentes e implicações práticas. *Estud Psicol.* (2020) 37:1–12. doi: 10.1590/1982-0275202037e200090
63. Kokou-Kpolou CK, Fernández-Alcántara M, Cénat, JM. Prolonged grief related to COVID-19 deaths: do we have to fear a steep rise in traumatic and disenfranchised griefs. *Psychol Trauma.* (2020) 12:S94–5. doi: 10.1037/tra0000798
64. Dei F. *Riti Negati. Ambivalenza del Cordoglio, Alias-Manifesto*. (2020). Avaiable online at: http://fareantropologia.cfs.unipi.it/wp-content/uploads/2020/03/Alias-ambivalenze-del-cordoglio.pdf
65. Hungelmann J, Kenkel-Rossi E, Klassen L, Stollenwerk RM. Spiritual well-being in older adults: harmonious interconnectedness. *J Relig Health.* (1985) 24:147–53. doi: 10.1007/BF01532258
66. Hungelmann, J, Kenkel-Rossi E, Klassen L, Stollenwerk RM. Focus on spiritual well-being: harmonious interconnectedness of mind-body-spirit—use of the JAREL Spiritual well-being scale: assessment of spiritual well-being is essential to the health of individuals. *Geriatr Nurs.* (1996) 17:262–6. doi: 10.1016/S0197-4572(96)80238-2
67. Piccinelli M, Bisoffi G, Bon MG, Cunico L, Tansella M. Validity and test-retest reliability of the Italian version of the 12-item General Health Questionnaire in general practice: a comparison between three scoring methods. *Compr Psychiatry.* (1993) 34:198–205. doi: 10.1016/0010-440X(93)90048-9
68. Elovanio M, Hakulinen C, Pulkki-Råback L, Aalto AM, Virtanen M, Partonen T, et al. General Health Questionnaire (GHQ-12), Beck Depression Inventory (BDI- 6), and Mental Health Index (MHI-5): psychometric and predictive properties in a Finnish population-based sample. *Psychiatry Res.* (2020) 289:1–8. doi: 10.1016/j.psychres.2020.112973
69. Rodríguez-Rey R, Garrido-Hernansaiz H,Collado S. Psychological impact and associated factors during the initial stage of the coronavirus (COVID-19) pandemic among the general population in Spain. *Front Psychol.* (2020) 11:1540. doi: 10.3389/fpsyg.2020.01540
70. Field A. *Discovering Statistics Using SPSS*. 3 ed. London: SAGE publications Ltd (2009). p. 822.
71. Ghasemi A, Zahediasl S. Normality tests for statistical analysis: a guide for non-statisticians. *Int J Endocrinol Metab.* (2012) 10:486–9. doi: 10.5812/ijem.3505
72. Preti A, Sardu C, Piga A. Mixed-handedness is associated with the reporting of psychotic-like beliefs in a non-clinical Italian sample. *Schizophr Res.* (2007) 92:15–23. doi: 10.1016/j.schres.2007.01.028
73. González Sanguino C, Ausín B, Castellanos MÁ, Saiz J, López-Gómez A, Ugidos C, et al. Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain Behav Immun.* (2020) 87:172–6. doi: 10.1016/j.bbi.2020.05.040
74. Ahmed Z Md, Ahmed O, AibaoZ, Hanbin S, Siyu L, Ahmad A. Epidemic of COVID-19 in China and associated psychological problems. *Asian J of Psychiatr.* (2020) 51:1–7. doi: 10.1016/j.ajp.2020.102092
75. Li LZ, Wang, S. Prevalence and predictors of general psychiatric disorders and loneliness during COVID-19 in the United Kingdom. *Psychiatry Res.* (2020) 291:1–6. doi: 10.1016/j.psychres.2020.113267
76. MichiyoAndo RN, TatsuyaMorita MD, MitsunoriMiyashita RN, MakikoSanjo RN, HarukoKira BA, YasuoShima MD. Effects of bereavement life review on spiritual well-being and depression. *J Pain Symptom Manag.* (2010) 40:453–9. doi: 10.1016/j.jpainsymman.2009.12.028
77. Hammermeister J, Flint M, Alayli A, Ridnour A, Peterson M. Gender differences in spiritual well-being: are females more spiritually well than males? *Am J Health Stud.* (2005) 20:80–4. Available online at: https://search.proquest.com/scholarly-journals/gender-differences-spiritual-well-being-are/docview/210477730/se-2?accountid=15964
78. Levin JS, Taylor RJ, Chatters LM. Race and gender differences in religiosity among older adults: findings from four national surveys. *J Gerontol.* (1994) 49:137–45. doi: 10.1093/geronj/49.3.S137
79. Giorgi G, Pérez J, d'Antonio AC, Pérez F, Arcangeli G, Cupelli V, et al. The general health questionaire (GHQ-12) in a sample of italian workers: mental health at individual and organizational level. *J Med Sci.* (2014) 11:47–56. doi: 10.5829/idosi.wjms.2014.11.1.83295
80. Van Droogenbroeck F, Spruyt B, Keppens G. Gender differences in mental health problems among adolescents and the role of social support: results from the Belgian health interview surveys 2008 and 2013. *BMC Psychiatry.* (2018) 18:6. doi: 10.1186/s12888-018-1591-4
81. Kvrgic S, Harhaji S, Mijatovic Jovanovic V, Ac Nikolic E, Radic I, Cankovic S, et al. Gender differences in mental health among adult population in Vojvodina, Serbia. *Iran J Public Health.* (2013) 42:833–41.
82. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychol Health Med.* (2020) 26:13–22. doi: 10.1080/13548506.2020.1746817
83. Casagrande M, Favieri F, Tambelli R, Forte G. The enemy who sealed the world: effects quarantine due to the COVID-19 on sleep quality, anxiety, and psychological distress in the Italian population. *Sleep Med.* (2020) 75:12–20. doi: 10.1016/j.sleep.2020.05.011
84. Rania N, Coppola I. Psychological Impact of the Lockdown in Italy Due to the COVID-19 Outbreak: Are There Gender Differences. *Front. Psychol.* (2021) 1–11. doi: 10.3389/fpsyg.2021.567470
85. Lee CM, Cadigan JM, Rhew IC. Increases in loneliness among young adults during the COVID-19 pandemic and association with increases in mental health problems. *J Adolescent Health.* (2020) 67:714–7. doi: 10.1016/j.jadohealth.2020.08.009
86. Smith L, Jacob L, Yakkundi A, McDermott D, Armstrong NC, Barnett Y, et al. Correlates of symptoms of anxiety and depression and mental wellbeing associated with COVID-19: a cross-sectional study of UK-based respondents. *Psychiatry Res.* (2020) 291:1–7. doi: 10.1016/j.psychres.2020.113138
87. Parisi R, Lagomarsino F, Rania, N, Coppola I. Women face to fear and safety devices during the COVID-19 pandemic in Italy: impact of physical distancing on individual responsibility, intimate and social relationship. *Front Public Health*. (2021) 9:622155. doi: 10.3389/fpubh.2021.622155
88. *Centro di Ateneo Studi e Ricerche Sulla Famiglia*, *La famiglia Sospesa*, *Vita e Pensiero*. Milano: Università Cattolica del Sacro Cuore (2020).
89. Carter EW. *Spirituality and The Family Unit in Systematically Treating Autism*, 1st edition, Routledge (2019). p. 9. doi: 10.4324/9781315141831-22
90. Vezzoni C, Ferruccio B. Calibrating self-reported church attendance questions in online surveys. experimental evidence from the Italian context. *Soc Compass*. (2019) 66:596–616. doi: 10.1177/0037768619868420
91. Mayordomo T, Viguer P, Sales A, Satorres E, Meléndez JC. Resilience and coping as predictors of well-being in adults. *J Psychol.* (2016) 150:809–21. doi: 10.1080/00223980.2016.1203276
92. Daks JS, Peltz JS, Rogge RD. Psychological flexibility and inflexibility as sources of resiliency and risk during a pandemic: modeling the cascade of COVID-19 stress on family systems with a contextual behavioral science lens. *J Contextual Behav Sci.* (2020) 18:16–27. doi: 10.1016/j.jcbs.2020.08.003
93. Brown SM, Doom JR, Lechuga-Peña S, Watamura SE, Koppels T. Stress and parenting during the global COVID-19 pandemic. *Child Abuse Negl.* (2020) 110:1–14. doi: 10.1016/j.chiabu.2020.104699
94. Ward MK, Meade AW, Allred CM, Pappalardo G, Stoughton JW. Careless response and attrition as sources of bias in online survey assessments of personality traits and performance. *Comput Hum Behav.* (2017) 76:417–30. doi: 10.1016/j.chb.2017.06.032
95. Johnston D, Mayers C. Spirituality: a review of how occupational therapists acknowledge. Assess and Meet Spiritual Needs. *Brit J Occup Ther.* (2005) 68:386–92. doi: 10.1177/030802260506800902

96. Ellis MR, Thomlinson P. The spiritual needs and resources of hospitalized primary care patients. *J Relig Health.* (2013) 52:1306–18. doi: 10.1007/s10943-012-9575-z
97. Balboni MJ, Peteet JR. The relationship between medicine, spirituality and religion: three models for integration. *J Relig Health.* (2014) 53:1586–98. doi: 10.1007/s10943-014-9901-8
98. Morocutti P. Correlazioni positive tra spiritualità e salute: i risultati di alcune indagini/Positive correlations between spirituality and health: results from some surveys. *Medicina E Morale.* (2019) 68:41–54. doi: 10.4081/mem.2019.566

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

OPINION
published: 07 April 2021
doi: 10.3389/fpubh.2021.638964

The Role of Clinical Researchers During COVID-19: Balancing Individual, Scientific, and Social Benefits of Research

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Keywords: clinical research, COVID-19, bioethics, psychological distress, death and mourning

INTRODUCTION

Clinical and research psychologists around the world are experiencing various challenges due to the COVID-19 pandemic. Quarantine, mobility restrictions and health risks associated with the new SARS-CoV-2 virus have disrupted studies, which has impacted data collection, project coordination and monitoring efforts. Researchers have had to shift and adapt their fields of research. Consequently, various studies regarding COVID-19 have emerged. In Panama, a multidisciplinary research group, the Panama Aging Research Initiative (PARI), has been studying the characteristics associated with aging among the Panamanian population for the last 10 years. Due to the COVID-19 pandemic, enrollment and assessment of elderly participants came to a halt being as they are most vulnerable to COVID-19. As the team became involved in pandemic-related studies, it faced an unfamiliar challenge: to collect data from hospitalized patients who had tested positive to SARS-CoV-2. This opinion article aims to present our experience with COVID-19 patients and critically explore the role of clinical researchers in emergency situations as they balance between the individual, scientific and social benefits of research.

OPEN ACCESS

Edited by:
Sara Invitto,
University of Salento, Italy

Reviewed by:
Siddharth Sarkar,
All India Institute of Medical Sciences, India

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Public Health

Received: *08 December 2020*
Accepted: *12 March 2021*
Published: *07 April 2021*

Citation:
Oviedo DC, Perez-Lao AR, Villarreal AE, Carreira MB and Britton GB (2021) The Role of Clinical Researchers During COVID-19: Balancing Individual, Scientific, and Social Benefits of Research. Front. Public Health 9:638964. doi: 10.3389/fpubh.2021.638964

Ethical Issues During Public Health Emergency Situations

Conducting research during health emergency situations is an ethical responsibility for researchers, institutions and countries (1). From vaccine and pharmaceutical clinical trials to psychology and social research, obtaining scientific data is critical to create guidelines, adequately clarify or identify risk factors and clinical symptoms, evaluate tests and generate appropriate interventions (2). Nevertheless, collecting clinical data in emergencies requires adaptation to extreme settings, flexibility, and agility (3, 4). Health emergencies imply special ethical circumstances above and beyond normal.

Initially, protocols must undergo evaluation and approval from a bioethics committee. Nevertheless, in some countries ethic reviews can take months; therefore, in emergencies it is crucial that institutions accelerate review processes of research protocols while maintaining quality (1, 5). Also, in health crises, the perception of risks and benefits must be taken into account, as these can change over time. Moreover, accountability and transparency must be carefully monitored (5). Informed consents as well as other ethics considerations such as ensuring ethical treatment of vulnerable groups, guaranteeing scientific validity and social value, benefit vs. risks assessments, are fundamental in researching during critical conditions (6).

Sociocultural and Socioeconomic Considerations for Research in Low- and Middle-Income Countries

Conducting research in health emergencies poses many challenges, particularly for low- and middle-income countries. These obstacles can include the unpredictable nature of the crisis itself, limited healthcare systems and infrastructures, ruptured communication between the scientific and political systems, limited funding, and inadequate policies in response to epidemics (1). In Asian and African countries, previous pandemics such as Ebola, SARS-CoV1 and MERS-CoV gave researchers an idea of what to expect during COVID-19 pandemic (7, 8). Formerly, in the Latin American and Caribbean (LAC) region, a Zika outbreak forced researchers to generate research networks rapidly in order to be able to respond to the different needs as the outbreak unraveled (9). Nevertheless, the LAC region was unprepared for the current pandemic's magnitude and has become one of the most affected regions (10). In the case of Panama, as in most countries, COVID-19 revealed many social, health, economic and educational inequalities and has mainly affected the most disadvantaged individuals (10). Data collection in the hospital research context revealed insufficient medical personnel and infrastructure. Also, researchers encountered complex challenges in enrollment, such as difficulties reaching patients eligible for the study, as well as participants' fears and psychological distress.

PSYCHOLOGICAL AND SOCIAL IMPACT OF COVID-19

In Panama, in April 2020, the PARI group began a seroprevalence antibody study in three different groups, namely healthcare workers, healthy controls recruited from a blood donor clinic and SARS-CoV-2 positive hospitalized patients from public hospitals (11). The research instruments included an initial informed consent, an interview to obtain sociodemographic information, previous diseases and COVID-19 related symptoms and the collection of a blood sample. Data collection in the current health emergency, specifically from positive hospitalized patients posed a series of adversities. As it was the beginning of the pandemic, different situations hindered research conditions; knowledge on the virus was scarce, there was a high mortality rate and there were no approved treatments. Additionally, as in many countries, we faced situations such as limited personal protection equipment and poor conditions in hospital facilities.

In this high uncertainty, high risk context, we also faced limitations regarding participant selection. Patients' level of illness varied. Some patients were delirious, cognitively impaired or experiencing psychological distress affecting their ability to talk. This required a careful evaluation of which participants were eligible to be offered participation in the study. We had to seek the balance between being just and offering the study to everyone, but also recognizing whether or not some people in a situation of vulnerability can be contemplated as research participants.

Second, as we addressed the COVID-19 patients, we were faced with realities that included educational, cultural and language barriers. Such challenges are common to many studies in Panama. One of the main difficulties was a low literacy level. Even though literacy rates in the last 12 years have increased in 50% and currently adult literacy rates are ∼95.4%, the mean number of years of schooling is 10 (12) and education quality has been reported to be deficient (13). Moreover, some of the patients belonged to indigenous groups, therefore we had to take into consideration culturally appropriate materials.

Third, some of the other patients who understood the study and signed the informed consent viewed their participation as an opportunity to talk about the deficiencies they experienced at the hospital, such as the conditions of the rooms, bathrooms, food and the understaffed hospital wards. Although these situations are not research limitations *per se*, they can contribute to the psychological burden patients sustain.

Fourth, one of the biggest challenges we confronted conducting our study was the impact of COVID-19 on mental health. As we collected data, we had to consider that a large portion of SARS-CoV-2 positive participants were under extreme stress and fear. Topics such as loneliness, uncertainty, confusion, anger, sadness, anxiety, and stress were often discussed among patients. Literature has shown that symptoms of psychological distress, are associated to hospitalizations (14, 15). Isolation and quarantine where patients are not allowed to receive visitors often augment these psychological and psychiatric symptoms (14, 16). In addition to this, healthcare professionals have to deal with an overload of patients and work, often limiting the time they can spend with each patient aggravating the loneliness and despair patients experience.

Lastly, a recurring fear manifested by most patients, independent of their disease severity, was that of their own death. Moreover, others had witnessed other patients in their rooms dying; and a patient even had to intervene in a suicide attempt. Lastly some of the interviewed patients had been admitted to the hospital with a family member, and while hospitalized, their loved one passed away. Psychological distress regarding death in hospitalization situations and associated to pandemics and epidemics has been previously studied (14–17). From mourning to fear of dying, death is an extremely relevant topic that must be taken into account when approaching hospitalized patients. Studies have shown that in patients who recover from life threatening diseases, the experience of being hospitalized is associated with post-traumatic stress disorder and can be highly intensified by grief (15, 18). Having all this in mind, we had to rapidly assess if answering questions that were related to participant's health contemplated in our study, would emotionally and psychologically harm them.

As patients discussed the anguish they had experienced after contracting the virus, some of them evidenced the coping mechanisms they had developed through their convalescence. Some mentioned they had turned to faith and were constantly praying and thanking God for being alive and this helped them maintain optimistic. Others, turned to their roommates looking for comfort in their new friendship. Evidence suggests that, as witnessed, often patients look for external mechanisms such as spirituality and religion, gratitude, and social support to help them cope with burdensome situations (16, 19).

CONCLUSIONS

Conducting research during public health emergencies demands an adequate balance of social, scientific and individual benefits. Researcher's roles in clinical settings during COVID-19 require a comprehensive understanding of ethical principles and an empathic engagement with participants (6). Ethical considerations are fundamental from the conception and planification of the study, to the actual field work of data collection, publishing and sharing of results (2). As we conducted our study, we constantly asked ourselves, how do we draw the line between benefits for science, participants and knowledge?

At an individual level, we had a duty to always seek benefits for participants. A critical analysis had to be made regarding possible psychological or social harms of the study, as well as acknowledging and empathizing with patients' vulnerable states. Additionally, we needed to make sure they understood the study and made a voluntary decision to participate.

At a scientific level, due to the complexity, novelty and unexpectedness of COVID-19, we as other researchers around the world, have urgently responded by rapidly generating data while maintaining scientific validity and replicability. Researchers and work groups have had to generate multiple therapeutic strategies, prevention mechanisms and diagnostic tests to tackle this new disease. Moreover, the COVID-19 pandemic has exposed the importance of research's social benefits. Knowledge cannot be limited to a laboratory or to a publication. It is mandatory that research in this health emergency has practical applications that rapidly reaches all countries affected by the virus. In the case of the PARI COVID-19 study, over the last months there has been an important increase in the use of the antibody test.

As a multidisciplinary group we have engaged in multiple areas of science. Our previous experience in research with elderly population, aided us in conducting the COVID-19 project as it gave us tools to work and assess vulnerable groups. In our aging study, some participants have physical and cognitive impairments, frailty, a limited functional status as well as low literacy levels and/or economic limitations. Therefore, as researchers we are obliged to acknowledge their vulnerability and carefully ensure all ethical processes are taken into account.

The current study has shown us the immense need to address the long term psychological and social effects of the COVID-19 pandemic. Even though more than 80% of patients will recover from the virus, the pandemic will continue to have a detrimental mental health burden on various population groups (20). Therefore, as clinical and psychology researchers, we recommend the following:

1. Creating research platforms dedicated to generating knowledge, using open data and aiding in the management of mental health issues. To ensure the creation of such platforms, investment in research must be a priority.
2. As scientific data is generated, it is relevant to divulge scientific findings in a simple way. Science illiteracy even among educated population poses a challenge, especially in the context of widespread conspiracy theories and fake news.
3. It is imperative to include mental health as part of countries' response plans, which includes an increase in funding and the promotion of policies that support efficient mental health services.
4. Finally, in hospital contexts, we recommend the generation and use of liaison psychiatry, allowing more mental health professionals to attend COVID-19 patients while being hospitalized. Currently, psychologists and psychiatrists become involved when there is a crisis situation with a particular patient, nevertheless, continuous mental health assistance is greatly required.

It's time to move beyond the initial critical sanitary response to a sustainable global effort toward resilience.

AUTHOR CONTRIBUTIONS

DO conceived and wrote the manuscript. GB, AV, AP-L, and MC read, reviewed and equally contributed to the intellectual content, and format of the manuscript. All authors approved the submitted version.

FUNDING

This work was supported by the Sistema Nacional de Investigación (SNI) and the Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT) Grant COVID19-233.

ACKNOWLEDGMENTS

DO, AV, MC, and GB acknowledge and thank the financial support of Sistema Nacional de Investigación (SNI), Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT). All authors acknowledge and thank Universidad Santa María La Antigua (USMA) and the Instituto de Investigaciones Científicas y Servicios de Alta Tecnología (INDICASAT).

REFERENCES

1. Bain LE, Ngwain CG, Nwobegahay J, Sumboh JG, Nditanchou R, Awah PK. Research ethics committees (RECs) and epidemic response in low and middle income countries. *Pan African Med J.* (2018) 31:1–7. doi: 10.11604/pamj.2018.31.209.17076
2. Jamrozik E, Selgelid MJ. COVID-19 human challenge studies: ethical issues. *Lancet Infect Dis.* (2020) 20:e198–203. doi: 10.1016/S1473-3099(20)30438-2
3. Mezinska S, Kakuk P, Mijaljica G, Waligóra M, O'Mathúna DP. Research in disaster settings: a systematic qualitative review of ethical guidelines. *BMC Med Ethics.* (2016) 17:1–11. doi: 10.1186/s12910-016-0148-7
4. Rojek AM, Dunning J, Leliogdowicz A, Castle L, Van Lieshout M, Carson G, et al. Regulatory and operational complexities of conducting a clinical treatment trial during an ebola virus disease epidemic. *Clin Infect Dis.* (2018) 66:1454–7. doi: 10.1093/cid/cix1061
5. World Health Organization. *Research Ethics in International Epidemic Response*. World Health Organization (2009). p. 1–20.

6. World Health Organization (2020). Ethical standards for research during public health emergencies: distilling existing guidance to support COVID-19. *World Health Organization* 1–4.
7. Edwards KM, Kochhar S. Ethics of conducting clinical research in an outbreak setting. *Annu Rev Virol.* (2020) 7:475–94. doi: 10.1146/annurev-virology-013120-013123
8. Thielman NM, Cunningham CK, Woods C, Petzold E, Sprenz M, Russell J. Ebola clinical trials: five lessons learned and a way forward. *Clin Trials.* (2016) 13:83–6. doi: 10.1177/1740774515619897
9. Wilder-Smith A, Preet R, Renhorn KE, Ximenes RA, Rodrigues LC, Solomon T, et al. ZikaPLAN: zika preparedness Latin American network. *Global Health Action.* (2017) 10:1398485. doi: 10.1080/16549716.2017.1398485
10. The Lancet. COVID-19 in Latin America: a humanitarian crisis. *Lancet.* (2020) 396:1463. doi: 10.1016/S0140-6736(20)32328-X
11. Villarreal A, Rangel G, Zhang X, Wong D, Britton G, Fernandez PL, et al. Performance of a point of care test for detecting IgM and IgG antibodies against SARS-CoV-2 and seroprevalence in blood donors and health care workers in Panama. *Front Med.* (2021) 8:616106. doi: 10.3389/fmed.2021.616106
12. UNDP. *Human Development Report 2019: Inequalities in Human Development in the 21st Century Jordan*. Panama: UNDP (2019). Available online at: http://hdr.undp.org/en/data
13. OECD. *PISA 2018 Results Vol I*. Panama (2019). doi: 10.1787/5f07c754-en
14. Sun N, Wei L, Wang H, Wang X, Gao M, Hu X, et al. Qualitative study of the psychological experience of COVID-19 patients during hospitalization. *J Affect Disord.* (2021) 278:15–22. doi: 10.1016/j.jad.2020.08.040
15. Hugo M, Declerck H, Fitzpatrick G, Severy N, Gbabai, O. B.-M., et al. Post-traumatic stress reactions in ebola virus disease survivors in sierra leone. *Emerg Med.* (2015) 5:6. doi: 10.4172/2165-7548.1000285
16. Shultz JM, Althouse BM, Baingana F, Cooper JL, Espinola M, Greene MC, et al. Fear factor: the unseen perils of the Ebola outbreak. *Bull Atomic Sci.* (2016) 72:304–10. doi: 10.1080/00963402.2016.1216515
17. Ji D, Ji YJ, Duan XZ, Li WG, Sun ZQ, Song XA, et al. Prevalence of psychological symptoms among Ebola survivors and healthcare workers during the 2014-2015 Ebola outbreak in Sierra Leone: a cross-sectional study [Prevalencia de síntomas psicológicos entre los supervivientes del ébola y los trabajadores sani. *Oncotarget.* (2017) 8:12784–91. doi: 10.18632/oncotarget.14498
18. Boyraz G, Legros DN. Coronavirus disease (COVID-19) and traumatic stress: probable risk factors and correlates of posttraumatic stress disorder. *J Loss Trauma.* (2020) 25:503–22. doi: 10.1080/15325024.2020.1763556
19. Wang W, Wu X, Tian Y. Mediating roles of gratitude and social support in the relation between survivor guilt and posttraumatic stress disorder, posttraumatic growth among adolescents after the Ya'an earthquake. *Front Psychol.* (2018) 9:1–8. doi: 10.3389/fpsyg.2018.02131
20. The Lancet Infectious Diseases. The intersection of COVID-19 and mental health. *Lancet Infect Dis.* (2020) 20:1217. doi: 10.1016/S1473-3099(20)30797-0

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 12 April 2021
doi: 10.3389/fpsyt.2021.638359

Under-Reporting of COVID-19 Cases Among Indigenous Peoples in Brazil: A New Expression of Old Inequalities

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OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Shaun Ewen, The University of Melbourne, Australia
Karen Adams, Monash University, Australia

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *06 December 2020*
Accepted: *01 March 2021*
Published: *12 April 2021*

Citation:
Fellows M, Paye V, Alencar A, Nicácio M, Castro I, Coelho ME, Silva CVJ, Bandeira M, Lourival R and Basta PC (2021) Under-Reporting of COVID-19 Cases Among Indigenous Peoples in Brazil: A New Expression of Old Inequalities. Front. Psychiatry 12:638359. doi: 10.3389/fpsyt.2021.638359

Objective: To estimate the incidence, mortality and lethality rates of COVID-19 among Indigenous Peoples in the Brazilian Amazon. Additionally, to analyze how external threats can contribute to spread the disease in Indigenous Lands (IL).

Methods: The Brazilian Amazon is home to nearly half a million Indigenous persons, representing more than 170 ethnic groups. As a pioneer in heading Indigenous community-based surveillance (I-CBS) in Brazil, the Coordination of the Indigenous Organizations of the Brazilian Amazon (COIAB) started to monitor Indigenous COVID-19 cases in March of 2020. Brazil's Ministry of Health (MOH) was the main source of data regarding non-Indigenous cases and deaths; to contrast the government's tally, we used the information collected by I-CBS covering 25 Special Indigenous Sanitary Districts (DSEI) in the Brazilian Amazon. The incidence and mortality rates of COVID-19 were calculated using the total number of new cases and deaths accumulated between the 9th and 40th epidemiological weeks. We studied (a) the availability of health care facilities to attend to Indigenous Peoples; (b) illegal mines, land grabbing, and deforestation to perform a geospatial analysis to assess how external threats affect Indigenous incidence and mortality rates. We used the Generalized Linear Model (GLM) with Poisson regression to show the results.

Results: MOH registered 22,127 cases and 330 deaths, while COIAB's survey recorded 25,356 confirmed cases and 670 deaths, indicating an under-reporting of 14 and 103%, respectively. Likewise, the incidence and mortality rates were 136 and 110% higher among Indigenous when compared with the national average. In terms of mortality, the most critical DSEIs were *Alto Rio Solimões*, *Cuiabá*, *Xavante*, *Vilhena* and *Kaiapó do Pará*. The GLM model reveals a direct correlation between deforestation, land grabbing and mining, and the incidence of cases among the Indigenous.

Conclusion: Through this investigation it was possible to verify that not only the incidence and mortality rates due to COVID-19 among Indigenous Peoples are higher

than those observed in the general population, but also that the data presented by the federal government are underreported. Additionally, it was evident that the presence of illegal economic activities increased the risk of spreading COVID-19 in ILs.

Keywords: COVID-19, Indigenous Peoples, Brazilian Amazon, Indigenous health system, inequalities, under-reporting

INTRODUCTION

The advance of the novel coronavirus, which has already claimed more than one million lives globally, has hit the Indigenous populations of the Brazilian Amazon head-on. Indigenous Peoples bear a disproportionate brunt of the coronavirus pandemic as the result of the settler colonialization process that pushed them into a vulnerable situation (1). The history of Indigenous Peoples in Brazil, regardless of ethnicity, is marked by a series of epidemics caused by exogenous diseases, which have left a death trail in their wake, from the beginning of the colonization period until the current days (2). This process results from a deep and cruel history of subjugation and marginalization of Indigenous Peoples (3, 4), which they actively fight against since then. This is particularly troubling when considering the more than 100 free and autonomous Indigenous groups recently contacted or living in voluntary isolation (5), taking the difficulties to offer them appropriate and opportune health services into account.

The national Indigenous health system, coordinated by the Special Health Secretariat for Indigenous Peoples (SESAI) of the Brazilian Ministry of Health, has shown that it does not provide the necessary infrastructure to prevent and treat even ordinary diseases. Indigenous children and women present higher levels of malnutrition and anemia, among other morbidities (6), when compared to the Brazilian population as a whole (7, 8), as a direct effect of the inequalities expressed by health disparity (4, 9).

In addition to these chronic problems, the government's tally has been clearly under-reported. Based on the guidelines outlined in the National Policy for Indigenous Health Care, the federal government assures health assistance solely at the primary health care level and restricts the treatment to those living in Indigenous Lands (ILs) officially recognized by the Brazilian National Indigenous Foundation (FUNAI). Thus, the number of coronavirus cases does not include Indigenous Peoples living in cities as part of the tally of Indigenous Peoples infected, nor those who end up dying in their territories without receiving healthcare. Moreover, systemic racism issues persist, as their identity is sometimes denied, as some have been registered as *pardo*[1] or brown instead of Indigenous.

In cases of coronavirus in which there are clinical complications, there is a need for a more complex care structure, which includes the use of medications that are not available in primary health care facilities, such as the provision of oxygen therapy through artificial respirators or hospitalization in Intensive Care Unit (ICU) beds. Therefore, Indigenous Peoples should be considered a high-risk group for COVID-19 and should receive the appropriate extra attention and catered care (11, 12). Unfortunately, the federal government is not fulfilling its role in effectively ensuring comprehensive health care for this population.

The current scenario among Indigenous Peoples in Brazil is severe and worrisome. The mortality rate registered among the Indigenous Peoples of the Amazon today is an indicative of a situation that can be catastrophic if an urgent and adequate strategy for treating these communities is not implemented within these regions. Therefore, the Indigenous organizations, particularly the Coordination of the Indigenous Organizations of the Brazilian Amazon (COIAB), set up an Emergency Action Plan that has several fronts, including the one responsible to monitor Indigenous cases of coronavirus in the Brazilian Amazon, that later would influence other Indigenous organizations in Brazil and the Amazon basin (13). In this sense, the Indigenous community-based surveillance (I-CBS) was established to keep track of Indigenous cases to contrast the government's tally, by combating the misclassification of Indigenous Peoples from data sets in order to have substantial data to orient health policies that attend their particular needs. Several Indigenous and indigenists organizations are dedicated to support the I-CBS work since March of 2020.

Taking into consideration the abovementioned factors that elucidate the context in which the federal government under-reporting takes place, in addition to existing health disparities and inequalities (9), this article aims to estimate the incidence and mortality rates as well as the lethality of COVID-19 among the Indigenous Peoples of the Brazilian Amazon. Additionally, we try to analyze how external threats that occur in traditional territories can contribute to the dissemination of the disease in Indigenous Lands, threatening lives and ancestral knowledge.

METHOD

The Indigenous Context in the Brazilian Amazon

The Brazilian Amazon is home to nearly half a million Indigenous population which, when translated into ethnical groups, represent one of the most socio-diverse regions in the world with more than 170 different nations (14, 15), in addition to those living in voluntary isolation, which represents the region with the highest number of Indigenous communities that chose to live freely and autonomously in the world (16). Each Indigenous nation has its own relation with its territories (17), which represents 98% of the total area of ILs in Brazil (18).

[1]Pardo is a color and race definition used by the Brazilian Institute of Geography and Statistics (IBGE), and it denotes a mixed-race origin (10).

This great socio-cultural diversity is represented by COIAB and its robust organizational structure. Conceived in 1989, COIAB is ultimately the reference organization for the Indigenous Peoples of the Brazilian Amazon by representing its grassroots associations located in COIAB's sixty-four regions comprised in the states of the Legal Amazon. Moreover, COIAB's decision-making arrangement is supported by nine Indigenous state organizations, each representing their respective state in the region. Its long historical participation in debating and building public policies, which includes those of public health nature, paved the path that would conduct the efforts to combat the health disparities experienced by Indigenous groups (13).

As a pioneer in heading the I-CBS in Brazil, by the second half of March, COIAB started to monitor Indigenous coronavirus cases. This work is part of COIAB's Emergency Action Plan, aimed at preventing coronavirus from spreading in Indigenous communities and guiding public health policies to serve the areas and peoples that need more aid, in a collective effort to avoid losing more Indigenous lives. This document is an important tool of mobilization and planning to arrange the actions of COIAB and its partners. It was written with the following axis: communication, policy incidence, management of urgent actions of assistance and basic health care, food sovereignty, and Indigenous medicine (19).

Additionally, there was an urgent necessity to confront the information that was registered by governmental agencies, due to its colonialist vision of whom constitutes an Indigenous person. An administrative act issued by the Brazilian Ministry of Health defines that only those Indigenous persons living in their traditional territories have access to complete health care that respects their ethnocultural particularities (8). This norm creates a precedent by excluding Indigenous Peoples who live in urban areas from receiving treatment according to their cultural background.

In face of this challenge, COIAB and its network established a group dedicated to deal with coronavirus issues. Since then, they organize the information gathered by the twenty-five Special Indigenous Sanitary Districts (DSEI) located in the Legal Amazon region, comprehended within the nine states of the Amazon where COIAB acts directly through its member organizations. The DSEI are operational units whose range is defined not only by technical and geographical considerations, but also political relations, culture, and ancestral Indigenous population distribution (11). All ILs officially recognized by the government is served by one DSEI of reference; therefore, this is the area of analysis of this study (**Figure 1**).

Sources of Data

COVID-19 Cases and Deaths

The Ministry of Health of Brazil was the main source of data regarding non-Indigenous confirmed cases and deaths, which we divided the analysis into the Brazilian population as a whole, and the nine states of the Legal Amazon[2]. We used the data released by SESAI regarding Indigenous cases; to compare with the tally compiled by the federal government, we used the information relentlessly collected by COIAB and their Indigenous leaders, Indigenous health professionals, and its partners in the Brazilian Amazon.

The health management of Indigenous Peoples in Brazil is under SESAI's responsibility. Its actions are developed through the Subsystem of Indigenous Healthcare (SASI), within the scope of the Brazilian Public Healthcare System (SUS), and are delivered by DSEI that are distributed over the entire national territory (11). As part of the Brazilian Ministry of Health, SESAI uses the same standard form to register every suspected case of coronavirus. Although this form asks for racial information, it does not include the option to inform about ethnicity or Indigenous territory of origin. Unlike the federal government, SESAI only releases total numbers of Indigenous coronavirus cases, without mentioning details about their age, gender, or origin. The daily-updated epidemiological bulletins are divided by DSEIs.

Such lack of detail makes it impossible to plan feasible and opportune actions to face coronavirus from spreading among Indigenous Peoples living in the Amazon. Thus, COIAB maintains a task force to qualify the information released by SESAI and to reinforce the necessity to amplify the spectrum of assistance by including the Indigenous living in urban areas. Together, they record all coronavirus cases amongst Indigenous Peoples not reported by the government, regardless of where the patient lives. Through this articulation, the I-CBS was constituted to fight the pandemic, given the importance of tracking the cases to control the spread of the disease. The reports were sent from the Indigenous and indigenists organizations to a focal point of COIAB, daily. Nonetheless, Indigenous leaders and local organizations sporadically informed COIAB directly about a confirmed case or fatality.

To guarantee there will not be double-counting, COIAB undergoes an internal check that compares the data in the bulletins issued by SESAI with the information passed on by the Indigenous leaders and organizations. Social networks were the main communication vehicle used by them to exchange information about cases and deaths. Additionally, COIAB keeps track of their partners' bulletins to complete the whole picture, as the case of Acre and Amapá states where indigenists organizations were fundamental to provide information. Furthermore, there is also an active Indigenous group that supervises the situation and validates its results.

COIAB's registry is presented by location - COIAB's region, state, DSEI, and municipality, when available -, the patient's situation (suspect, confirmed case, death), and ethnicity whenever possible. Later, COIAB elaborated a detailed bulletin to report the situation of the pandemic among Indigenous Peoples in the Amazon. In September, an app called *Alerta Indígena Covid-19* was launched to support the data collection work that had been done until then[3].

Considering the ethical aspects of conducting research with human beings, the information used in this article comes from open sources when it comes to non-Indigenous

[2]For further information: https://covid.saude.gov.br/.

[3]For further information about the application "Indigenous Covid-19 Alert": https://coiab.org.br/covid.

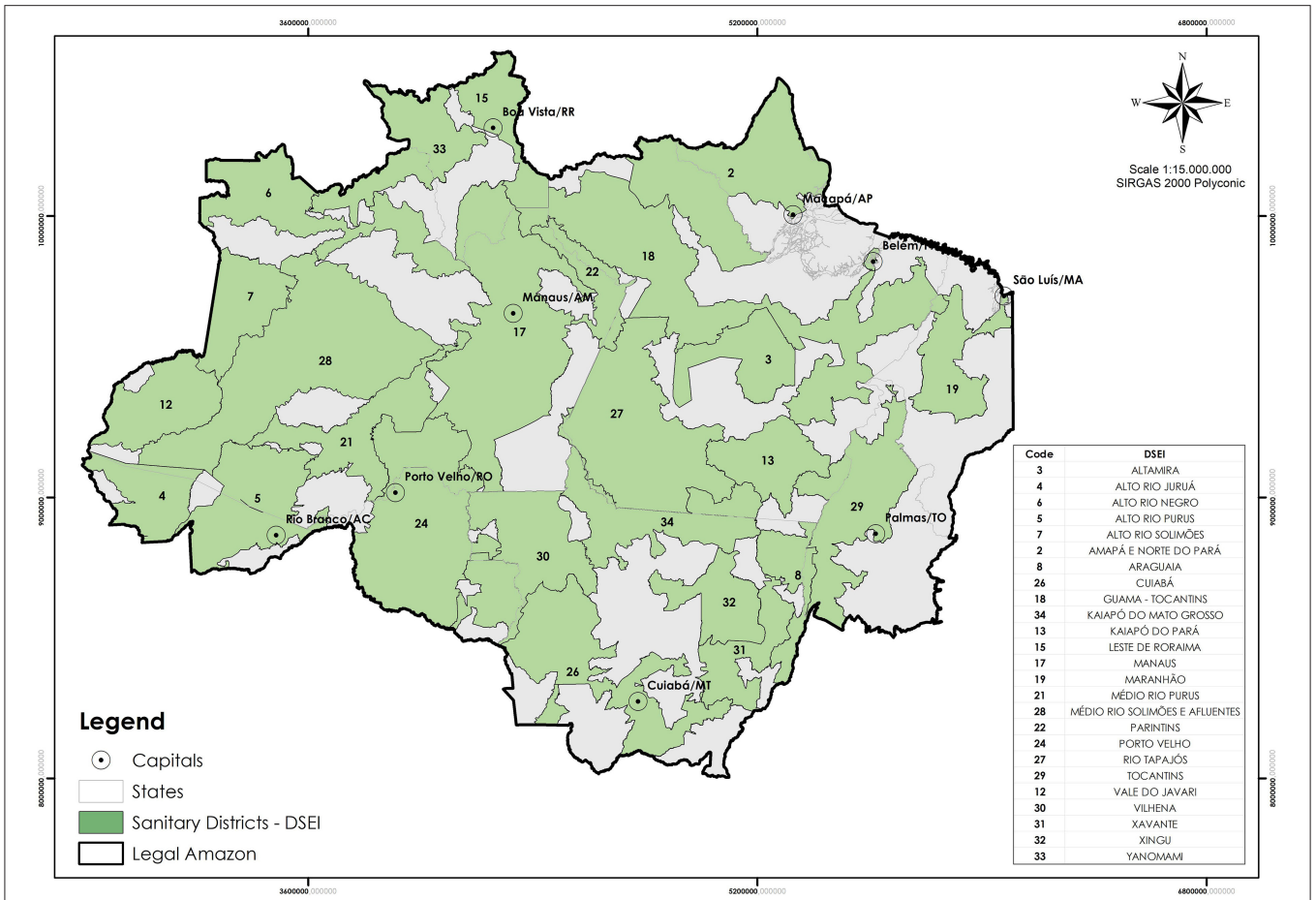

FIGURE 1 | Coverage map of the twenty-five Special Indigenous Sanitary Districts (DSEIs) in the Amazon. Source: SESAI, Brazilian Ministry of Health.

Peoples. Regarding the Indigenous population data, we used the federal government's open sources and COIAB's registry, which is made public by their bulletins disclosed in their social media. COIAB was a proponent of this paper represented by two Indigenous leaders (VP, MN) and one indigenist (MC) as co-authors.

Environmental Variables

Aiming to analyze how external variables affect the Indigenous incidence, mortality, and lethality rates, we took into account territorial encroachment (20) and the availability of health care facilities to attend to indigenous peoples in their villages (11).

In terms of health care infrastructure, we considered the sum of Basic Healthcare Units (BHU) facilities administrated by SESAI[4] per Indigenous population according to each DSEI. In addition, we measured the distance from the geographical center of the ILs to the nearest municipality with a hospital that has ICU beds, according to the Ministry of Health report[5].

Additionally, we evaluated a set of three illegal activities detected within the ILs, by outlining (a) the existence of illegal mines, identified and mapped by the Amazon Geo-referenced Socio-environmental Information Network (RAISG)[6], (b) the total area of illegally registered rural properties according to the Brazilian Rural Environmental Registry (CAR)[7] as an indicator of land grabbing, and (c) the proportion of area deforested[8] within the Indigenous territories and in a 10-kilometer buffer zone surrounding each IL, accumulated until 2019. The source for deforestation was the National Institute for Space Research (INPE) and the project PRODES, which monitor the clear-cutting of forests in the Legal Amazon area.

[4]SESAI manages three healthcare unit types: (i) basic healthcare stations, (ii) the so-called Polos-Base (PB), and (iii) the Indigenous Health Centers (CASAI).
[5]For further information: http://cnes.datasus.gov.br/.

[6]RAISG is a consortium of civil society organizations from the Amazon countries that produces and disseminates statistical data and geospatial socio-environmental information.
[7]CAR is the acronym for *Cadastro Ambiental Rural*, the mandatory register for every rural property to be recognized by the federal government.
[8]To calculate deforestation, we considered the whole area for each Indigenous Land and excluded rivers, lakes, and other types of landscape features that did not match the naturally occurring vegetation.

Data Analysis

Descriptive Epidemiological Analysis of Incidence, Mortality, and Lethality Rate

The incidence rate of coronavirus was calculated using the total number of new cases accumulated between the 9th and 40th epidemiological weeks, as the numerator. In the same way, the mortality rate of coronavirus was calculated using the total number of deaths, accumulated during the aforementioned epidemiological weeks [9–40th (February 23 to October 03, 2020)], in the numerator. The denominator for incidence and mortality rates consisted of the total Brazilian population at risk during the calendar year 2019, multiplied by 100,000. Lastly, the lethality is expressed by percentage and contrasts the total number of deaths with the total confirmed cases.

For this study, the Brazilian population and the population of the Legal Amazon region is the one provided by the Court of Audit of the Union (TCU), in 2019. The Indigenous population is an estimate that used a geometric interpolation and extrapolation for the same year. The equation used to compute the growth of this population is the following:

$$\mathbf{P_f = P_0 * (1+\propto)\,\hat{}\,n}$$

P_f is the final population that takes into account the initial Indigenous population, P_0, for each state of the Legal Amazon region, multiplied by α (*alfa*) as the Indigenous population growth rate from 2000 and 2010 (21), to the power of n, representing how many years from the initial population until 2019, to match with the estimated population for Brazil and the Legal Amazon.

Geospatial Analysis

The first step in the geospatial analysis was to use a correlation matrix to determine the connection between the environmental variables and the risk for an Indigenous person to get infected or die from COVID-19. Every variable was tested individually and those with a correlation higher than 0.2 were selected for further analysis (**Table 1**). The only exception for the correlation assessment was illegal mining, as it was represented as a binary variable.

We then used the GLM (Generalized Linear Model) with Poisson distribution to select the variables that together better predict incidence and mortality rates. In order to have comparable estimated coefficients, all input variables were converted to a 0 – 1 scale. The models were run from the most simple (null model) to the most complex (all variables added). The variables were added in turns to each model following a descending order based on the correlation coefficient. We assessed the models in pairs using the Analysis of Variance (ANOVA) to test if an addition of a variable improved the prediction of Indigenous cases and fatalities. Subsequently, to compare the models, we used the AIC index (Akaike information criterion) with the R package *rcompanion*. The AIC determines the best models prioritizing its goodness of fit (how well the model reproduces the data) and simplicity (the least number of variables). Finally, we selected the best models based on the least value of AICc, which are the following:

$$\mathbf{Incidence} \sim \mathbf{BHU_{pop} + CAR + Mining,\ family = "poisson"}$$

$$\mathbf{Mortality} \sim \mathbf{Deforestation + BHU_{pop},\ family = "poisson"}$$

Incidence and *Mortality* are the number of cases and deaths divided by population, multiplied by 100,000, respectively; *BHU_pop* is the amount of Basic Healthcare Units normalized by the population for each DSEI in the villages; *CAR* is the land grabbing area in hectares; *Mining* represents the illegal mining site area found within the DSEIs; *Deforestation* represents the proportion of the deforestation rates accumulated until 2019, within the ILs and a buffer zone of 10 kilometers around them. Different variables were selected for each model as correlations with incidence and mortality differed, and their combination is an outcome of the statistical selection which prioritizes the goodness of fit.

Vulnerability Index

The vulnerability index was designed for this study to analyze the variables chosen, given the aforementioned selected models, in two maps: (a) incidence index indicating the risk of contamination, combining access to health care services and exposure to the disease (represented by illegal mining and land grabbing) and (b) mortality index indicating the risk of death among the Indigenous population, which combines the access to healthcare infrastructure and deforestation variables. For each map, an index per DSEI was calculated based on the corresponding weight of each variable derived from the estimated coefficients in the GLM. The indices were obtained from the weighted sum of input variables, according to the following equations, and subsequently scaled from 0 to 1.

$$\mathbf{Index\,(a)} = \sum \left((\mathbf{BHU} * \mathbf{3,16}) + \left(\mathbf{Mining} * \mathbf{1,20}\right) + (\mathbf{CAR} * \mathbf{1,39}) \right)$$

$$\mathbf{Index\,(b)} = \sum \left((\mathbf{BHU} * \mathbf{2,05}) + (\mathbf{Deforestation} * \mathbf{2,48}) \right)$$

RESULTS

Incidence, Mortality and Lethality Rate

The pandemic caused by coronavirus stresses the differences within Brazilian society. Since the disease claimed its first victim in March, the total number of cases and deaths escalated. From then on, SESAI registered 22,127 cases, and COIAB's survey recorded 3,229 additional cases, totaling 25,356 confirmed cases, indicating a noticeable under-reporting of 14%, as a consequence of the official protocol that excludes Indigenous residents in cities, resumption areas, or territories affected by conflicts. The under-reporting regarding the number of deaths is much more alarming; SESAI reported 330, which represents less than half of all 670 deaths registered by COIAB up to October 1st, 2020. Regarding the incidence, mortality, and lethality rates, the proportion of the indigenous population affected by the novel virus is higher than the other groups in every regard (**Table 2**).

It should be noted beforehand that the total numbers presented in the graphs are significantly different, considering

TABLE 1 | According to the correlation matrix, the incidence rate has a direct correlation with BHU, CAR, and illegal mining; the variables that showed a direct correlation with the mortality rate were BHU and deforestation accumulated.

	Distance to UCI	Basic Healthcare Units (BHU)	Land grabbing (CAR)	Deforestation accumulated
Incidence rate	−0.15	0.56	0.23	0.07
Mortality rate	−0.04	0.33	0.07	0.41

Brazilian Ministry of Health, Amazon Network of Geo-referenced Socio-Environmental Information (RAISG); INPE; CAR/Brazilian Forest Service.

TABLE 2 | Number of new confirmed cases and incidence rate of cases per 100,000 inhabitants; and the number of deaths and mortality rate per 100,000 inhabitants among the indigenous population of the Amazon (COIAB and SESAI), contrasting with cases and deaths in non-indigenous population by states of the Legal Amazon, and in Brazil on October 1st, 2020.

	N° of cases	N° of deaths	Incidence rate per 100,000	Mortality rate per 100,000	Lethality rate
COIAB	25,356	670	5,524	146.0	3.0%
SESAI	22,127	330	4,821	71.9	2.4%
Legal Amazon	941,425	22,379	3,247	77.2	1.5%
Brazil	4,906,833	145,987	2,335	69.5	2.6%

Sources: COIAB, SESAI, and Brazilian Ministry of Health.

the new cases by epidemiological week (**Figure 2**). Nevertheless, the results indicate the distinct contamination dynamic for Indigenous Peoples when compared to the remaining groups. Concerning the total cases in Brazil, it is possible to outline the trajectory of the spread of the disease over time, which has led to almost five million cases by October 1st (**Figure 2A**). The Legal Amazon's tally follows a similar path to Brazil's, characterized by a sharper initial curve (**Figure 2B**). In contrast, the Indigenous new cases are distinguished by their particular fluctuation (**Figures 2C,D**). Although the Legal Amazon is the same region where the Indigenous population represented in this study lives, the trends shown differ drastically for both.

Like the weekly report on new cases, the data presented for deaths showcase the specificities regarding Indigenous Peoples' condition (**Figure 3**). The cases in Brazil mirror its deaths (**Figure 3A**). The data demonstrate that after the curve peaked by the 22nd epidemiological week, the number of deaths per week remained stable, followed by a decrease in the latest weeks examined. The Legal Amazon presents similar features as those observed for Brazil in its entirety (**Figure 3B**). In contrast, the graphs for Indigenous deaths exhibit an oscillation in the number of fatalities per week, resembling the values for confirmed cases, as the virus spread throughout the communities (**Figures 3C,D**). It is noticeable that in the first weeks, COIAB's tally accounted for a larger amount of deaths caused by coronavirus in comparison with SESAI's reports, which indicates an expressive under-reporting.

According to COIAB's report, by the 40th epidemiological week, the incidence rate of COVID-19 per 100,000 inhabitants among the Indigenous population was 136% higher than Brazil's rate (**Figures 4A**, **5A**). Likewise, this same metric was 70% larger for Indigenous Peoples than for the Legal Amazon region (**Figure 4A**). SESAI's data follows the same path; according to its database, the incidence rate for Indigenous communities is 106% higher than the Brazilian rate and 48% higher than the one observed in the Legal Amazon.

The Indigenous mortality rate per 100,000 inhabitants, according to COIAB's data, discloses a comparable situation to what was previously presented: it is 110% higher than the Brazilian average and exceeds the Legal Amazon mortality rate by 89% (**Figures 4B**, **5B**). However, SESAI's record brings a different narrative that may reflect the under-reporting of deaths among Indigenous communities (**Figures 3C,D**). According to them, the mortality rate for Indigenous Peoples is lower than the Legal Amazon, and only 3.5% higher than Brazil's rate. The lethality also indicates a serious under-reporting as SESAI's values are 51% smaller than COIAB's numbers (**Figure 4C**).

The following maps enable a better understanding of the dispersion of coronavirus, previously presented in the graphs above (**Figures 2C**, **3C**). Each area responded differently to the disease (**Figure 5**), with some severely impacted by the loss of several knowledge-bearers in their community, as the DSEI *Xavante* in the Southeast of the Mato Grosso state (**Figure 5B**), which reinforces the findings of previous studies (11). Another DSEI that showed a high level of incidence and mortality rates was the neighboring *Cuiabá* (**Figure 5A**). One DSEI sticks out from the trend noticed in its region, especially concerning the mortality rate, which is the *Alto Rio Solimões*. Located in the Northwest of the Amazonas state, this Sanitary District has twenty-seven ethnical groups, it has the fourth-highest incidence rate and it is first in mortality rate, which got to this level in the first period of contagion due to the contact of an infected health professional with the local communities (22).

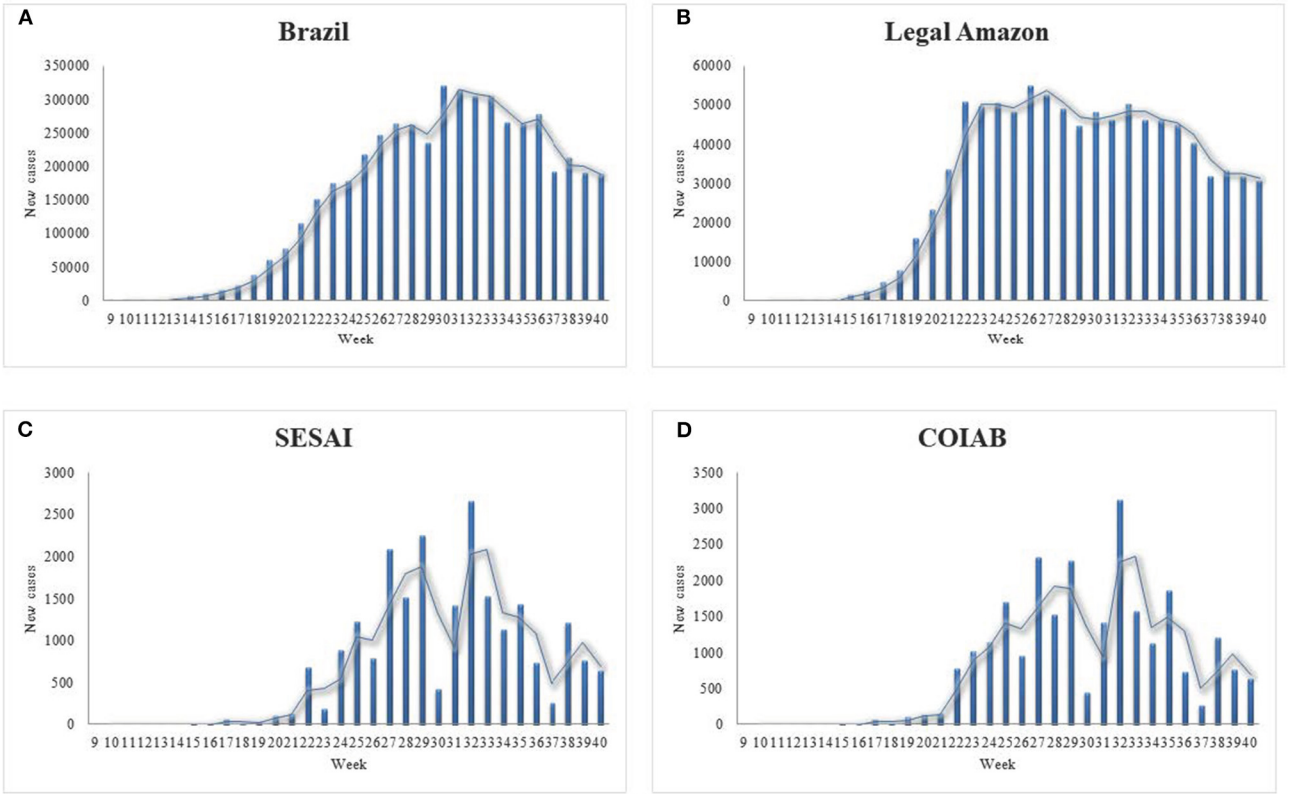

FIGURE 2 | New confirmed cases from the 9th to the 40th epidemiological week of 2020, for **(A)** Brazil; **(B)** Legal Amazon; **(C)** for Indigenous Peoples cases according to COIAB; and, **(D)** Indigenous Peoples cases according to SESAI. Sources: COIAB, SESAI, and Brazilian Ministry of Health.

Vulnerability Index

According to the results obtained by the GLM tests, we calculated the weight of the sum of the variables by DSEI, by vulnerability to infection and death (**Table 3**). The aforementioned indices were the basis to structure the vulnerability maps (**Figure 6**), its indicator varies from 1 - those highly endangered - to 0 – those least at risk.

The maps indicate the areas where Indigenous Peoples are more exposed to the virus according to the outcomes (**Figure 6A**). The ILs potentially exposed to COVID-19, according to the variables examined are located at the DSEI *Vilhena*, *Altamira*, *Guamá-Tocantins*, *Rio Tapajós*, and *Cuiabá*. Concerning the greater risk for one infected person to die from coronavirus, the results show that the DSEIs *Vilhena*, *Cuiabá*, *Maranhão*, *Altamira*, and *Xavante* are expected to face a higher number of losses (**Figure 6B**). Each region requires crafted individualized attention, as they have their own socio-cultural, geographical, and demographical dynamic.

DISCUSSION

Inequalities in access to healthcare are a historical reality for Indigenous Peoples in many countries (23, 24), and Brazil is no exception (8). Mismanagement and disregards by WHO guidelines by the Federal authorities become evident on the actual results verified by COIAB's I-CBS on COVID-19 incidence and mortality rates among Indigenous Peoples compared to the government tally for Indigenous and the Brazilian population at large. The data presented by the federal government not only under-reports but also reinforces cultural assimilation attempts embedded in structural racism, by not accounting for indigenous people living in cities and denying their identities. However, the administration's handling of environmental stressors such as illegal economic activities (i.e., gold miners, loggers, land grabbers) on IL increased the risk of spreading coronavirus in all nine states of the Brazilian Legal Amazon. In one fell swoop, purposely threatening the lives and ancestral knowledge of different ethnic groups living in the Amazon region (25).

Our results indicate that Indigenous Peoples in the Legal Amazon are 136% more affected by COVID-19 than the rest of the country. Whilst mortality rate is 110% higher among Indigenous Peoples than the general population. Significant discrepancies between Legal Amazon states morbidity rates among Indigenous Peoples obtained by our study, correlated to settler colonization policy causing environmental stressors. Therefore, the spread of the coronavirus deserves maximum attention from health agencies, as confirmed by this study and COIAB's Emergency Action Plan. However, this urgency was not

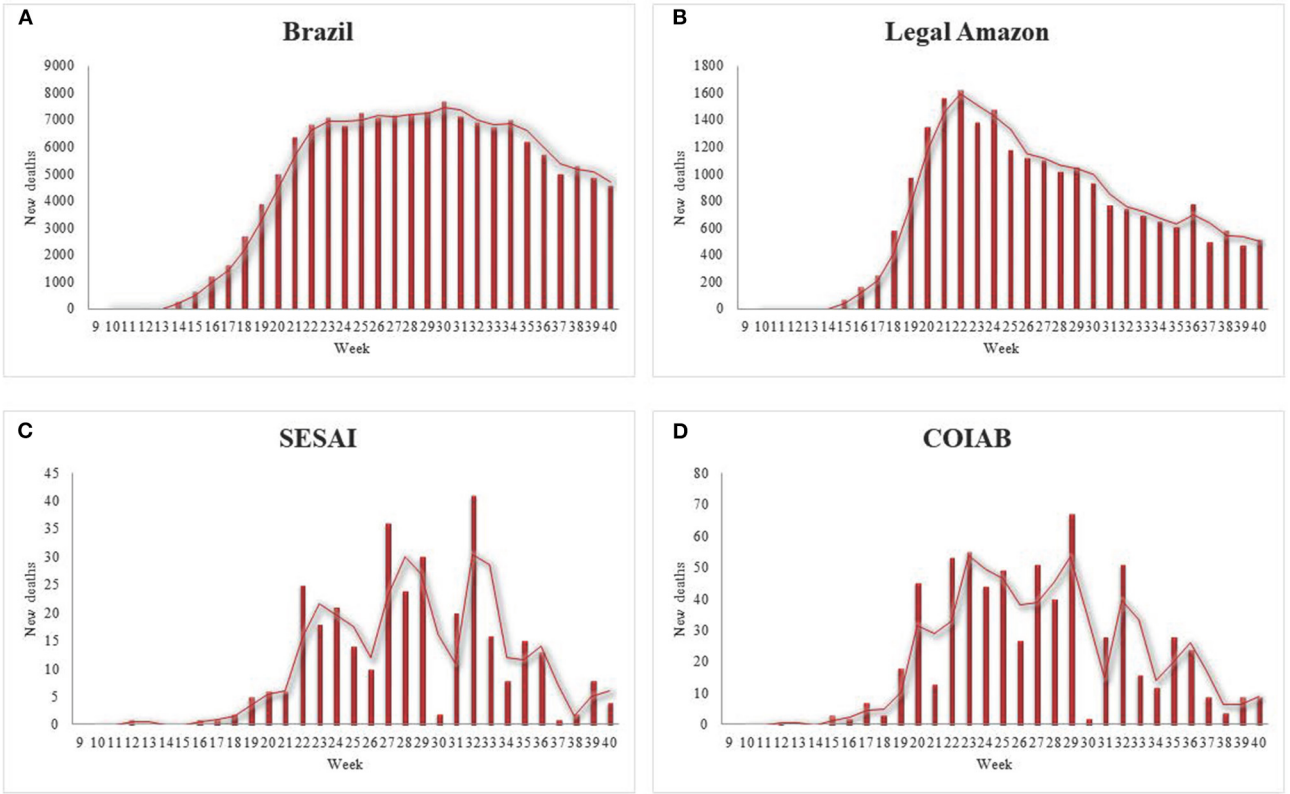

FIGURE 3 | New deaths from the 9th to the 40th epidemiological week of 2020, for **(A)** Brazil; **(B)** Legal Amazon; **(C)** for Indigenous Peoples' deaths according to COIAB; and, **(D)** Indigenous Peoples' deaths according to SESAI. Sources: COIAB, SESAI, and Brazilian Ministry of Health.

translated into combating the external sources of infection (26). It is key to halt contact with outsiders to stop the contamination cycle (20).

External agents carry the virus into the Indigenous communities at a faster pace than the government's ability to respond to the disease (27).

The GLM tests showed a direct correlation between the occurrence of illegal activities within the ILs and a high incidence rate, notably illegal mining and land grabbing. The current context is, therefore, grave. In addition to the external factors that threaten the health of Indigenous Peoples, there is still a lack of swift and widespread unequal medical care system. Reflected in our results by the amount of Basic Healthcare Units per population and the direct correlation with the incidence and mortality rates. A clear sign that the COVID-19 pandemic worsens an already harsh situation that Indigenous Peoples face.

However, it is essential to recognize some aspects of the current Indigenous health system. Conceived collaboratively by the Brazilian Indigenous movement, SESAI has been widely acknowledged as a major achievement and a step forward toward a health system that provides culturally safe and responsive services better able to address health inequities. This endeavor has played a major role in guaranteeing Indigenous participation in decision-making processes regarding health issues (28), and it has achieved great progress toward the implementation of the Brazilian public healthcare system (29). The data gathered by I-CBS indigenous network urged the administration to allocate to Indigenous Peoples, priority access to vaccines, through DSEIs and the National immunization program.

Managed by the federal government, this system has yet to improve. As the pandemic demonstrates, there are several gaps to be filled. An exemplary model is how the under-reporting gap that hides a bigger issue and hinders the combat of the pandemic was flagged by COIAB's I-CBS and is confronting SESAI's database regarding COVID-19 information. These shortages could be avoided by integrating civil society organizations as decision-making partners, in the opposed direction of the administration's policy.

Some enshrined rights have a sluggish pace toward transforming public policies into effective and efficient affirmative actions, while social inequalities prevent Indigenous Peoples from seeking medical care (8). For instance, many who live in their communities have to travel long distances to the nearest hospital for treatment. The average distance from one IL to a city with ICU beds is 271 km, which can reach up to more than 700 km, as the case of the DSEI *Alto Rio Negro* (30).

More than half of the Indigenous population in Brazil live in the Amazon (21). Of those, it is estimated that around 95,000 are living in urban areas, none of them covered by SESAI. Moreover, these people are not counted in the coronavirus government

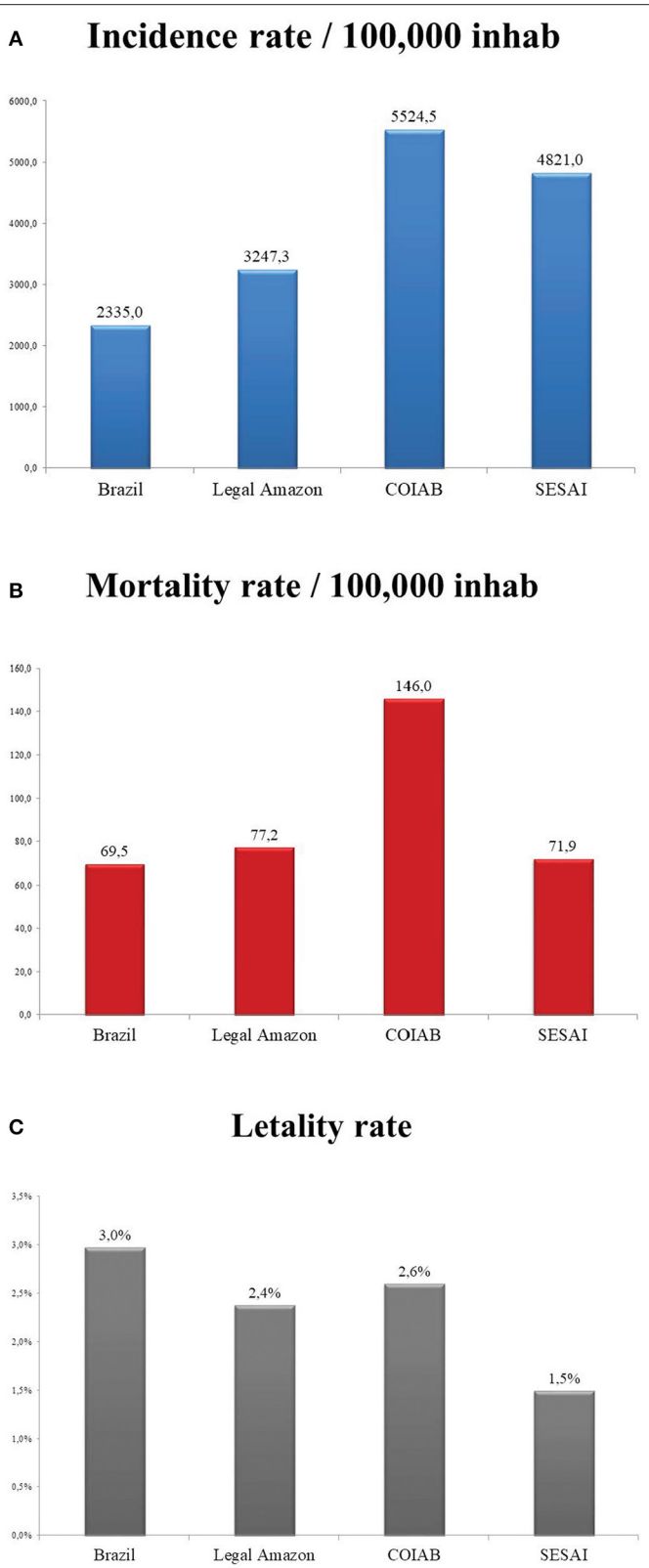

FIGURE 4 | (A) Incidence rate per 100,000 inhabitants for Brazil, Legal Amazon, COIAB, and SESAI; **(B)** Mortality rate per 100,000 inhabitants for Brazil, Legal Amazon, COIAB, and SESAI; **(C)** Lethality for Brazil, Legal Amazon, COIAB, and SESAI, calculated for the 40th epidemiological week of 2020. Sources: COIAB, SESAI, and Brazilian Ministry of Health.

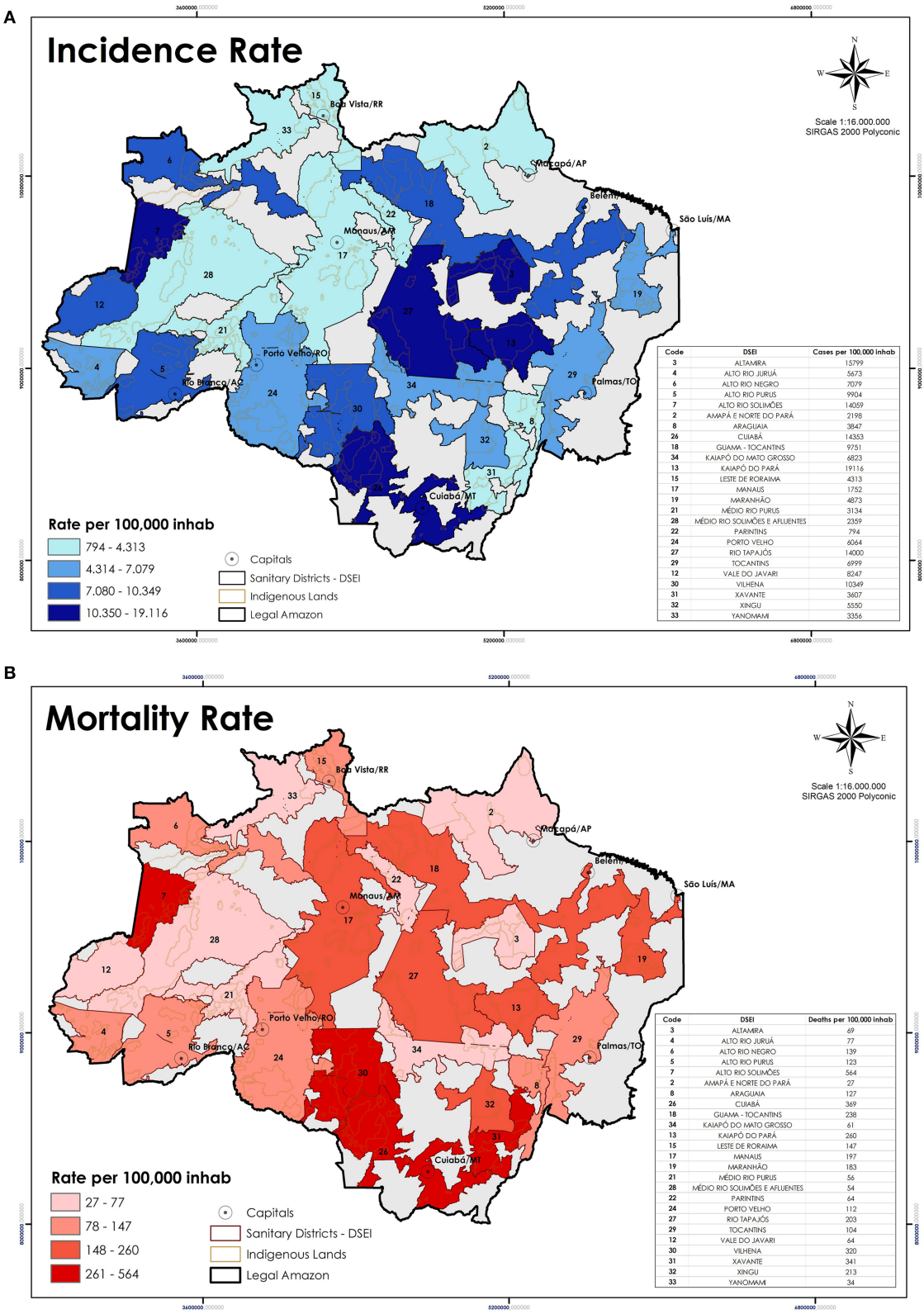

FIGURE 5 | Each map shows the situation of the **(A)** Incidence rate; and **(B)** Mortality rate of the Indigenous population in the Amazon, distributed by DSEI, on October 1st. Source: COIAB.

TABLE 3 | Indices per DSEI, according to the sum of variables tested.

Code	DSEI	Vulnerability index Incidence 0-1	Vulnerability index Mortality 0-1
3	ALTAMIRA	0.831	0.61
4	ALTO RIO JURUÁ	0.131	0.173
6	ALTO RIO NEGRO	0.336	0.117
5	ALTO RIO PURUS	0.182	0.117
7	ALTO RIO SOLIMÕES	0.198	0.251
2	AMAPÁ E NORTE DO PARÁ	0.284	0.045
8	ARAGUAIA	0.273	0.52
26	CUIABÁ	0.455	0.928
18	GUAMA - TOCANTINS	0.789	0.466
34	KAIAPÓ DO MATO GROSSO	0.34	0.333
13	KAIAPÓ DO PARÁ	0.525	0.441
15	LESTE DE RORAIMA	0.546	0.439
17	MANAUS	0.08	0.128
19	MARANHÃO	0.202	0.692
21	MÉDIO RIO PURUS	0.225	0.206
28	MÉDIO RIO SOLIMÕES E AFLUENTES	0.21	0.142
22	PARINTINS	0.093	0.126
24	PORTO VELHO	0.475	0.458
27	RIO TAPAJÓS	0.582	0.303
29	TOCANTINS	0.22	0.5
12	VALE DO JAVARI	0.252	0.27
30	VILHENA	1	1
31	XAVANTE	0.178	0.588
32	XINGU	0.23	0.463
33	YANOMAMI	0.425	0.193

Sources: Brazilian Ministry of Health, Amazon Network of Georeferenced Socio-Environmental Information (RAISG); INPE; CAR/Brazilian Forest Service.

statistics as Indigenous, despite their constitutional entitlement, as well as it is not possible to follow their health conditions. A legal resolution in force limits SESAI's assistance to those Indigenous persons living in ILs officially demarcated by the federal government (8).

Indigenous ethnicity is also denied when the registration identifies them as *pardos*, a "whitening" leftover of Brazil's colonial (ist) past (10, 31). This severe situation is masked by the information reported by federal agencies: SESAI's lack of registered cases and deaths of Indigenous Peoples indicates a lethality rate 57% lower than COIAB's data. Such mismatch between registration of confirmed cases and deaths hinders the enactment of public policies to prevent further contamination and deaths, increasing a mortality trend already high among Indigenous Peoples (14).

During the pandemic, the Indigenous movement achieved a remarkable legal milestone. One was Law No. 14021, a collective process led by Indigenous and indigenists organizations, and political parties, that had the lawyer Joênia Wapichana, the first Indigenous woman elected as a federal deputy in Brazil, as the head of the process[9]. In the same direction, the jurisdictional act promoted by the Brazilian Indigenous Peoples Articulation (APIB) and six political parties, addressed to the Brazilian Supreme Court (STF)[10] urging the implementation of a national plan to combat and monitor the pandemic among Indigenous Peoples. The first was approved to establish emergency actions to combat the advance of COVID-19 in Indigenous communities[11], while the second demanded from the federal government the Indigenous right to exist. Although these were historical acts, the main loophole for Indigenous communities is still unresolved (32). Once again, the structural racism long experienced by Indigenous Peoples rears its ugly head (31, 33, 34).

The variables assessed in this study are indicative of the main threats to Indigenous lives. Previous works have pointed out the dangers of opening Indigenous territories to foreign actors (11, 20, 25, 27). Nevertheless, the vulnerability index is empirical and has limitations. The case of the DSEI *Alto Rio Solimões*, for instance, stands out, as the virus entered the community via a health professional who was infected, leading to an outbreak in the following weeks (22).

CONCLUSIONS

Unfortunately, history repeats itself. Indigenous Peoples have endured violence throughout their past and until the present day. Their exposure to several diseases and conflicts has devastated many ethnic groups (35, 36), and COVID-19 appears to be a perfect storm in this regard (20, 27).

In this study, we conducted an analysis of public data on the situation of COVID-19 throughout Brazil until the 40th epidemiological week, closed on October 3rd, 2020. At that time, there was an expectation that the pandemic would be controlled, as the graphs pointed to a slight downward trend, considering the moving average of new cases and deaths.

However, a few weeks later, after the municipal elections in mid-November, both the number of cases and the number of deaths rose again. Today (middle-February, 2021), we can say that we are experiencing the peak of the second wave of the pandemic in Brazil, especially in the state of Amazonas. The encouraging news is that the available clinical trials (37) report that vaccines in phase three testing from international consortia are safe and effective.

Nevertheless, the federal government under the administration of Jair Messias Bolsonaro, who holds the sad title of the worst world leader in the management of the COVID-19 pandemic (38–40), has not prepared to offer vaccines to the population. Under Bolsonaro's guidance, Brazil not only did not join the consortium of countries that collaborated in the development of Covax when it first started (41), but also did not anticipate the purchase of active pharmaceutical ingredients (AFI) produced by Chinese, North American, and European pharmaceutical companies. Further, nor did it organize its needles and syringes stocks (42). In addition, the current management of the Ministry of Health has not been structured to include a clear plan for vaccinating the Brazilian people against COVID-19 in the National Immunization Program (43).

[9]For further information: https://bit.ly/3rGWL1M.

[10]For further information: http://apib.info/2020/08/01/adpf-709-no-supremo-povos-indigenas-e-o-direito-de-existir/.

[11]For further information: https://bit.ly/3eOYDQ.

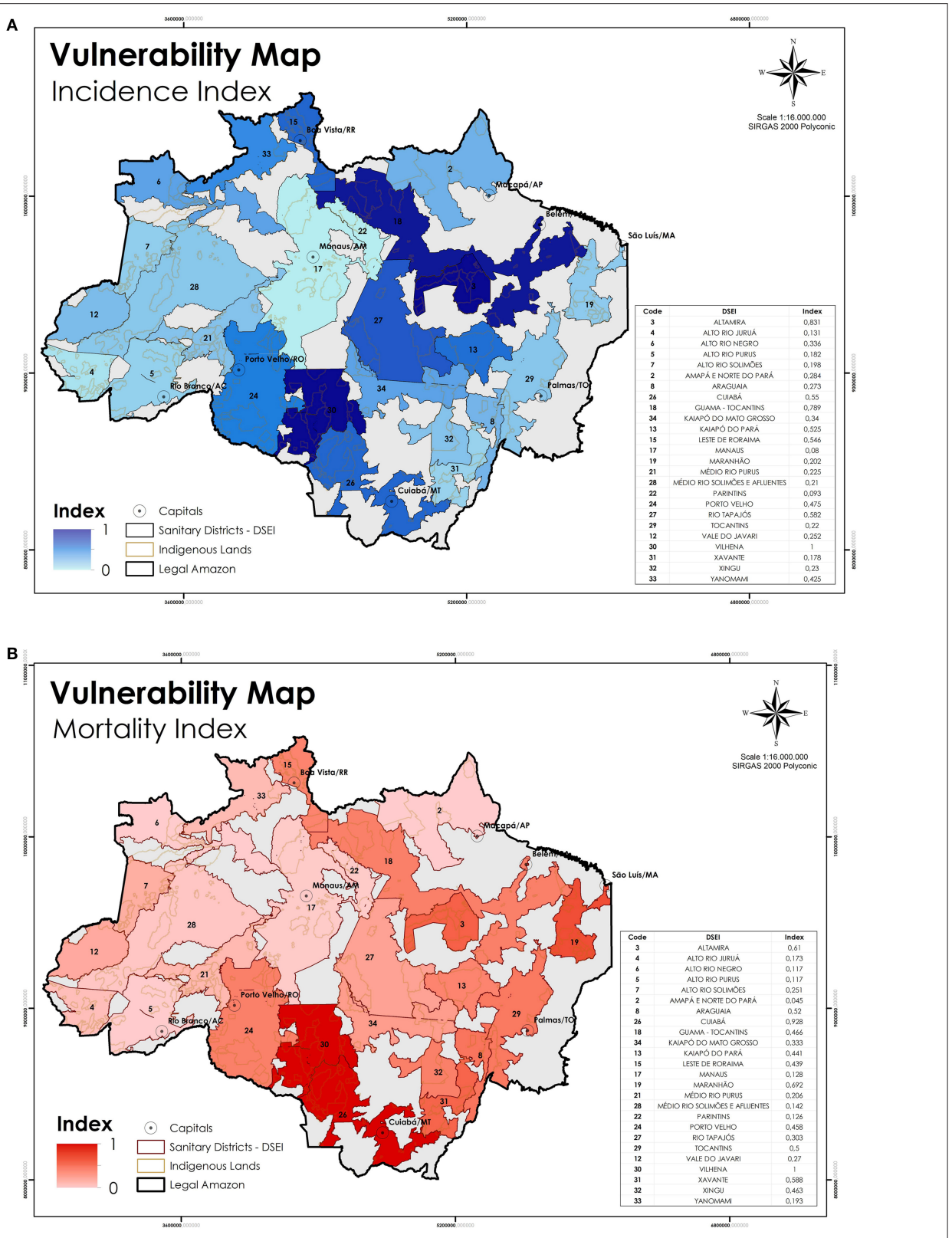

FIGURE 6 | (A) DSEIs requiring greater attention to the risk of Indigenous populations getting infected or **(B)** die by COVID-19 due to external factors. Sources: Brazilian Ministry of Health, Amazon Network of Georeferenced Socio-Environmental Information (RAISG); INPE; CAR/Brazilian Forest Service.

It was only on 2020 December 16th that the Ministry of Health launched the national immunization plan against COVID-19 (44). In its first phase, this document includes, in addition to health professionals who work on the front lines of the fight against the pandemic, elderly people over 60 years old living in nursing homes, Indigenous Peoples over 18 years (45), as a result of the Indigenous organizations' movement. Despite the plan was launched in December, the first dose of the vaccine was offered on January 17th, in São Paulo state, 1 month later.

Regardless of the unprecedented health crisis that we are living in; the high rates of incidence, mortality, and lethality, reported here as well as high prevalence rates for Sars-CoV-2 antibodies for Indigenous Peoples (46); the cry of national and international society; and the pressure from Indigenous organizations and associations, Bolsonaro and his advisors continue to deny access to the best treatments available in the unified health system (SUS) to Indigenous Peoples living in urban areas or resumption areas and territories not regulated by FUNAI (2). The national immunization plan restricts the vaccine doses to approximately half of the Indigenous population, even though the action promoted by APIB in the Brazilian Supreme Court underpins that all Indigenous lives matter. In one movement, the federal government reinforces the structural racism historically present in the country, violates fundamental rights guaranteed in the Brazilian Constitution and international treaties, denies access to essential health care, and puts people under a situation of extreme vulnerability of falling ill and dying by COVID-19 (47).

In accordance with Charlier and Varison (2), we believe that there are only two solutions to guarantee the survival of Indigenous Peoples in the COVID-19 pandemic. First, taking into consideration the Indigenous movement and their association's view in order to elaborate public health policies regarding local perspectives on diseases, their determinants, as well as treatments culturally feasible. Then, the respect to the right to self-determination recognized by the Federal Constitution and by the UN Declaration on the Rights of Indigenous Peoples (2007). Otherwise, we will keep watching these peoples suffering and dying on the margins of society.

Indigenous Peoples are both grieving and fighting at the same time. Their resilience is their strength. The loss of an entire immaterial world of ancestral knowledge is occurring at a time when this very knowledge is of the utmost importance to fight this disease and move beyond it. Unfortunately, it seems that Brazil, as a whole, as well as the Indigenous population, keep under threat by the syndemic promoted by the coronavirus and federal government acting together. For all those who lost their lives in this pandemic, you will not be silenced.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

MF, RL, and PB were responsible for the organization of the study and its conception. VP, MN, and MC contributed with the context, database, results, and conclusion. AA, IC, CS, and MB performed the statistical and geospatial analysis. All authors contributed to the revision of the manuscript, having read and approved the submitted version and have been working on the Indigenous agenda for a long period, particularly VP, MN, and MC belong to COIAB, and VP and MN are Indigenous leaders.

FUNDING

This paper was supported by the Institute for Climate and Society (iCS), by the Stiefel Behner Charitable Fund, by Vinny Smith, from Toba Capital, and the Environment, Diversity and Health research group of the Oswaldo Cruz Foundation.

ACKNOWLEDGMENTS

COIAB's contribution was substantial to this work. Not only the co-authors contributed with their database, but primarily with their perspectives on how the disease is affecting Indigenous communities during this pandemic and how to fight against it.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.638359/full#supplementary-material

REFERENCES

1. Wolfe P. Settler colonialism and the elimination of the native. *J Genocide Res.* (2006) 8:387–409. doi: 10.1080/14623520601056240
2. Charlier P, Varison L. Is COVID-19 being used as a weapon against indigenous peoples in Brazil? *Lancet.* (2020) 396:1069–70. doi: 10.1016/S0140-6736(20)32068-7
3. Santos RV, Camacho LAB, Rego ST, Terena LE, Pontes AL, Beltrão JF, et al. Amerindian genetic ancestry as risk factor for tuberculosis? Critical perspectives and implications for public policies in indigenous peoples's health. *Cad Saude Publica.* (2020) 36:e00245420. doi: 10.1590/0102-311x00245420
4. Anderson I, Robson B, Connolly M, Al-yaman F, Bjertness E, King A, et al. Indigenous and tribal peoples' health (*The Lancet–Lowitja Institute Global Collaboration*): a population study. *Lancet.* (2016) 388:131–57. doi: 10.1016/S0140-6736(16)00345-7
5. Fundação Nacional do Índio. *Observações Sobre "Povos Indígenas Isolados."* Brasília, DF: Ministério da Justiça (2020).
6. Hernandez JBR, Kim PY. *Epidemiology Morbidity and Mortality.* (2020). Available online at: https://www.ncbi.nlm.nih.gov/books/NBK547668/ (accessed February 9, 2021).
7. Coimbra CEA, Santos RV, Welch JR, Cardoso AM, De Souza MC, Garnelo L, et al. The first national survey of indigenous people's health and nutrition in brazil: rationale, methodology, and overview of results. *BMC Public Health.* (2013) 13:1–19. doi: 10.1186/1471-2458-13-52
8. Garnelo L, Parente RCP, Puchiarelli MLR, Correia PC, Torres MV, Herkrath FJ. Barriers to access and organization of primary health care services for

rural riverside populations in the Amazon. *Int J Equity Health.* (2020) 19:1–14. doi: 10.1186/s12939-020-01171-x
9. Braveman P. What are health disparities and health equity? We need to be clear. *Public Health Rep.* (2014) 129:5–8. doi: 10.1177/00333549141291S203
10. Telles E, Paschel T. Who is black, white, or mixed race? How skin color, status, and nation shape racial classification in latin America. *Am J Sociol.* (2014) 120:864–907. doi: 10.1086/679252
11. Azevedo M, Damasco F, Antunes M, Martins MH, Rebouças MP. *Análise de Vulnerabilidade Demográfica e Infraestrutural das Terras Indígenas à Covid-19*. (2020). Available online at: https://www.abep.org.br/site/index.php/demografia-e-covid-19/1635-analise-de-vulnerabilidade-demografica-e-infraestrutural-das-terras-indigenas-a-covid-19-caderno-de-insumos/ (accessed May 20, 2020).
12. United Nations. COVID-19 and indigenous peoples. *COVID-19 Indig peoples*. (2020). Available online at: https://www.un.org/development/desa/indigenouspeoples/covid-19.html (accessed February 2, 2021).
13. Articulação dos Povos Indígenas do Brasil. *Nossa Luta é Pela Vida: Covid-19 e os Povos Indígenas o Enfrentamento Das Violências Durante a Pandemia*. (2020). Available online at: https://emergenciaindigena.apiboficial.org/files/2020/12/APIB_nossalutaepelavida_v7PT.pdf (accessed December 11, 2020).
14. Lima JFB, Silva RAR, D'Eça Júnior A, Batista RFL, Rolim ILTP. Analysis of the mortality trend in the indigenous population of Brazil, 2000–2016. *Public Health.* (2020) 186:87–94. doi: 10.1016/j.puhe.2020.06.008
15. Carneiro Filho A, de Souza OB. *ATLAS de Pressões e Ameaças às Terras Indígenas na Amazônia Brasileira*. São Paulo, SP: Instituto Socioambiental (2009).
16. Ricardo F, Gongora MF. *Enclosures and Resistance Isolated Indigenous Peoples in Brazilian Records of Isolated Indigenous Peoples in Brazilian Amazonia*. 1th ed. São Paulo: St. Instituto Socioambiental São Paulo, SP (2019).
17. Little PE. Territórios sociais e povos tradicionais no Brasil. Por uma antropologia da territorialidade. *Série Antropol.* (2002) 322:1–22.
18. Crisostomo AC, Alencar A, Mesquita I, Silva IC, Dourado MF, Moutinho P, et al. *Terras Indígenas na Amazônia Brasileira: Reservas de Carbono e Barreiras ao Desmatamento*. Brasília, DF (2015).
19. Coordenação das Organizações Indígenas da Amazônia Brasileira. *Plano de Ação Emergencial de Combate ao Avanço do Coronavírus e de Tratamento Entre os Povos Indígenas da Amazônia Brasileira*. (2020). Available online at: https://coiab.org.br/covid (accessed November 6, 2020).
20. Laudares H. Is deforestation spreading COVID-19 to the indigenous peoples? *Covid Econ Vetted Real Time Pap.* (2020) 53:33–71.
21. Instituto Brasileiro de Geografia e Estatística. *Os Indígenas no Censo Demográfico 2010 Primeiras Considerações com Base no Quesito cor ou Raça*. (2012). Available online at: https://ww2.ibge.gov.br/indigenas/indigena_censo2010.pdf%0A; http://biblioteca.ibge.gov.br/visualizacao/livros/liv6687.pdf (accessed October 6, 2020).
22. Codeço CT, Villela D, Coelho F, Bastos LS, Carvalho LM, Gomes MFC, et al. *Risco de Espalhamento da COVID-19 em Populações Indígenas: Considerações Preliminares Sobre Vulnerabilidade Geográfica e Sociodemográfica*. Rio de Janeiro, RJ (2020). Available online at: https://portal.fiocruz.br/documento/4o-relatorio-sobre-risco-de-espalhamento-da-covid-19-em-populacoes-indigenas (accessed March 3, 2021).
23. Piette JD, Valverde H, Marinec N, Jantz R, Kamis K, de la Vega CL, et al. Establishing an independent mobile health program for chronic disease self-management support in Bolivia. *Front Public Heal.* (2014) 2:1–10. doi: 10.3389/fpubh.2014.00095
24. Laycock A, Bailie J, Matthews V, Bailie R. Interactive dissemination: engaging stakeholders in the use of aggregated quality improvement data for system-wide change in australian indigenous primary health care. *Front Public Heal.* (2016) 4:1–8. doi: 10.3389/fpubh.2016.00084
25. Ellwanger JH, Kulmann-Leal B, Kaminski VL, Valverde-Villegas JM, Da Veiga ABG, Spilki FR, et al. Beyond diversity loss and climate change: impacts of Amazon deforestation on infectious diseases and public health. *An Acad Bras Cienc.* (2020) 92:1–33. doi: 10.1590/0001-37652020201 91375
26. Vale MM, Berenguer E, Argollo de Menezes M, Viveiros de Castro EB, Pugliese de Siqueira L, de Portela RCQ. The COVID-19 pandemic as an opportunity to weaken environmental protection in Brazil. *Biol Conserv.* (2021) 255:108994. doi: 10.1016/j.biocon.2021.108994
27. Instituto Socioambiental. *O Impacto da Pandemia na Terra Indígena Yanomami*. (2020). Available online at: https://acervo.socioambiental.org/acervo/publicacoes-isa/o-impacto-da-pandemia-na-terra-indigena-yanomami-foragarimpoforacovid (accessed June 17, 2020).
28. Ministério da Saúde. *Política Nacional de Atenção à Saúde dos Povos Indígenas*. 2nd ed. Brasília, DF: Ministério da Saúde, Fundação Nacional de Saúde (2002).
29. Massuda A, Hone T, Leles FAG, De Castro MC, Atun R. The Brazilian health system at crossroads: progress, crisis and resilience. *BMJ Glob Heal.* (2018) 3:1–8. doi: 10.1136/bmjgh-2018-000829
30. Human Rights Watch. *O ar é Insuportável: Os Impactos das Queimadas Associadas ao Desmatamento da Amazônia Brasileira na Saúde*. Brasília: Instituto de Pesquisa Ambiental da Amazônia - IPAM (2020).
31. Wade P. Racism and race mixture in latin America. *Lat Am Res Rev.* (2017) 52:477–85. doi: 10.25222/larr.124
32. Santos RV, Pontes AL, Coimbra CEA. A "total social fact": COVID-19 and indigenous peoples in Brazil. *Cad Saude Publica.* (2020) 36:1–4. doi: 10.1590/0102-311x00268220
33. Paradies Y. Colonisation, racism and indigenous health. *J Popul Res.* (2016) 33:83–96. doi: 10.1007/s12546-016-9159-y
34. Almeida S. *O que e racismo estrutural*. Belo Horizonte: Grupo Editorial Letramento (2018).
35. Almeida C, Notzols AL. O Impacto da Colonização e Imigração no Brasil Meridional: Contágios, Doenças e Ecologia Humana dos Povos Indígenas. *Temp Acad.* (2010) 6:1–18. Available online at: http://periodicos.unesc.net/index.php/historia/article/viewArticle/431
36. IACHR I-AC on HR. *Situation of Human Rights of the Indigenous and Tribal Peoples of the Pan-Amazon Region.* San José, CA: Costa Rica (2019).
37. Voysey M, Clemens SAC, Madhi SA, Weckx LY, Folegatti PM, Aley PK, et al. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK. *Lancet.* (2021) 397:99–111. doi: 10.1016/S0140-6736(20)32661-1
38. The Washington Post. *Leaders Risk Lives by Minimizing the Coronavirus. Bolsonaro is the Worst*. (2020). Available online at: https://www.washingtonpost.com/opinions/global-opinions/jair-bolsonaro-risks-lives-by-minimizing-the-coronavirus-pandemic/2020/04/13/6356a9be-7da6-11ea-9040-68981f488eed_story.html (accessed February 11, 2021).
39. Ponce D. The impact of coronavirus in Brazil: politics and the pandemic. *Nat Rev Nephrol.* (2020) 16:483. doi: 10.1038/s41581-020-0327-0
40. Idrovo AJ, Manrique-Hernández EF, Fernández Niño JA. Report from Bolsonaro's Brazil: the consequences of ignoring science. *Int J Heal Serv.* (2021) 51:31–6. doi: 10.1177/0020731420968446
41. Lisboa V. *Brazil is Geared up for COVID-19 Vaccine, WHO Researcher Says*. Agência Bras (200). Available online at: https://agenciabrasil.ebc.com.br/en/saude/noticia/2020-10/brazil-geared-covid-19-vaccine-who-researcher-says (accessed February 25:2021).
42. CNN. *Compra de Seringas Fracassa e Saúde Garante Menos de 3% do que Precisa*. (2020). Available online at: https://www.cnnbrasil.com.br/saude/2020/12/30/compra-de-seringas-fracassa-e-saude-garante-menos-de-3-do-que-precisa (accessed February 25, 2021).
43. de Dourado DA, dos Pinheiro ES, Maciel ELN, Temporão JG, de Oliveira RA, Oliva R, et al. *Denúncia com pedido de perda do cargo e de direitos políticos (Impeachment)*. (2021). p. 1–54. Available online at: https://static.poder360.com.br/2021/02/pedido-de-impeachment-bolsonaro-medicos.pdf (accessed February 23, 2021).
44. Ministério da Saúde. *Plano Nacional de Operacionalização da Vacinação Contra a Covid-19*. 1th ed. St. Brasília, DF (2020).
45. Ministério da Saúde. *Entenda a Ordem de Vacinação Contra a Covid-19 Entre os Grupos Prioritários*. (2021). Available online at: https://www.gov.br/saude/

pt-br/assuntos/noticias/entenda-a-ordem-de-vacinacao-contra-a-covid-19-entre-os-grupos-prioritarios (accessed February 22, 2021).
46. Hallal PC, Hartwig FP, Horta BL, Silveira MF, Struchiner CJ, Vidaletti LP, et al. SARS-CoV-2 antibody prevalence in Brazil: results from two successive nationwide serological household surveys. *Lancet Glob Heal.* (2020) 8:1390–8. doi: 10.1016/S2214-109X(20)30387-9
47. Hotez PJ, Huete-Perez JA, Bottazzi ME. COVID-19 in the Americas and the erosion of human rights for the poor. *PLoS Negl Trop Dis.* (2020) 14:1–7. doi: 10.1371/journal.pntd.0008954

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 14 April 2021
doi: 10.3389/fpsyt.2021.622060

The Value of Companion Dogs as a Source of Social Support for Their Owners: Findings From a Pre-pandemic Representative Sample and a Convenience Sample Obtained During the COVID-19 Lockdown in Spain

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OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *27 October 2020*
Accepted: *11 March 2021*
Published: *14 April 2021*

Citation:
Bowen J, Bulbena A and Fatjó J (2021) The Value of Companion Dogs as a Source of Social Support for Their Owners: Findings From a Pre-pandemic Representative Sample and a Convenience Sample Obtained During the COVID-19 Lockdown in Spain. Front. Psychiatry 12:622060. doi: 10.3389/fpsyt.2021.622060

Dogs are a source of companionship and comfort for their owners, but the degree to which this might translate into real emotional and social support has not been quantified. Emotional and social support are essential to help people to get through personal crises such as bereavement. In this study we characterize the social support owners obtain from their dogs, provide evidence of how widespread this social support is amongst dog-owners, and show how social support from dogs can increase during a crisis (using the COVID-19 pandemic as an example). We collected data from a representative population-based sample of Spanish dog-owners and found that most respondents said that their dogs helped them to get through tough times. They got comfort from physical contact with their dogs, shared activities with them and treated them as confidants in a similar way to friends and family. These are all key aspects of social support, and dogs offer the advantage of being more available than human sources of support. It would be expected that the support that dogs provide would be increased during a time of personal crisis and when we looked at data collected from a convenience sample of Spanish dog-owners during the COVID-19 confinement that is what we found; during the confinement owners engaged in more shared activities with their dogs, hugged them more often and turned to them more as a source of companionship and comfort ($p < 0.0001$ in all cases). However, although owners did confide more in their dogs ($p < 0.0001$), the effect was not as great as for other aspects of social support. We suspect that this is because people were able to use telecommunications such as video conferencing to maintain their human confidant relationships. Our findings indicate that dogs can substitute for humans

as sources of some kinds of social support when conventional sources are unavailable. Our conclusion is that where a dog is present in a household, it should be regarded as an important resource for social support. This should be considered when designing clinical interventions and when public health decisions are being made.

Keywords: social support, crisis, dog, bereavement, COVID-19

INTRODUCTION

A recent systematic review suggests that the COVID-19 pandemic is having significant psychological effects on the general populations of many countries including the USA, China, Italy and Spain (1). In particular, the pandemic has had a substantial effect on both the prevalence of grief and its management. The process of grieving has been negatively affected by reduced social interactions due to restrictions and lockdowns, financial insecurity, fear of contagion, and the limitations on the holding of funerals and burials that have resulted from pandemic control measures (2). The pandemic is also having detrimental effects on positive lifestyle factors, such as physical activity and healthy dietary habits (3).

There is a very robust relationship between access to social support and positive indicators of physical and mental health (4), and social support has been one of the main protective factors against stress and anxiety during the pandemic (1). The stress-buffering hypothesis proposes that social support acts as a buffer to reduce the negative impact of stressful situations on health and well-being, as well as to compensate individual trait vulnerabilities, such as neuroticism and introversion (5, 6). However, during the pandemic there has been a profound disruption of social support networks and access to regular face-to-face medical services, including counseling and psychological support to the bereaved, which has exacerbated existing vulnerabilities (7). This is a situation in which pet dogs could become a supplementary source of support, not only in the face of highly stressful events, but also as a buffer to help people to cope with the background of every day low-level stressors.

Social support is an overarching construct that includes several somewhat independent components. Two of the main features of any given source of social support are availability and closeness (4). Availability relates to how easily a source of social support can be accessed, and closeness includes interdependence, shared activities and emotional support (8). Another valuable role in a relationship is that of "confidant;" someone with whom to share personal thoughts. Self-disclosure is the main characteristic of a confidant relationship (9). Physical contact is also important to social support, and has positive effects on socio-emotional, physical and psychological well-being (10). Although not part of social support, for many people there is a psychological benefit to having opportunities to care for others (11).

According to recent estimates, 24% of European households own at least one dog (12) and most people who live with dogs consider them to be like family members (13). Also, several studies have found neurophysiological similarities between human-dog relationships and interactions between people, particularly between the mothers and their children (14). Previous research has identified pets as one of the potential sources of social support that could contribute to mental resilience (6, 15, 16). However, to the best of our knowledge no previous research has explored how companion dogs might fit into the multi-faceted framework of social support, in the general population.

In this study we sought to confirm our hypotheses that the social support people get from their companion dogs is a widespread phenomenon, that the types of support that people get from their dogs is comparable in character to that which is obtained from people, and that social support from dogs would increase during a time of crisis.

METHODS

Two samples of data were collected in Spain. The main focus of the study was a representative sample population that was obtained in early 2019, a year before the COVID-19 pandemic. This data was used to establish the types and levels of support that dog owners would be expected to obtain from their pets. A second, convenience sample, was collected during the initial period of the COVID-19 pandemic lockdown in Spain. This data was used to provide evidence for the effect that a personal crisis might have on the degree to which people seek such social support from pets. The data from the representative sample population was collected anonymously, so it was not possible to re-contact the respondents during the pandemic. For both populations, a questionnaire based on the Monash Dog Owner Relationship Scale (17) (MDORS) was used to evaluate the social support obtained by the owner from the pet dog. Data was analyzed at the level of the individual item scores for the scales that were used, as the subscale scores for these scales were originally designed to measure the human-animal bond, and include items that are not relevant to social support.

Spanish Representative Sample Population

Five hundred and one responses from dog owners were collected in Spain during March-April 2019 by Ipsos MORI for the Affinity Foundation Chair for Animals and Health and the Affinity Foundation. Data were collected from an Ipsos Panel representative sample of the population of Spanish dog owners. The sample population included dog owners who were adult Spanish residents (above 18 years of age). The sampling method applied national representative quotas related to the socio-demographic features of the owner and general characteristics of the dog. Data was obtained following a standard CAWI

(Computer Assisted Web Interviewing) procedure. Respondents completed demographic questions about themselves and their history of dog ownership, as well as the MDORS (17). A previously prepared, standardized, back-translated Spanish language version of MDORS questionnaire was used (18). In the conventional scoring of MDORS, the items within the perceived costs subscale are reverse scored. This means that a high score for the perceived costs subscale equates to a low-level of perceived costs. Although this is confusing, it means that high scores for all three subscales indicate a better human-animal bond, and a single value for quality of relationship can be calculated by combining the scores from the subscales. This was not relevant to our study, so to reduce confusion all items were scored in the same way (none were reverse scored). For example, "Strongly agree" was scored 5 for all items, regardless of which subscale they originated from. This makes it easier to interpret the results, within the context of the present study, particularly in combination with the data from the COVID lockdown convenience sample.

Spanish COVID Convenience Sample Population

Two weeks after the start of the COVID lockdown in Spain, an online questionnaire about the impact of the lockdown on pets and household was distributed through social media of the Affinity Foundation Chair for Animals and Health, the Affinity Foundation, AVEPA/VetBonds (Asociación de Veterinarios Españoles Especialistas en Pequeños Animales), the Grupo de Especialidad de Etología Clínica de Avepa (GrETCA), the Fundación para el Asesoramiento y Acción en Defensa de los Animales (FAADA), Single Track Ltd, and veterinary clinics associated with AVEPA. The lockdown included the following measures; social distancing, the closure of schools and universities, banning of mass gatherings and public events, and the suspension of all non-essential economic activities (19). Data collection ended after 2 weeks. The survey was hosted on the SurveyGizmo® platform (which is now known as Alchemer®). Seven hundred and ninety-four responses were collected from dog owners (no data from cat owners was included).

Respondents completed a modified version of the Cat/Dog-Owner Relationship scale (C/DORS), that was developed from the MDORS by the authors, for the measurement of the human-animal bond between owners and their cats or dogs (20). The differences between MDORS and C/DORS mostly relate to items from the owner-pet interaction sub-scale, because, for example, cat owners don't usually take their cats with them to visit friends and family. Three items were excluded from this part of the study, either because they were in direct contravention of the lockdown regulations ("How often do you take your dog to visit people?" and "How often do you take your dog in the car?"), or because they had the potential to cause substantial distress to people during a time of crisis ("How traumatic do you think it will be for you when your dog dies?"). Scoring of the items was also different from the standard implementation of C/DORS or MDORS: All items were scored on a 5-point scale from "Much more than before the confinement," which was scored +2, to "Much less than before the confinement," which was scored −2. One reason for changing the scoring system was that, as we will see, scores for many items of MDORS were already maximal for most respondents in the representative sample. A scale from "much more" to "much less" than before the COVID confinement not only restored the range for each item, but also made it clear to respondents that they were being asked to compare their current situation (during the lockdown confinement) with prior to the lockdown.

Statistics

Data was tabulated, mean scores and other descriptive statistics were calculated in Microsoft Excel (version 16. 2020). After finding that data was not normally distributed (D'Agostino-Pearson test), Spearman rank correlation was used to investigate correlations between variables in the representative sample. A Bonferroni correction was applied to these correlations, so that the threshold for significance was 0.0026 (0.05 divided by 19).

For the convenience sample COVID-19 population, a single-sample Wilcoxon Signed Rank Test was used to determine whether responses for each modified MDORS item were significantly different from the mid-point response "The same as before the confinement." A Bonferroni correction was applied to those contrasts, so that the threshold for significance was 0.002 (0.05 divided by 25). Statistical tests were performed using Prism version 8 (Graphpad Software, 2020).

RESULTS

Spanish Representative Sample Population

The mean age of the 501 respondents was 41.7 years of age, with 47.9% being male and 52.1% being female. The mean number of dogs per household was 1.3 (SD 0.6). A table of the individual item scores is presented in **Table 1**, with the items sorted according to their location in the three MDORS sub-scales (interaction, emotional closeness and perceived costs).

Ninety-four point six percent and 88.4% of respondents played games with their dogs or had their dog with them while relaxing at least once a day or once every few days, respectively, and 69.6% of respondents told their dogs things that didn't tell anyone else once a day or at least once a week. Eighty-six-point eight percent of respondents hugged their dogs at least once a day or once every few days, and 80% agreed or strongly agreed with the statement "my dog helps me get through tough times."

To understand the relationship between perceived costs and the interaction and emotional closeness items, a series of correlations was calculated. An additional measure, "How hard is it to look after your dog?," was chosen as a factor, because in the convenience sample collected during the COVID lockdown, this item of perceived cost was the only one for which a large percentage of the population reported an increase. The results are summarized in **Table 2**. In the table, significant correlations are highlighted in bold.

The score for "How hard is it to look after your dog?" was negatively correlated with more of the interaction and emotional closeness items than the overall perceived costs score was. Within the interaction sub-scale, physical contact (hugging and kissing) and shared activities (play and relaxation time together), were

TABLE 1 | Individual item scores for MDORS items (representative sample).

				Scores (%)						
		Mean score	SD	5	4	3	2	1	% scoring 4 or 5	Meaning of score 4 or 5
Interaction	How often do you play games with your dog?	4.7	0.7	79.8	14.8	3.0	1.4	1.0	94.6	At least once a day or once every few days
	How often do you have your dog with you while relaxing, ie watching TV?	4.5	1.0	77.4	11.0	4.8	1.8	5.0	88.4	At least once a day or once every few days
	How often do you hug your dog?	4.5	1.0	71.0	15.8	5.8	3.6	3.8	86.8	At least once a day or once every few days
	How often do you kiss your dog?	3.7	1.7	56.9	12.2	3.4	3.0	24.5	69.1	At least once a day or once every few days
	How often do you give your dog food treats?	3.5	1.3	27.7	29.1	21.0	11.0	11.2	56.8	At least once a day or once every few days
	How often do you take your dog to visit people?	3.5	1.5	37.9	18.8	18.1	6.0	19.2	56.7	Once a week or once a fortnight
	How often do you groom your dog?	3.4	1.1	15.6	39.1	21.5	16.6	7.2	54.7	At least once a day or once every few days
	How often do you take your dog in the car?	2.9	1.2	9.0	26.9	24.6	27.5	12.0	35.9	At least once a day or once every few days
	How often do you buy your dog presents?	3.0	1.0	7.2	22.0	37.5	27.3	6.0	29.2	Once a week or once a fortnight
Emotional closeness	If everyone else left me my dog would still be there for me.	4.6	0.7	69.8	20.8	8.6	0.8	0.0	90.6	Strongly agree or agree
	My dog provides me with constant companionship.	4.6	0.7	67.2	23.0	8.4	1.0	0.4	90.2	Strongly agree or agree
	How traumatic do you think it will be for you when your dog dies?	4.4	0.8	58.7	28.7	10.4	1.2	1.0	87.4	Very traumatic or traumatic
	My dog is there whenever I need to be comforted.	4.5	0.8	60.9	26.1	11.0	1.4	0.6	87.0	Strongly agree or agree
	I wish my dog and I never had to be apart.	4.4	0.8	58.5	26.7	11.2	3.0	0.6	85.2	Strongly agree or agree
	My dog helps me get through tough times.	4.3	0.9	50.7	29.3	16.2	2.8	1.0	80.0	Strongly agree or agree
	My dog gives me a reason to get up in the morning.	4.2	0.9	44.3	33.5	16.8	4.2	1.2	77.8	Strongly agree or agree
	My dog is constantly attentive to me.	4.0	1.0	33.7	39.9	17.8	7.0	1.6	73.6	Strongly agree or agree
	How often do you tell your dog things you don't tell anyone else?	3.7	1.6	50.3	19.3	6.8	1.6	22.0	69.6	Once a day or once a week
	I would like to have my dog near me all the time.	3.9	1.0	35.5	32.3	24.4	6.8	1.0	67.8	Strongly agree or agree
Perceived costs	My dog costs too much money.	2.8	1.0	4.0	21.9	36.7	24.8	12.6	25.9	Strongly agree or agree
	There are major aspects of owning a dog I don't like.	2.4	1.2	4.8	15.1	20.8	34.7	24.6	19.9	Strongly agree or agree
	It is annoying that I sometimes have to change my plans because of my dog.	2.3	1.1	3.6	13.8	24.6	29.7	28.3	17.4	Strongly agree or agree
	How often do you feel that looking after your dog is a chore?	1.8	1.2	4.4	9.8	13.6	9.6	62.6	14.2	Once a day or once a week
	My dog makes too much mess.	2.3	1.1	4.4	9.8	20.8	37.9	27.1	14.2	Strongly agree or agree
	How often does your dog stop you doing things you want to?	2.0	1.2	3.0	9.4	19.5	16.0	52.1	12.4	Once a day or once a week
	It bothers me that my dog stops me doing things I enjoyed doing before I owned it.	2.1	1.1	4.0	8.0	22.2	29.7	36.1	12.0	Strongly agree or agree
	How often do you feel that having a dog is more trouble than it is worth?	1.6	1.1	3.6	5.4	8.8	12.0	70.2	9.0	Once a day or once a week
	How hard is it to look after your dog?	2.2	0.9	1.0	4.8	28.7	40.5	25.0	5.8	Very difficult or difficult

Within each sub-scale group, items are sorted in descending order of the percentage of respondents scoring 4 or 5.

TABLE 2 | Correlations between individual MDORS items and the scores for perceived costs and "How hard is it to look after your dog" (representative sample).

				Perceived costs score			"How hard is it to look after your dog?"		
		Mean score	SD	Spearman r	*P* (two-tailed)	95% confidence interval	Spearman r	*P* (two-tailed)	95% confidence interval
Interaction	How often do you play games with your dog?	4.7	0.7	**−0.29**	**<0.0001**	**−0.37 to −0.2**	**−0.27**	**<0.0001**	**−0.35 to −0.18**
	How often do you have your dog with you while relaxing, ie watching TV?	4.5	1.0	**−0.32**	**<0.0001**	**−0.4 to −0.23**	**−0.26**	**<0.0001**	**−0.34 to −0.17**
	How often do you hug your dog?	4.5	1.0	**−0.24**	**<0.0001**	**−0.32 to −0.15**	**−0.23**	**<0.0001**	**−0.31 to −0.14**
	How often do you kiss your dog?	3.7	1.7	**−0.18**	**<0.0001**	**−0.27 to −0.1**	**−0.22**	**<0.0001**	**−0.31 to −0.13**
	How often do you give your dog food treats?	3.5	1.3	−0.10	0.0201	−0.19 to −0.01	**−0.15**	**0.0005**	**−0.24 to −0.06**
	How often do you take your dog to visit people?	3.5	1.5	−0.12	0.0057	−0.21 to −0.03	**−0.16**	**0.0003**	**−0.25 to −0.07**
	How often do you groom your dog?	3.4	1.1	−0.06	0.1651	−0.15 to 0.03	**−0.18**	**<0.0001**	**−0.27 to −0.09**
	How often do you take your dog in the car?	2.9	1.2	0.01	0.8161	−0.08 to 0.1	−0.12	0.0079	−0.21 to −0.03
	How often do you buy your dog presents?	3.0	1.0	0.00	0.9925	−0.09 to 0.09	−0.06	0.1499	−0.15 to 0.03
Emotional closeness	If everyone else left me my dog would still be there for me.	4.6	0.7	**−0.28**	**<0.0001**	**−0.36 to −0.19**	**−0.23**	**<0.0001**	**−0.31 to −0.14**
	My dog provides me with constant companionship.	4.6	0.7	**−0.33**	**<0.0001**	**−0.41 to −0.25**	**−0.28**	**<0.0001**	**−0.36 to −0.19**
	How traumatic do you think it will be for you when your dog dies?	4.4	0.8	**−0.30**	**<0.0001**	**−0.38 to −0.22**	**−0.26**	**<0.0001**	**−0.34 to −0.17**
	My dog is there whenever I need to be comforted.	4.5	0.8	**−0.28**	**<0.0001**	**−0.37 to −0.2**	**−0.29**	**<0.0001**	**−0.37 to −0.21**
	I wish my dog and I never had to be apart.	4.4	0.8	**−0.37**	**<0.0001**	**−0.44 to −0.28**	**−0.33**	**<0.0001**	**−0.41 to −0.25**
	My dog helps me get through tough times.	4.3	0.9	**−0.29**	**<0.0001**	**−0.37 to −0.20**	**−0.29**	**<0.0001**	**−0.37 to −0.21**
	My dog gives me a reason to get up in the morning.	4.2	0.9	**−0.26**	**<0.0001**	**−0.35 to −0.18**	**−0.25**	**<0.0001**	**−0.34 to −0.17**
	My dog is constantly attentive to me.	4.0	1.0	−0.11	0.0153	−0.20 to −0.02	**−0.18**	**<0.0001**	**−0.26 to −0.09**
	How often do you tell your dog things you don't tell anyone else?	3.7	1.6	−0.08	0.0606	−0.17 to 0.01	**−0.14**	**0.002**	**−0.23 to −0.05**
	I would like to have my dog near me all the time.	3.9	1.0	**−0.29**	**<0.0001**	**−0.37 to −0.21**	**−0.27**	**<0.0001**	**−0.35 to −0.19**

For convenience of reference, the order of items is as in ***Table 1****. The threshold for significance after Bonferroni correction is* $p < 0.0026$*. Significant correlations are highlighted in bold.*

both negatively correlated with both perceived costs (Spearman r −0.24, −0.18, −0.29, and −0.32, respectively, $p < 0.0001$ in all cases) and "how hard is it to look after your dog?" (Spearman r −0.23, −0.22, −0.27, and −0.26, respectively, $p < 0.0001$ in all cases). Within the emotional closeness sub-scale, only "my dog is constantly attentive to me," and "how often do you tell your dog things you don't tell anyone else?," were not correlated with both perceived costs and "how hard is it to look after your dog?." Although all of these correlations were significant, they were modest in size.

Spanish COVID Convenience Sample Data

The mean age of the 794 respondents was 40.7 years of age, with 90.2% being female and 9.8% being male. The mean number of dogs per household was 1.6 (SD 1.02). The mean duration of confinement reported by respondents was 3.2 weeks (SD 1.19). **Table 3** shows the mean score and standard deviation for each C/DORS item, as well as the results for the single-sample Wilcoxon test. Apart from "How often do you buy your pet presents?," which was insignificant ($p = 0.12$), all results were significantly different from the mid-point response "The same as before the confinement" at the level of $p < 0.0001$. The percentage of respondents giving each response is also presented in **Table 3**, along with the overall percentages that answered more or much more than before, the same as before, or less or much less than before.

For the interaction and emotional closeness items, 12.7–62.2% of respondents indicated a change of more or much more

TABLE 3 | Individual item scores for C/DORS items and the results of the single-sample Wilcoxon signed rank test (convenience sample, COVID).

				%					% much more or more	% same as before	% much less or less	Wilcoxon signed rank test	
		Mean	SD	2	1	0	−1	−2				Sum of ranks (W)	*p*
Interaction	How often do you play games with your dog?	0.66	0.72	8.9	53.0	33.2	4.4	0.5	61.9	33.2	4.9	121,267	<0.0001
	How often do you have your dog with you while relaxing, i.e., watching TV?	0.55	0.73	13.6	28.2	57.8	0.4	0.0	41.8	57.8	0.4	55,596	<0.0001
	How often do you hug your dog?	0.57	0.72	11.1	37.4	49.6	1.5	0.4	48.5	49.6	1.9	74,350	<0.0001
	How often do you kiss your dog?	0.35	0.81	10.3	23.6	59.2	5.0	1.9	33.9	59.2	6.9	35,250	<0.0001
	How often do you give your dog food treats?	0.30	0.64	2.4	31.3	61.0	4.2	1.1	33.7	61.0	5.3	33,529	<0.0001
	How often do you groom your dog?	0.21	0.59	2.4	21.8	70.5	4.5	0.8	24.2	70.5	5.3	17,271	<0.0001
	How often do you buy your dog presents?	0.03	0.58	2.1	10.6	76.7	9.5	1.1	12.7	76.7	10.6	2,100	0.12
Emotional closeness	If everyone else left me, my dog would still be there for me.	0.34	0.66	10.1	14.2	75.1	0.6	0.0	24.3	75.1	0.6	19,106	<0.0001
	My dog provides me with constant companionship.	0.67	0.72	14.9	37.3	47.6	0.2	0.0	52.2	47.6	0.2	86,138	<0.0001
	My dog is there whenever I need to be comforted.	0.31	0.63	8.2	15.5	75.9	0.3	0.1	23.7	75.9	0.4	17,767	<0.0001
	I wish my dog and I never had to be apart.	0.41	0.75	13.4	15.7	69.5	0.9	0.5	29.1	69.5	1.4	26,972	<0.0001
	My dog helps me get through tough times.	0.58	0.73	13.5	31.6	54.3	0.5	0.1	45.1	54.3	0.6	64,423	<0.0001
	My dog gives me a reason to get up in the morning.	0.20	0.56	4.8	12.7	80.4	1.6	0.5	17.5	80.4	2.1	9,667	<0.0001
	My dog is constantly attentive to me.	0.77	0.74	16.5	45.7	36.3	1.4	0.1	62.2	36.3	1.5	123,265	<0.0001
	How often do you tell your dog things you do not tell anyone else?	0.26	0.54	4.6	16.8	78.2	0.3	0.1	21.4	78.2	0.4	14,470	<0.0001
	I would like to have my dog near me all the time.	0.33	0.65	8.0	18.8	71.7	1.4	0.1	26.8	71.7	1.5	23,268	<0.0001
Perceived costs	My dog costs too much money.	−0.05	0.38	0.3	1.5	93.8	1.8	2.6	1.8	93.8	4.4	−749	<0.0001
	There are major aspects of owning a dog I do not like.	−0.27	0.71	0.2	3.1	77.5	7.7	11.5	3.3	77.5	19.2	−13,403	<0.0001
	It is annoying that sometimes I have to change my plans because of my dog.	−0.23	0.63	0.3	1.4	82.7	6.8	8.8	1.7	82.7	15.6	−8,321	<0.0001
	How often do you feel that looking after your dog is a chore?	−0.21	0.62	0.0	2.1	83.8	5.4	8.7	2.1	83.8	14.1	−7,348	<0.0001
	I feel that my dog makes too much mess.	−0.08	0.62	0.9	6.4	82.9	3.5	6.3	7.3	82.9	9.8	−3,724	<0.0001
	How often does your dog stop you doing things you want to?	−0.19	0.59	0.4	2.4	82.0	8.7	6.5	2.8	82.0	15.2	−7,909	<0.0001
	It bothers me that my dog stops me doing things I enjoyed doing before I owned it.	−0.18	0.59	0.5	1.1	86.2	4.8	7.4	1.6	86.2	12.2	−5,041	<0.0001
	How often do you feel that having a dog is more trouble than it is worth?	−0.17	0.64	0.9	3.4	81.6	6.4	7.7	4.3	81.6	14.1	−7,023	<0.0001
	How hard is it to look after your dog	0.25	0.80	5.3	29.0	54.4	8.5	2.8	34.3	54.4	11.3	30,829	<0.0001

For convenience of reference, the order of items is as in ***Table 1****. The threshold for significance after Bonferroni correction is* $p < 0.002$.

during the COVID-19 lockdown, with present-buying for the dog showing the lowest percentage of change and "My dog is constantly attentive to me" the highest. Perceived costs items tended to stay the same or be reduced, with the greatest reported reductions being for "there are major aspects of owning a dog that I don't like," "It is annoying that sometimes I have to change my plans because of my dog," and "How often does your dog stop you doing things you want to." "How hard it is it to look after your dog?" was the only perceived costs item that increased in a large percentage of respondents (34.3%).

Looking at items that are associated with support, 61.9% of respondents played games with their dogs more or much more,

41.8% had their dogs with them while relaxing more or much more, and 48.5% hugged their dog more or much more. Fifty-two point two percent of respondents indicated that their dog provided them with constant companionship more or much more, and 45.1% said that the dog helped them through tough times more or much more.

DISCUSSION

The context of this paper was the global COVID-19 pandemic and Spanish national confinement lockdown that occurred from 14th March (2020) onward. Many families were isolated at home, people were unable to work, and their households experienced financial, emotional, health and lifestyle impacts. As the pandemic developed, many families also experienced grief.

The Monash Dog Owner Relationship Scale (MDORS) that we used with the representative sample population includes items that measure aspects of social support, as this is one of the benefits proposed as the basis for a functioning relationship in the social-exchange theory (17). In our study we abstracted those social support items to evaluate them outside the subscales that MDORS uses to quantify the human-animal bond. Due to their anonymity, it was not possible for us to re-contact the members of the representative sample panel during the COVID pandemic. Had we collected data from a convenience sample population and compared that with our representative data, differences would have been confounded by demographic biases.

So, when we collected data during the COVID-19 lockdown in Spain we changed the scoring of the scale to a relative measure for each item (a 5-point scale from "much more" to "much less" than before the lockdown). Also, we wanted to look at cat and dog owners, so we used the C/DORS scale that is an adaptation of MDORS for use with both species. C/DORS contains several additonal items on pet-owner interaction that are more specific to cats. However, for the present study the items included are the same for the two populations, aside from those items which were excluded in the Spanish lockdown study because they involved activities that were potentially in breach of the law (such as traveling to other people's homes).

The findings from the lockdown study have already been published (21), but in that paper we gave only a broad overview of the effect of the lockdown on the lifestyle, quality of life and behavior of people and their pets. We found that emotional and lifestyle impacts on the household were those most strongly associated with a perceived negative effect on personal quality of life during the confinement, but we did not look in detail at the data from C/DORS and the support people got from their pets.

The discussion will prioritize the findings from the representative sample population obtained prior to the pandemic in detail and separately from the findings from the COVID-19 lockdown, because it offers a more generalizable insight into the social support people get from their companion dogs. Findings from the sample obtained during the COVID-19 lockdown should be considered only as an illustration of how social support might be realized during a crisis, since, as it is from a convenience sample, the data is exposed to various demographic and recruitment biases.

Representative Sample Population

Although numerous studies have collected information about the human-animal bond using convenience samples, the results have not been generalizable because of biases in the sex, age and other demographic features of the studied populations (15, 16, 22). To our knowledge, our study is the first to present findings from a representative sample, and as a result we are able to make reasonable generalizations about how valuable dogs are in the social support networks of their owners.

MDORS includes a range of items grouped into sub-scales of owner-dog interaction, emotional closeness and perceived costs. Unlike other measures of the human-animal bond, MDORS has been tested for both reliability and validity (23). It also has widespread use (23), including in studies of dog ownership satisfaction (24) the performance of seizure detection dogs (25), the effects of service dogs on the psychosocial health and well-being of individuals (26), and the effects of dog-owner relationship on perceived stress and happiness (27). Although studies of associations between MDORS and biological measures in dogs and people are limited, there is some evidence of an association between MDORS parameters and plasma oxytocin levels in people and dogs (28).

Some of the MDORS items are more directly relevant to the social support that the owner gets from the dog. These include direct statements about support, such as "My dog helps me get through tough times." However, MDORS also includes items that do not necessarily relate to support, such as "how often do you take your dog in the car." For this study we focussed on those items which relate most closely to social support and caregiving.

Table 4 presents those MDORS items which are most relevant to social support, grouped according the previously mentioned characteristics, with a summary of the percentage of respondents who gave the most positive answers.

Two items in MDORS stand out as are direct statements of the degree of support that people get from their dogs; "My dog helps me get through tough times" and "My dog gives me a reason to get up in the morning." Both of these statements gained a high level of agreement, with 80% of respondents agreeing or strongly agreeing with the former (50.7% strongly agreed with the statement). Lack of motivation is a common characteristic of people who are in an anhedonic or depressive state, so the fact that 77.8% of respondents agreed or strongly agreed with the statement "My dog gives me a reason to get up in the morning" is a powerful indicator of the importance of the human-dog relationship.

However, agreement with direct statements of this kind may not reflect the actual support people get from their dogs. If it is real, the social support people get from their dogs should conform to what we know about the characteristics of social support between people.

Availability

Availability is one of the main predictors of perceived social support (4). It is worth noting that in Spain, 26% of families

TABLE 4 | Key items from MDORS that relate to social support, with the percentage of respondents who gave the positive responses for each item (representative sample population).

	% scoring 4 or 5	Meaning of score 4 or 5
Stated support		
My dog helps me get through tough times.	80.0	Strongly agree or agree
My dog gives me a reason to get up in the morning.	77.8	Strongly agree or agree
Availability		
If everyone else left me my dog would still be there for me.	90.6	Strongly agree or agree
My dog provides me with constant companionship.	90.2	Strongly agree or agree
My dog is there whenever I need to be comforted.	87.0	Strongly agree or agree
My dog is constantly attentive to me.	73.6	Strongly agree or agree
Shared activity		
How often do you play games with your dog?	94.6	At least once a day or once every few days
How often do you have your dog with you while relaxing, i.e., watching TV?	88.4	At least once a day or once every few days
Confidant		
How often do you tell your dog things you don't tell anyone else?	69.6	Once a day or once a week
Physical contact		
How often do you hug your dog?	86.8	At least once a day or once every few days
How often do you kiss your dog?	69.1	At least once a day or once every few days
Opportunity for care giving		
How often do you give your dog food treats?	56.8	At least once a day or once every few days
How often do you groom your dog?	54.7	At least once a day or once every few days
How often do you buy your dog presents?	29.2	Once a week or once a fortnight

live with at least one dog (12), making dogs a readily availability source of social support for many families. Four items from the MDORS refer to the availability of support, and all achieved a high level of agreement from respondents in the representative sample, with 69.8% strongly agreeing with the statement "If everyone else left me, my dog would still be there for me," 67.2% strongly agreeing with "My dog provides me with constant companionship" and 60.9% strongly agreeing with "My dog is there whenever I need to be comforted." Of these, the statement about the dog still being there for the person even after everyone else left could be seen as an indication of the emotional support a grieving person might get from their dog. This finding is in agreement with previous research that indicated that living with a dog seems to help people to get through the early stages of bereavement, particularly if the person actively seeks support from the dog (29).

Almost three out of four dog owners in this study declared that their dogs are constantly attentive to them. This proactive attitude perceived by dog owners is consistent with previous research on human-dog interactions, which have found that dogs are able to detect and interpret primary human emotional responses, including expressions of negative affective states (30, 31). For example, dogs proactively approach people more often if they are crying than showing other emotionally neutral vocalizations (32). This ability can be partially explained by selection pressure favoring the survival of dogs that exhibited human-oriented behaviors during the process of domestication (33). Recent evidence suggests that dogs are able not only to express emotional contagion but also to show prosocial helping behaviors, regardless of whether they are truly intentional or only perceived as such by their caretakers (31). In our study, the majority of owners perceived their dogs to be readily available and actively motivated to provide them with emotional support.

Shared Activities

Playing games with the dog and relaxing with the dog are two important shared activities. More than 90% of participants in the present study said that they play games with their dogs at least once a day or once every few days. Just under 90% of respondents stated that they had their dog with them while they were relaxing at least once a day or once every few days.

Interactive play is considered one of the main benefits of interacting with dogs, together with going on walks (34, 35), and interactive play with dogs seems to be particularly beneficial in promoting prosocial behavior in children (35). The frequency of other shared activities included in the MDORS, such as going with the owner to visit people and on car trips are more influenced by factors outside the relationship, including lifestyle preferences, the dog's dislike of travel or its inability to be left alone at times. In our opinion play and time relaxing are the best overall indicators of the level of shared activities between people and their dogs within MDORS.

Self-Disclosure and the Confidant

Self-disclosure is the main characteristic of a confidant relationship (9). In this study, the majority of dog owners reported telling their dogs things they didn't tell anyone else at least once a day or once a week (69.6%). This fits with findings from a study comparing self-disclosure to partners and companion dogs, which found that for dog owners the dog played a similar confidant role as the person's partner, with people showing greater willingness to talk to their dog about depression, jealousy, anxiety, calmness, apathy, and fear-related emotions, compared with a human confidant (36).

Although it is easy to be dismissive of this confidant relationship between owner and dog because the dog is incapable of understanding what is being disclosed, evidence from the use of text-based chatbots and artificial intelligence (AI) based counseling systems suggest that people benefit from disclosure even when they know that the counselor is inanimate. The first evidence that computerized chatbots could be convincing conversational partners that were able to elicit disclosure came from the ELIZA studies at MIT (37); one of the response

scripts for this system was a convincing simulation of Rogerian psychotherapy (38). More effective chatbots are being developed to use AI to analyze user inputs and patterns of communication in order to respond to human emotions (39), which is something that dogs do naturally. The fact that so many owners regularly engage in personal disclosure to their dogs should be considered an important indicator of the nature of the relationship.

Physical Contact

Touch and physical contact are important for socio-emotional, physical and psychological well-being (10, 40, 41). In a laboratory study of the effects of physical contact on scores for loneliness, touch contact was found to reduce the perception of loneliness, especially among single people (42). In a study observing the naturally occurring touch contact between married partners whilst they were discussing personal stressors, disclosers who received more touch contact perceived that they were better able to overcome their stressors (43). They also reported greater decreases in self-reported stress, greater increases in self-esteem, and had a more positive view of their partners. Touch may even have effects on immune response that are of relevance to the current pandemic. In a study of the effects of stress-buffering social support and hugging on rate of infection after exposure to the common cold virus, Cohen et al. found that perceived support protected against the rise in infection risk associated with increasing frequency of social conflict, and that 32% of this effect was associated with hugging (44). In a study of psychiatric assistance dogs (PAD) used to help people with mental health disorders, patients were found to make use of tactile and body contact with dogs to help reduce their anxiety (45). A psychiatric assistance dog is a specific type of service dog that has been trained to assist its owner, and in that study PAD owners showed reduce rate of hospitalization and medication use, and an increase in ability to attend appointments.

In the present study, 86.8% of respondents said that they hugged their dog at least once every day or every few days. Likewise, 69.1% of respondents kissed their dog at least once every day or every few days. For people living alone, these may be valuable sources of physical contact. There is also evidence from a study of plasma levels of oxytocin in dogs and their owners during an interaction experiment, that the level of this hormone was associated with increased frequency of kissing the dog (23). During the pandemic, social distancing, restrictions on social interactions between people, and individual concerns about disease transmission have meant that many people have been isolated from sources of physical contact. For many people, this included reducing physical contact with resident friends and family members who worked outside the household in occupations associated with increased disease risk (such as healthcare). However, the social restrictions and isolation that the whole population has experienced during the pandemic is just a taste of what many disadvantaged, elderly people, and people with disabilities or mental illness experience as part of their everyday lives.

Opportunities for Care Giving

The majority of participants in our study reported that they engaged in activities related to caring for the dog on a daily or nearly daily basis. Helping others, including family members, friends and neighbors, can be as beneficial to health and well-being as receiving support. Caregiving has been associated with psychological benefits for the caregiver, particularly when caring behavior is not perceived as a burden (11).

We also explored the association between perceived costs on aspect of interaction and emotional closeness. Most of the key indicators of social support in MDORS were negatively correlated with perceived costs or difficulty looking after the dog, as shown in **Table 5**.

This suggests that increased perceived costs impair the owner's perception of, and ability to use, the dog as a source of support. Interestingly, a time-consuming activity like grooming the dog

TABLE 5 | Correlations between key MDORS items associated with social support and perceived costs and stated difficulty with looking after the dog.

	Correlation (Spearman *r*)	
	Perceived costs score	**"How difficult is it to look after your dog"**
Stated support		
My dog helps me get through tough times.	−0.29	−0.29
My dog gives me a reason to get up in the morning.	−0.26	−0.25
Availability		
If everyone else left me my dog would still be there for me.	−0.28	−0.23
My dog provides me with constant companionship.	−0.33	−0.28
My dog is there whenever I need to be comforted.	−0.28	−0.29
My dog is constantly attentive to me.		−0.18
Shared activity		
How often do you play games with your dog?	−0.29	−0.27
How often do you have your dog with you while relaxing, ie watching TV?	−0.32	−0.26
Confidant		
How often do you tell your dog things you don't tell anyone else?		−0.14
Physical contact		
How often do you hug your dog?	−0.24	−0.23
How often do you kiss your dog?	−0.18	−0.22
Opportunity for care giving		
How often do you give your dog food treats?		−0.15
How often do you groom your dog?		−0.18
How often do you buy your dog presents?		

Only correlations that were significant after Bonferroni correction are presented (non-significant correlations are left blank).

showed a weak but significant negative correlation with perceived cost, suggesting that it is not generally perceived as a burden by most dog owners who participated in our study.

CONVENIENCE SAMPLE POPULATION (COVID-19 PANDEMIC)

The COVID-19 pandemic provided an opportunity to gather supporting evidence for the findings from the representative sample population. This was a time of isolation, stress and bereavement that affected entire nations. We would expect people to turn to their dogs for support, and for the relevant key measures of MDORS to be increased. This is what we found (see **Table 6**). The average time of confinement was 3.2 weeks, which may be regarded as quite short. However, previous studies indicate that periods of quarantine and home confinement as short as 10 days have been associated with negative psychological consequences (46).

Increases were seen in each of the key areas of social support, but were greatest for shared activity, physical contact and availability. Interestingly, these would be the areas of human social interaction that would seem to be the most affected by the pandemic confinement, which implies that the social support provided by the dog dynamically adapted to fill gaps in social interaction and support created by the lockdown.

Forty-five-point one percent of respondents said that their dog helped them through tough times more or much more than before the confinement. There were increased ratings for every one of the key indicators, with "my dog is constantly attentive to me," "How often do you play games with your dog," "How often do you hug your dog," and "My dog provides me with constant companionship" being increased the most. However, "How often do you tell your dog things that you don't tell anyone else" was increased for only 21.4% of respondents, and this may reflect the fact that the use of video-conferencing technology has enabled many people to maintain a degree of communication with their human confidants.

Perceived costs items tended to stay the same or be reduced, which is unsurprising given that the data was collected during the lockdown; a time when having a dog would be expected to have less of an impact on owners' plans and activities. Although we would expect that the lockdown would have imposed a significant financial burden on households, the level of agreement with the statement "My dog costs too much money" hardly changed.

LIMITATIONS OF THIS STUDY AND FUTURE WORK

Using a representative sample population we were able to make a general characterization of the social support people get from dogs, and find out how widespread it is. However, we were unable to follow-up the same population during the pandemic, so we had to adapt a version of the same scale to provide a relative measure for each item, and we collected data from a convenience sample. These were compromises that we felt were worthwhile, given the opportunity to collect data during such an unusual

TABLE 6 | Percentage of respondents in the COVID convenience sample who rated key MDORS items as much more, more or the same as before the lockdown.

	% Much more or more	% Same as before	% More or same as before	Mean % reporting an increase
Stated support				
My dog helps me get through tough times.	45.1	54.3	99.4	31.3
My dog gives me a reason to get up in the morning.	17.5	80.4	97.9	
Availability				
If everyone else left me my dog would still be there for me.	24.3	75.1	99.4	40.6
My dog provides me with constant companionship.	52.2	47.6	99.8	
My dog is there whenever I need to be comforted.	23.7	75.9	99.6	
My dog is constantly attentive to me.	62.2	36.3	98.5	
Shared activity				
How often do you play games with your dog?	61.9	33.2	95.1	51.9
How often do you have your dog with you while relaxing, i.e., watching TV?	41.8	57.8	99.6	
Confidant				
How often do you tell your dog things you don't tell anyone else?	21.4	78.2	99.6	21.4
Physical contact				
How often do you hug your dog?	48.5	49.6	98.1	41.2
How often do you kiss your dog?	33.9	59.2	93.1	
Opportunity for care giving				
How often do you give your dog food treats?	33.7	61.0	94.7	23.5
How often do you groom your dog?	24.2	70.5	94.7	
How often do you buy your dog presents?	12.7	76.7	89.4	

Mean percentage reporting an increase for each groups of items.

event, but they limit the value of the lockdown data. Future studies should address these limitations. During the lockdown we also did not explore the relationship between individual circumstances and the social support obtained. For example, how the type and level of social support from the dog related to the quality of a person's wider social support network, the stresses the person experienced, their physical and mental health, and how technological solutions (such as video calling and social media) had mitigated the non-physical aspects of social isolation. These are areas that require further study.

PRACTICAL IMPLICATIONS

Our findings indicate that dog owners treat their dogs as a source of social support that offers a unique combination of characteristics; emotional responsiveness, physical contact, being non-judgmental and unquestioning in the face of personal disclosure, and apparently unaffected by the underlying causes of the person's distress. In addition, what is qualitatively lacking in each of these characteristics, when compared with the support that might be provided by a person, may be made up for by the immediacy of availability.

Our data from the COVID-19 pandemic show that dogs can be a valuable source of social support during a time of crisis, and in particular a source of physical contact to people during a time of social isolation.

This suggests that the social support dogs provide should be factored into public health decisions about how to manage crises, such as a pandemic, and interventions to help people who are in distress. This could include interventions to take advantage of the presence of a dog in the household as part of psychological or counseling interventions or finding ways to alleviate perceived costs and difficulties of ownership that we have shown can impair perceived support from the dog in a number of important areas.

For example, if we want dog owners to gain the maximum benefit from having a dog during a period of personal crisis, interventions could be targeted to make owning the dog easier. On an individual basis, this could include helping with the costs of food and veterinary care or helping a person who is elderly or has a disability to exercise their dog. During a national emergency, such as the COVID-19 lockdown, this could include making public announcements that the availability of dog food and healthcare will not be affected, and that dogs will continue to be able to go outside (as we found in our previous study that these were specific concerns dog owners had).

Hodgson et al. identified 4 ways in which pets could benefit human health; as builders of social capital, as agents of harm reduction, as motivators for healthy behavior change, and as potential participants in treatment plans (47). They suggested that pets could motivate regular exercise, encourage activities of daily living, catalyze social interactions and a sense of community, encourage harm reduction (e.g., quitting smoking), and augmenting plans for the treatment of chronic disease. The simplest way to activate these benefits during healthcare interventions would be to ask people about their pets, as this is a non-challenging way to open a dialogue and discover details about a person's social support network, and lifestyle.

The authors of that paper went on to test this hypothesis using primary healthcare providers (PHPs; family physicians, nurses, and social workers) who were trained to include communication with patients about their pets as part of their service. As hypothesized, this was found to be a good way to open up communication that had positive effects on practice and relationships with patients (48). Patients responded quickly and openly to questions about their pets, and this enabled PHPs to learn more about aspects of lifestyle such as physical activity, as well as about patients' family members, social capital and housing. PHPs were also able to use discussion about pets to leverage improvements in social capital, physical exercise, controlling unhealthy behaviors and the therapeutic benefits of pets.

Talking with patients about their pets as a way to improve communication, establish rapport, gather information and leverage support and behavioral change could be of increased importance in situations in which the patient has limited mobility or access to social capital, as we have seen during the pandemic confinement.

CONCLUSION

The findings from the representative sample population indicate that the majority of dog owners feel that their dogs help them through tough times, and that the support they get conforms to known characteristics of social support such as availability, shared activity, physical contact and acting as a confidant. In the convenience sample pandemic population, shared activity, physical contact and availability items were, in decreasing order, those which were most increased. The owner-dog relationship therefore seems to be highly adaptable to compensate for changes in other sources of social support. If we want to take make the most of these benefits, we have two options; firstly to create interventions that take advantage of the presence of a dog in the household, and secondly to identify and minimize perceived costs for the owner so that the dog can be most effective as a social support.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Social Sciences Research Ethical Review Board (SSRERB) at the Royal Veterinary College. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JB and JF designed the study, performed the analysis and drafted the paper. AB assisted with the design of the study, interpretation

of the results and final drafting of the paper. All authors contributed to the article and approved the submitted version.

FUNDING

This study was funded as part of the research activities of the Affinity Foundation Chair for Animals and Health.

ACKNOWLEDGMENTS

The authors would like to thank Elena García, Patricia Darder, Juan Argüelles for their assistance in organizing and collecting data for the convenience sample used in this study. We would also like to thank Germán Sánchez for helping us to collect the data for the representative sample.

REFERENCES

1. Xiong J, Lipsitz O, Nasri F, Lui LMW, Gill H, Phan L, et al. Impact of COVID-19 pandemic on mental health in the general population: a T systematic review. *J Affect Disord.* (2020) 277:55–64. doi: 10.1016/j.jad.2020.08.001
2. Wallace CL, Wladkowski SP, Allison Gibson A, White P. Grief during the COVID-19 pandemic: considerations for palliative care providers. *J Pain Symptom Manage.* (2020) 60:e70–6. doi: 10.1016/j.jpainsymman.2020.04.012
3. Ammar A, Brach M, Trabelsi K, Chtourou H, Boukhris O, Masmoudi L, et al. On Behalf of the ECLB-COVID19 Consortium. Effects of COVID-19. Home confinement on eating behaviour and physical activity: results of the ECLB-COVID19 international online survey. *Nutrients.* (2020) 12:1583. doi: 10.1159/000512852
4. Rush MM. Perceived social support: dimensions of social interaction among sober female participants in alcoholics anonymous. *J Am Psychiatr Nurses Assoc.* (2002) 8:114–19. doi: 10.1067/mpn.2002.126673
5. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychol Bull.* (1985) 98:310–57. doi: 10.1037/0033-2909.98.2.310
6. Li F, Luo S, Mu W, Li Y, Zheng X, Xu B, et al. Effects of sources of social support and resilience on the mental health of different age groups during the COVID-19 pandemic. *BMC Psychiatry.* (2021) 21:16. doi: 10.1186/s12888-020-03012-1
7. Ammar A, Chtourou H, Boukhris O, Trabelsi K, Masmoudi L, Brach M, et al. On Behalf of The Eclb-Covid Consortium. COVID-19 home confinement negatively impacts social participation and life satisfaction: a worldwide multicenter study. *Int J Environ Res Public Health.* (2020) 17:6237. doi: 10.3390/ijerph17176237
8. Berscheid E, Snyder M, Omoto AM. The relationship closeness inventory: assessing the closeness of interpersonal relationships. *J Pers Soc Psychol.* (1989) 57:792–807. doi: 10.1037/0022-3514.57.5.792
9. Isaacs J, Soglian F, Hoffman E. Confidant relations in Italy. *Eur J Psychol.* (2015) 11:50–62. doi: 10.5964/ejop.v11i1.741
10. Field T. Touch for socioemotional and physical well-being: a review. *Dev Rev.* (2010) 30:367–83. doi: 10.1016/j.dr.2011.01.001
11. Schulz R, Sherwood PR. Physical and mental health effects of family caregiving. *Am J Nurs.* (2008) 108 (9 Suppl.):23–7. doi: 10.1097/01.NAJ.0000336406.45248.4c
12. FEDIAF (European Pet Food Industry Federation). *Facts and Figures 2019 Report.* (2019). Available online at: https://fediaf.org/images/FEDIAF_facts_and_figs_2019_cor-35-48.pdf (accessed October 27, 2020).
13. Julius H, Beetz A, Kotrschal K, Turner D, Uvnäs-Moberg K. *Attachment to Pets: An Integrative View of Human-Animal Relationships With Implications for Therapeutic Practice*. Cambridge: Hogrefe Publishing (2013).
14. Nagasawa M, Mitsui S, En S, Ohtani N, Ohta M, Sakuma Y, et al. Social evolution. Oxytocin-gaze positive loop and the coevolution of human-dog bonds. *Science.* (2015) 348:333–36. doi: 10.1126/science.1261022
15. Kurdek LA. Pet dogs as attachment figures for adult owners. *J Fam Psychol.* (2009) 23:439–46. doi: 10.1037/a0014979
16. Gee NR, Mueller MK. Systematic review of research on pet ownership and animal interactions among older adults. *Anthrozoös.* (2019) 32:183–207. doi: 10.1080/08927936.2019.1569903
17. Dwyer F, Bennett PC, Coleman GJ. Development of the monash dog owner relationship scale (MDORS). *Anthrozoos.* (2006) 19:243–56. doi: 10.2752/089279306785415592
18. Calvo P, Bowen J, Bulbena A, Tobeña A, Fatjó J. Highly educated men establish strong emotional links with their dogs: a study with monash dog owner relationship scale (MDORS) in committed Spanish dog owners. *PLoS ONE.* (2016) 11:e0168748. doi: 10.1371/journal.pone.0168748
19. BOE (Official Gazettes). *Real Decreto 463/2020*, Vol. 67. p. 25390–400. Available online at: https://www.boe.es/eli/es/rd/2020/03/14/463 (accessed March 14, 2020).
20. Howell TJ, Bowen J, Fatjó J, Calvo P, Holloway A, Bennett PC. Development of the cat-owner relationship scale (CORS). *Behav Process.* (2017) 141:305–15. doi: 10.1016/j.beproc.2017.02.024
21. Bowen J, Garcia E, Darder P, Argüelles J, Fatjó J. The effects of the Spanish COVID-19 lockdown on people, their pets, and the human-animal bond. *J Vet Behav.* (2020) 40:75–91. doi: 10.1016/j.jveb.2020.05.013
22. Brooks HL, Rushton K, Lovell K, Bee P, Walker L, Grant L, et al. The power of support from companion animals for people living with mental health problems: a systematic review and narrative synthesis of the evidence. *BMC Psychiatry.* (2018) 18:31. doi: 10.1186/s12888-018-1613-2
23. Payne E, Bennett PC, McGreevy PD. Current perspectives on attachment and bonding in the dog–human dyad. *Psychol Res Behav Manag.* (2015) 8:71–9. doi: 10.2147/PRBM.S74972
24. Herwijnen IRV, van der Borg JAM, Naguib M, Beerda B. Dog ownership satisfaction determinants in the owner-dog relationship and the dog's behaviour. *PLoS ONE.* (2018) 13:e0204592. doi: 10.1371/journal.pone.0204592
25. Martos Martinez-Caja A, De Herdt V, Boon P, Brandl U, Cock H, Parra J, et al. Seizure-alerting behavior in dogs owned by people experiencing seizures. *Epilepsy Behav.* (2019) 94:104–11. doi: 10.1016/j.yebeh.2019.02.001
26. Rodriguez KE, Bibbo J, O'Haire ME. The effects of service dogs on psychosocial health and wellbeing for individuals with physical disabilities or chronic conditions. *Disabil Rehabil.* (2020) 42:1350–8. doi: 10.1080/09638288.2018.1524520
27. Gonzalez-Ramirez MT, del Quezada-Berumen L, Vanegas-Farfano M, Landero-Hernandez R. The effects of dog-owner relationship on perceived stress and happiness. *Hum Anim Interact Bull.* (2018) 6:44–57.
28. Handlin L, Nilsson A, Ejdebäck M, Hydbring-Sandberg E Uvnäs-Moberg K. Associations between the psychological characteristics of the human–dog relationship and oxytocin and cortisol levels. *Anthrozoös.* (2012) 25:215–28. doi: 10.2752/175303712X13316289505468
29. McNicholas J, Collis G. Animals as social supports: insights for understanding animal-assisted therapy. In: Fine AH, editor. *Handbook on Animal-Assisted Therapy: Theoretical Foundations and Guidelines for Practice*. San Diego, CA: Academic Press (2006). p. 49–71.
30. Huber A, Barber AA, Faragó T, Müller CA, Huber L. Investigating emotional contagion in dogs (Canis familiaris) to emotional sounds of humans and conspecifics. *Anim Cogn.* (2017) 20:703–15. doi: 10.1007/s10071-017-1092-8
31. Sanford EM, Burt ER, Meyers-Manor JE. Timmy's in the well: empathy and prosocial helping in dogs. *Learn Behav.* (2018) 46:374–86. doi: 10.3758/s13420-018-0332-3
32. Custance D, Mayer J. Empathetic-like responses in domestic dogs (Canis familiaris) to distress in humans: an exploratory study. *Anim Cogn.* (2012) 15:851–59. doi: 10.1007/s10071-012-0510-1
33. Hare B, Brown M, Williamson C, Tomasello M. The domestication of social cognition in dogs. *Science.* (2002) 298:1634–36. doi: 10.1126/science.1072702
34. Westgarth C, Christley RM, Christian HE. How might we increase physical activity through dog walking?: a comprehensive review of dog walking correlates. *Int J Behav Nutr Phys.* (2014) 11:83. doi: 10.1186/1479-5868-11-83
35. Wenden EJ, Lester L, Zubrick SR, Ng M, Christian HE. The relationship between dog ownership, dog play, family dog walking, and pre-schooler social-emotional development: findings from the PLAYCE observational study. *Pediatr Res.* (2020) 1–7. doi: 10.1038/s41390-020-1007-2

36. Evans-Wilday AS, Hall SS, Hogue TE, Mills DS. Self-disclosure with dogs: dog owners' and non- dog owners' willingness to disclose emotional topics. *Anthrozoos.* (2018) 31:353–66. doi: 10.1080/08927936.2018.1455467
37. Weizenbaum J. ELIZA-A computer program for the study of natural language communication between man and machine. *Comput Linguist Assoc Comput Linguist.* (1966) 9:36–45. doi: 10.1145/365153.365168
38. Bassett C. The computational therapeutic: exploring Weizenbaum's ELIZA as a history of the present. *AI Soc.* (2019) 34:803–12. doi: 10.1007/s00146-018-0825-9
39. Bendig E, Erb B, Schulze-Thuesing L, Baumeister H. The next generation: chatbots in clinical psychology and psychotherapy to foster mental health – a scoping review. Verhaltenstherapie. (2019) 1–13. doi: 10.1159/000501812
40. Gallace A, Spence C. The science of interpersonal touch: an overview. *Neurosci Biobehav Rev.* (2010) 34:246–59. doi: 10.1016/j.neubiorev.2008.10.004
41. Jakubiak BK, Feeney BC. Affectionate touch to promote relational, psychological, and physical well-being in adulthood: a theoretical model and review of the research. *Per Soc Psychol Rev.* (2017) 21:228–52. doi: 10.1177/1088868316650307
42. Tejada AH, Dunbar RIM, Montero M. Physical contact and loneliness: being touched reduces perceptions of loneliness. Adapt *Human Behav Physiol.* (2020) 6:292–306. doi: 10.1007/s40750-020-00138-0
43. Jakubiak BK, Feeney BC. Interpersonal touch as a resource to facilitate positive personal and relational outcomes during stress discussions. *J Soc Pers Relat.* (2019) 36:2918–36. doi: 10.1177/0265407518804666
44. Cohen S, Janicki-Deverts D, Turner RB, Doyle WJ. Does hugging provide stress-buffering social support? A study of susceptibility to upper respiratory infection and illness. *Psychol Sci.* (2014) 26:135–47. doi: 10.1177/0956797614559284
45. Lloyd J, Johnston L, Lewis J. Psychiatric assistance dog use for people living with mental health disorder. *Front Vet Sci.* (2019) 6:166. doi: 10.3389/fvets.2019.00166
46. Hawryluck L, Gold W, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis.* (2004) 10:1206–12. doi: 10.3201/eid1007.030703
47. Hodgson K, Barton L, Darling M, Antao V, Kim FA, Monavvari A. Pets' impact on your patients' health: leveraging benefits and mitigating risk. *J Am Board Fam Med.* (2015) 28:526–34. doi: 10.3122/jabfm.2015.04.140254
48. Hodgson K, Darling M, Freeman D, Monavvari A. Asking about pets enhances patient communication and care: a pilot study. *Inquiry.* (2017) 54:46958017734030. doi: 10.1177/0046958017734030

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

ORIGINAL RESEARCH
published: 16 April 2021
doi: 10.3389/fpubh.2021.625756

Psychology Students' Perceptions of COVID-19 in a Death Education Course

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The systematic removal of death from social life in the West has exposed people living in areas affected by COVID-19 to the risk of being unable to adequately manage the anxiety caused by mortality salience. Death education is a type of intervention that helps people manage their fear of death by offering them effective strategies to deal with loss and anxiety. To that end, a path of death education has been carried out with University students of psychology. The main purpose of the research is to understand how students who participated in the death education course perceive the lockdown experience in light of course teachings. The research was carried out at a University in northern Italy in an area severely affected by COVID-19, during the first year of the pandemic. The group of participants included 38 students, 30 women and 8 men, with an average age of 25.45 years ($SD = 7$). At the end of the course, the students could respond on an optional basis to the request to comment on the training experience according to what they experienced during the pandemic. A thematic analysis was subsequently carried out on the texts, which made it possible to identify the most relevant thematic areas for the students. The qualitative analyses permitted recognition of three main forms of discovery: the removal of death in contemporary culture; the importance of community, ritual and funeral, and spirituality; and the significance of death education for future health professionals. The texts have highlighted how the removal of these issues exposes people to the risk of being unable to handle extremely painful events such as those related to dying. The results show the positivity of death education pathways conducted at the University level to help students reflect on these issues and manage the related anguish.

Keywords: COVID-19, death, death education, psychology students, lockdown experience

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Steven Kator Iorfa, University of Nigeria, Nigeria
Rotimi Oguntayo, University of Ilorin, Nigeria
Samson Olowo Kolawole, Nigeria Police Academy, Nigeria
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Public Health

Received: *03 November 2020*
Accepted: *19 March 2021*
Published: *16 April 2021*

Citation:
Testoni I, Iacona E, Corso C, Pompele S, Dal Corso L, Orkibi H and Wieser MA (2021) Psychology Students' Perceptions of COVID-19 in a Death Education Course. Front. Public Health 9:625756. doi: 10.3389/fpubh.2021.625756

INTRODUCTION

During the early months of 2020, the Italian health system was forced to grapple with the recent pandemic caused by the spread of COVID-19 and the subsequent sudden increase in death rates, which constituted a huge, and, at least in the last decades, unprecedented, public health concern, and challenge. The national health emergency significantly affected life and work, and the restrictive solutions negatively influenced almost all social sectors, including those of the educative area (primary and secondary school, and universities).

A theory that could help understand the significant negative psychological impact of COVID-19 on society is terror management theory (TMT), which states how the constant conflict between survival instinct and the awareness that everyone must die sooner or later (called mortality salience) causes intense cognitive dissonance and sufferance to people, who therefore constantly attempt to reduce mortality salience itself (1). Terror management theory focuses therefore on the crucial role death awareness plays in human life. Over the past 35 years, hundreds of empirical studies have confirmed how diverse aspects of human behavior are directly influenced by this, showing the role of proximal defenses, which are cultural constructions that enable people to think of themselves as valuable contributors to a meaningful, significant, and permanent universe, and distal defenses, which help individuals to give sense to the relationships between life and death (2).

It is therefore understandable how in a period such as the present one, with a world pandemic of highly contagious nature that is causing an enormous death toll, how mortality salience could become almost impossible to hide, and how the virus plays very important roles in spawning anxiety that could result in critical behaviors and situations. From the TMT point of view, therefore, mortality salience caused by the pandemic plays a central role in driving the attitudes and behaviors of most of the population in each country plagued by the virus (3–5).

The systematic removal of the reflection on death and dying that has particularly characterized Western culture in recent decades (6) has left individuals unprepared in the face of the massive amount of news that activates the mortality salience in the pandemic period. In recent years some death education pathways have been developed to help people, especially adolescents, to acquire familiarity with the idea of death, feeling free to discuss it with peers and expressing the related feelings and thoughts, especially through the mean of the arts, which allow them to be as free as possible in their elaboration of the concept of death and dying (7). For example, an approach that is proving to be extremely useful is psychodrama, through which people, usually divided in groups, have the possibility to represent and give life to both past experiences and personal fears or fantasies through the mean of dramatic enactment and which is easy to implement with adolescents in a context of death education, during which they can live again and possibly change, in the protected psychodramatic stage, past griefs, or even represent their personal idea of death, and share it with the rest of the group, discussing it together (8). A very common psychodramatic techniques applied to death education is for example the "empty chair," in which participants are sitting in front of a physical empty chair on which they imagine a deceased loved person or even death itself as a personified character is sitting, thus allowing them to elaborate their feelings and thoughts concerning the theme of dying in a dialog with the person/entity on the empty chair (7).

Another methodology that has proven to be very useful in death education courses with groups of adolescents is for example photovoice, in which they are asked to produce pictures concerning the theme of death and dying and how they personally perceive and represent it, and later show them to their group and discuss them with the others (9). These experiences seem to have demonstrated that consciously managing the issue of death and the negative feelings associated with it can indeed strengthen people's resilience and allow them to feel less frightened by it (7, 10). Death education aims therefore to promote dialogue and reflection on issues that are usually removed from daily dialogue because they prompt anxiety and sadness (11). The greater awareness of the terror of death and the resulting defensive dynamics help people face the difficulties that arise from mortal situations and help others relate to people who are suffering from a personal loss (12). Moreover, literature has also shown that reflecting on death and human vulnerability can also help to reduce anxiety and to better manage information related to the preservation of one's health (13). For example, a qualitative study of community death education in which participants were offered a death education course and were later asked to imagine they were affected by Amyotrophic Lateral Sclerosis (ALS) and had to prepare their Advanced Treatment Directives (ATDs) highlighted how reflecting upon the themes of the knowledge of having to die, palliative care and ATDs significantly helped participants to think to their death in a less distressful way and to be able to plan their future healthcare treatments and fundamental desires with less anxiety (14). Death education has moreover been demonstrated to be useful also to help prevent other significant public health concerns, such as for example the issue of suicide risk, especially among adolescents (15) and the likeliness of smoking (16).

The strength of these paths lies in the reflection on transcendence and spirituality, which find in distal defenses their power to reduce anxiety and fear (7).

It is reasonable to believe therefore that death education courses could indeed provide an important support also in dealing with the current pandemic situation, the present most significant and dangerous worldly public health crisis.

As stated in *The Lancet* (2020): "A pandemic is a cause and powerful amplifier of suffering, through physical illness and death, through stresses and anxieties, and through financial and social instability. Alleviation of that suffering, in all its forms, needs to be a key part of the response" (17). Such an extreme negative impact the COVID-19 pandemic has and the mortality salience it elicits, imply that the contrast to the pandemic is also carried out with initiatives of consciousness-raising that make people aware of their psychological frailty in facing death. These further undesirable effects worsen the state of psychosocial distress caused by the virus. Recent studies show the usefulness of conducting death education courses with children, adolescents, and University students. If conducted properly, it is possible to manage in a positive way the effects of the path of reflection on death, on the fears it arouses, and on the effects (9, 15, 18). Therefore, it could help in critical periods of the pandemic to set up special paths of death education that support students in becoming aware of what happens and their experiences in this regard (19).

In Italy, Law 38/2010 on "Provisions to ensure access to palliative care and pain therapy" (8, 20) has included in all University courses of medicine, nursing, psychology, and social services that must address the issue of death to enable future

health professionals to acquire basic skills related to palliative care (8). In one of these courses held during the first phase of the pandemic in Italy, in one of the geographical areas most severely affected by the infection, the psychological effect of the COVID-19 experience was explicitly addressed. This intervention coincided with the lockdown period imposed by the Italian government since March 2020 (21), and for this reason the lessons were held at a distance. The literature on educational pathways during COVID-19 focused especially on internal and external changes in the formative paths that institutes, teachers, and professors had to make to rapidly adjust their modes of teaching (22, 23). Since there is not yet much literature on specific death education activities useful to manage anxiety and fear of death, this study presents the results of a qualitative survey with students who participated in a course for palliative care where they could face their emotions and feelings related to the pandemic.

The course was realized with undergraduate psychology students at a University in northern Italy, where the pandemic effects were particularly severe, and it focused on palliative care, including death education issues with particular attention paid to the current COVID-19 pandemic.

The present research, instead, aimed to understand how the students who took part in the teaching experienced the lockdown period in light of the preparation that the course provided them. We wanted to investigate how dealing with death education issues influenced the way the participants lived and perceived quarantine and the constant mortality salience caused by the daily information. In particular, we tried to recognize and outline the students' personal feelings with respect to the death education course and its effect, extrapolating the fundamental pivots on which they anchored the capability to think of and talk about issues relating to death and dying as proposed in the course.

METHODS

Participants

The research involved 38 students, 30 women and 8 men. The average age was about 25.45 years ($SD = 7$). The participants were all psychology graduates who were pursuing master's degrees in psychology. In order to recruit them, researchers presented the study protocol and aims in detail during one of the first online lessons of the palliative care and death education course. During the occasion, all the necessary information concerning the protection of participants' personal data and confidentiality, as well as concerning the possibility to choose freely whether to complete the research procedure or withdraw from it at any time without having to give any explanation for it and without risking any penalty of any kind, were given too, and students were encouraged to ask all the questions they needed. The researchers also made clear that taking or not taking part in the study would not have affected in any way students' final score on the exam at the end of the course, in order to ensure that the participants' motivation for joining the study was of simply curiosity and desire to aid psychological research and not linked to fear of repercussions, if they chose not to participate, or rather the need to obtain some benefits if they did take part in the research. The fact that their answers would have been used anonymously for the research results was also specified, in order to prevent as much as possible any form of social desirability in their given answers. All this information were repeated to those who actually decided to participate and presented in a written informed consent they were asked to sign before starting with the concrete study procedure.

The research followed the APA Ethical Principles of Psychologists and Code of Conduct and the principles of the Declaration of Helsinki, and approval was obtained from the Padua University Ethics Committee for Experimentation (n. 57BC2002FDF5CBD4292F5F86AA077F23). The names reported below are fictious. When necessary, the quotation has been camouflaged to avoid revealing a participant's identity.

Data Collection

This study followed a qualitative research design (24) within the grounded method (25), considered in the literature to constitute the most reliable methodology for investigating issues pertaining to health problems that are not yet considered (26). This methodology can also generate reflections to a much greater extent than the classical technique of direct interview or questionnaire (27).

Participants, as has been previously mentioned, attended a death education course which focused on palliative care, including death education issues with particular attention paid to the current COVID-19 pandemic. It was structured in frontal lectures delivered in telematic mode through video lectures and in group work. In addition, interventions were proposed by experts in the field and peer group work to allow students to better understand some nodes related to the psychological effects of the death experience and to allow them to confront each other. The aim of the course was to provide knowledge to acquire awareness about the management of terror of death and dying, loss, grief, and mourning, considering such themes from different points of view and involving psychological but also sociological, philosophical, and religious aspects and theories. The course, which is implemented every year for psychology students, usually also dedicates some time to the related themes of euthanasia, assisted suicide, and related bioethical issues, and to the aspect of psychological and medical support to the elders. However, because of the intense impact COVID-19 and the perceived urgent need students had to reflect upon the pandemic psychological and social implications, in the current version of the course these themes, even though fundamental, inevitably had to take second place, and were therefore less considered and discussed with students. With respect instead to the management of the COVID-19 experience, the main objectives of the course were: becoming aware of the forms through which death anxiety characterizes human suffering; knowing and understanding how terror of death influences human behavior; and considering the current situation in light of the death studies discussed.

Approximately 3 weeks after completion of the course, which was considered the proper amount of time to allow them to elaborate the personal experience lived during the course itself, participants were asked to write an essay concerning what they had understood about their experience of the pandemic and

their awareness with respect to the effect of the widespread and increasing mortality salience. The specific setting for the procedure was represented by each participants' home, since at the time of the implementation of the research, right after the course, universities were still closed, and only online lessons were allowed, to comply with the COVID-19 regulations on social distancing. The participants were given an hour and a half to complete the assignment, and they were asked to send the written reports to the researchers through their e-mail.

Data Analysis

The written texts obtained constituted the material for the qualitative research. The corpora obtained by the students' texts were analyzed following rigorously thematic analysis steps: reading, tracing the units of meaning, examining the redundancies and differences, reflecting on the units of meaning to extrapolate the theme being transformed into scientific language, and finally, formulating a consistent description of personal experiences (28, 29). The study identified the most salient thematic areas that the students involved had highlighted with their responses, through the recognition of the most relevant categories that facilitated a detailed conceptual analysis of their perspective (30). The paper-and-pencil analysis operations were then integrated using the computer program qualitative analysis software Atlas.ti, which has been precisely designed to aid researchers in qualitative data interpretation, allowing an analysis that is as objective as possible. Moreover, in order to ensure the findings would have been interpreted in an unbiased way, two of the authors have independently and simultaneously proceeded with the data analysis, and they have subsequently compared each other results, in order to check the eventual presence of high discrepancies between each other findings and to understand why this could have happened. In this study specific case however, no peculiar discrepancies have emerged and both researchers reached very similar conclusions.

RESULTS

Thirty-eight texts were collected for a total corpus of 16,454 words. The texts average 433 words each. A thematic analysis was conducted to highlight the thematic areas present in the corpus. Three main thematic areas have been identified: 1—Removal of death in contemporary culture; 2—The Importance of Community, Ritual and Funeral, and Spirituality; 3—The Significance of Death Education for Future Health Professionals.

Concerning the first thematic area, "Removal of death in contemporary culture," some of the fundamental elements that have emerged are:

— Students becoming aware of the social strategies that characterize the removal of death from the consciousness of everyday life;
— The importance of reflecting on fundamental existential themes, which in turn developed into the importance of acquiring broader categories of thought and a suitable language to give meaning to life and the pain of loss.

Concerning the second thematic area, "The importance of Community, Ritual and Funeral, and Spirituality," the main themes that have emerged are:

— Understanding the suffering of those who had to deal with the loss of a loved one during the pandemic without being able to accompany him or her and without being able to celebrate an appropriate funeral ritual;
— Reflection on the importance of the spiritual dimension, regardless of personal attitudes toward religion;
— The need for closeness with others and sharing the negative feelings caused by the pandemic.

Lastly, concerning the third thematic area, "The Significance of Death Education for Future Health Professionals," the fundamental elements that have emerged are:

— Acquisition of awareness and personal reflection, especially concerning the recognition and control of the negative emotions that occur in situations related to death;
— Better management of the social trauma caused by COVID-19 thanks of the Death Education course;
— The possibility to refocus on life instead of the fear of death;
— Recognition of the need for adequate preparation regarding the topics covered by the course.

In order to visually summarize the present fundamental thematic areas and their main sub-themes, a figure (**Figure 1**) has been created that illustrates the results findings. In the following section of the manuscript, each thematic area will be presented in depth, and quotations from the very narrations offered by participants will be presented.

First Prevalent Thematic Area: Removal of Death in Contemporary Culture

More than half of the participants acknowledged that they had reflected for the first time on the fact that death is a real cultural taboo, that it is not at all a socially accepted topic that can be freely spoken about. Valeria (28 years old) expressed for example how during the period of the pandemic, according to her, people have been forced to deal with the concept of human vulnerability and death, on a daily basis: "Suddenly, during the course, I became aware of how I had never had the chance to reflect on the meaning of death and how I could never talk about it with anyone. During the lockdown, instead, we were all forced to reckon with this censorship, because suddenly there was no other talk about it in the media, but of course everything always referred only to COVID-19. We all realized that we were absolutely unprepared for this sudden forwarding of messages related to death and this inevitably distressed us. I for one always believed that there was no point in thinking about death […]." Unlike Valeria, who expressed how before the course she had never really thought about death, Sofia (23 years old), for example reported instead she had already felt the desire to explore the theme in her life, even though it also scared her, but that was never possible and she did not know how to face this: "When I was a child and a teenager, I often felt the need to talk about it, to confront it, to tell my family how terrified I was at the idea that something

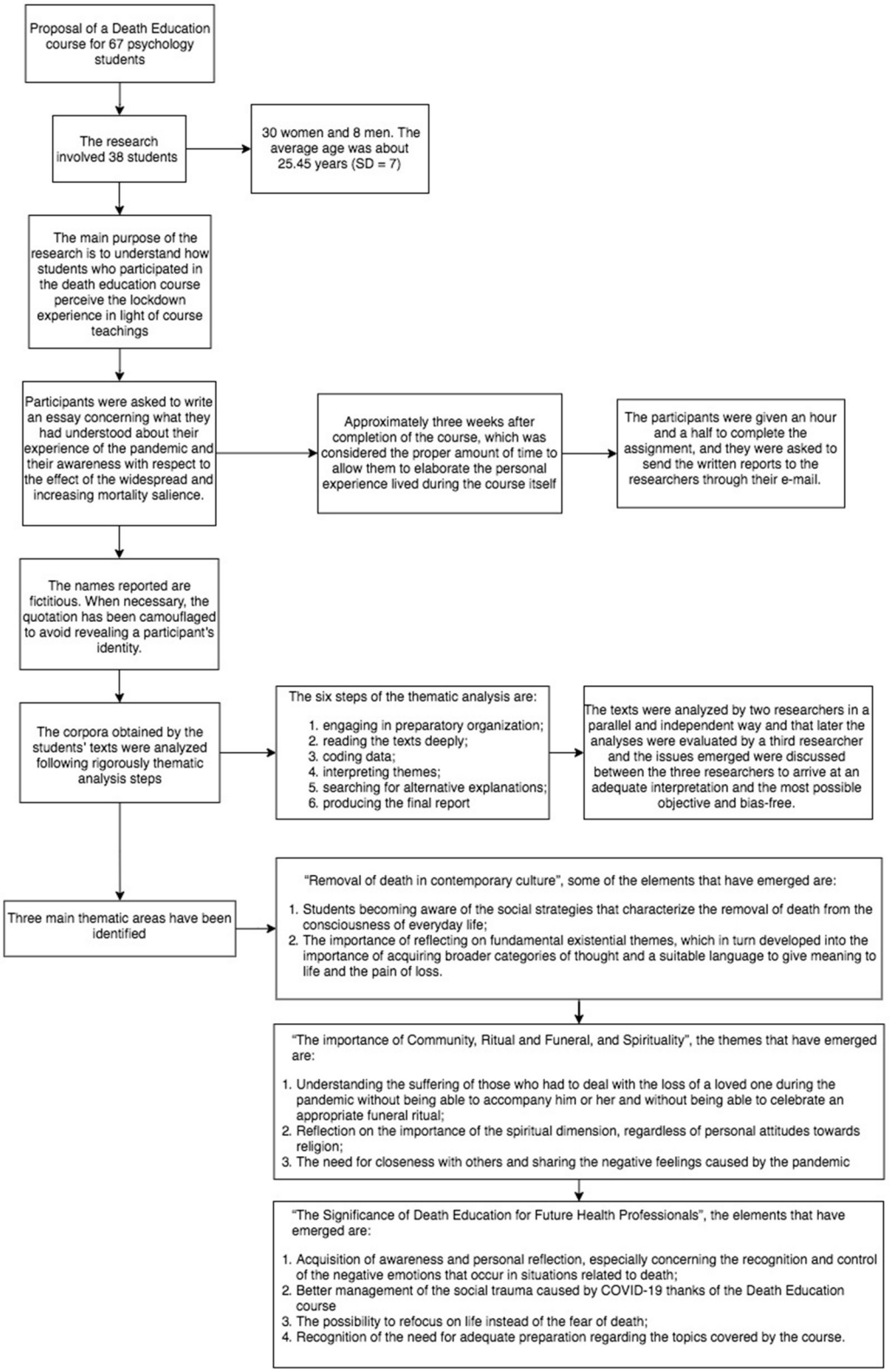

FIGURE 1 | Flowchart describing the phases of the study.

might happen to them. But it has never been possible to address this issue. I wondered what meaning life would have had if my parents had died, [. . .]. I wondered what the relationship between the meaning of life and the attachment I felt for my loved ones was."

Federico (32 years old), also expressed how the context of the pandemic made his fear of losing his parents and to die himself, even stronger, and how the course on the contrary helped him find a way to deal with this fear: "I was very scared of losing my parents and of dying myself too, however the course helped me, especially analyzing other people's different representations of death, discussing about annihilation and nothingness and especially the thought of the Italian philosopher Severino."

Alessandra (28 years old) reported as well how the pandemic has allowed her to realize how much of a taboo the theme of death is still considered: "I was surprised to realize that we live in a delusional delirium that makes us believe that we can avoid considering arguments concerning death in everyday life. I suddenly realized that we procrastinate the moment of encountering this topic for so long, that when it is necessary to deal with it we are unprepared. This is exactly what is happening now, that we are forced to deal with the anguish of death without having tools."

As evidence of what Alessandra said, Gioele (23 years old) tested in his real life the fact that people avoid talking about death and dying: "It was useful and interesting because within my group of friends, now that we have had the opportunity to meet again, we have dealt with the topic of Covid and the topic of death and I was able to feel the block we have also from a practical point of view. When we have to talk about death."

Similarly, Giulia (23 years old), expressed as well how the course helped her understand the importance of actively talking about death: "Understanding the importance of talking about death has given me the opportunity to experience firsthand how beneficial a constructive dialogue on death and fear of death can be. Perhaps the current pandemic could be managed in a different, less distressing way." Ivan (25 years old) recognized too the help given by the course, and referred it directly to his personal experience, saying: "I also noticed the decrease in my tendency to change the subject when someone communicated to me a grieving situation." In line with these considerations, Roberta (23 years old) concluded by saying that she hoped the experience of the pandemic would not lead to a new community removal of the concept of dying: "now the important thing to do is to make sure that compared to this terrible experience of the COVID-19 there is no sort of mass social removal. It would be important to find a way to process it in a meaningful way. Indeed, I have suddenly understood that it is not with the removal and avoidance of themes that remind us of our finitude, that our impact on death is avoided."

Rosa (31 years old), reported a thought very similar to Roberta's one, by saying that what the course really left her was the awareness that death is actually part of life, it is natural, and should not therefore be demonized or avoided as a theme: "I believe this is what I understood thanks to this course that I attended exactly during the pandemic: the awareness that death is a part of life, that it can happen even though we do not expect it, and that we should learn to face it serenely and to accept it, even though fearing it is unfortunately part of the social and cultural background we live in."

Similarly, Alberto (24 years old) reflected on our society and how difficult it is for it to relate with the theme of death: "This path, through the pandemic, has allowed me to reflect on the relationship between death and Western society, on how our society is not very accustomed and not very close to what is most intimate and natural the human being possesses, that is the awareness of our own finitude."

A slightly different point of view on the issue was brought by Alice (24 years old), who instead considered the professional aspect and the importance to be able to manage, as a healthcare professional, the theme of death with patients without feeling overwhelmed: "I realized the importance of beginning to speak honestly about death, how much confusion there is around these issues, both in terms of unconscious beliefs and representations, and in terms of misinformation. It is even clearer to me the importance of good information, especially if you work with those who are sick, with those who are ill."

Second Prevalent Thematic Area: The Importance of Community, Ritual and Funeral, and Spirituality

Significantly linked with the first thematic area, the second one highlighted a further discovery, that is, the importance of the accompanying rite and funeral of those who die and of the community. Indeed, the very condition of constant social and cultural removal of death and its devastating effects during a period of high mortality salience as the pandemic one brought participants to acknowledge the vital psychological and social function funeral rites possess, since they help mourners to feel embraced by their community and better elaborate their grief. This was expressed by many participants, for example by Luisa (26 years old): "I thought about those who were sick in the hospital. I felt a great relief in being able to share my fear with others, through the internet, and this allowed me to feel less alone." Similarly, Maria, a woman of 65 years old, the only participant who had a significantly different age from the rest of the group, highlighted how during the lockdown she felt it was fundamental for her to be resilient and maintain a contact, even though not physical, with her loved ones, and how the course helped her realize how fundamental social relationships are and how important it is to share feelings and fears with others especially in such periods of global crisis: "I especially felt I had to nurture my resilience in that moment by regularly having telephone and on-line contacts with my friends and relatives since I felt I could share the same experience with them. And preparing this exam has helped me in this purpose, I could take care of my loved ones even though at a distance, have authentic and supportive relationships, give voice to my fears and share them."

Giada (23 years old) proceeded in this direction as well and specified she felt the need to live even more intensely when she thought about those who were left alone to suffer: "During this lockdown, I committed myself to live more intensely the

relationship with my parents, to grow together. I looked for more moments in which we could communicate, and I thought about those who had to live the suffering alone." Costanza (23 years old) expressed the same thoughts as well: "Thinking about those who die in the hospital alone, I understood how important it is for a community that pays attention to the pain caused by death. A community is truly such if it never makes you feel alone and creates a network of support and sharing ready to help and support you in your time of need. I had never considered this important aspect of social life before." Monica (23 years old) highlighted the importance of a support network as well especially in such a delicate phase as that of the end of life: "Communication and sharing on a collective and community level of suffering are the key to improve grief processing and support people who have and are suffering now. I didn't think about this before."

These considerations on the importance of sharing and emotional support led some participants to also consider the fundamental role psychological help can have in painful and complex situations as the present one. Luca (23 years old), for example, said: "I have therefore realized how important is the profession that I hope to be able to perform in the psychological field, I thought about the support that can be given and how fundamental it is to receive it especially in situations like the one we are living." Agreeing with him, Lucia (23 years old) said: "Before this course, I had never grasped the positive aspect of being able to be next to a dying person. [. . .] Before, I had never thought about the importance of the human aspect of health care work. [. . .] Instead, understanding this, relationships become essential tools."

According to the participants, the importance of relationships is more evident in moments of difficulty, such as the pandemic, and the support of the community becomes crucial in the moment of mourning when its members gather around the mourners, as Costanza said: "I was struck by the difference between grief and mourning and the passage from the first to the second, thanks to the funeral rite and the closeness of the community. I understood that they are fundamental elements that, if they are missing, important problems can arise. For this reason, I believe that we should support those who have seen their loved ones go in an ambulance to the hospital and have not seen them come back."

But the funeral ritual is not meant to help only the suffering people to mourn. Vanessa (24 years old) commented on the function of the funeral from the point of view of collective support as well: "Thanks to this course, I understood the importance of the funeral ritual and the closeness and support of the community at that time to the mourners. I had never asked myself the question, or rather, it seemed unimportant. Now I finally understood the importance and meaning of this celebration, even though I am not a believer." Agreeing with her, Lorenzo (24 years old) said "I think that the course has helped me above all to give words to something that I already only sensed, that is the value of the rituality of death. Seeing how this had been made impossible by the rules on social distancing, and the anguish, dismay and anger that this caused in the population was like re-meaning the value of this experience."

Lastly on this thematic area, Roberta also highlighted another fundamental aspect, that is, the difference between religiosity and spirituality, which in turn allowed her to feel freer to explore the latter in her personal dimension: "Understanding that the spiritual dimension is different from religiosity and what revolves around religion has finally allowed me to open a dialogue with myself to reflect deeply on the coordinates of life. Being able to do this now, in this time of pandemic was important to me."

Third Prevalent Thematic Area: The Significance of Death Education for Future Health Professionals

The awareness of having to realistically reckon with the limit and in particular with the limit of life, put in the foreground by the pandemic, as well as the paralyzing lack of proper rites to support mourners in those moments, allowed the participants to also recognize in turn the positive aspects of sharing thoughts, opinions, and feelings within educational paths that allow to place death in a historical-cultural context, especially in moments of extreme uncertainly as the present COVID-19-related one. Participants indeed expressed that they believed proper death education paths could represent a valuable tool to strengthen people's psychological resources and help them face these complex situations. For example, according to Alberto: "Looking at death by tracing a historical, symbolic-cultural and scientific-psychological path has allowed me to acquire a greater awareness and a greater critical sense about the events that, especially during the acute phase of the pandemic, congested our windows and the media." More specifically, the course of death education has helped some participants to better understand and formulate their own way of understanding death, as for example Chiara (23 years old) expressed: "The study of themes related to death and dying has given me the opportunity to better understand how death has been understood during the various eras and in this way to become more aware of how I understand death, what value I attribute to it, giving me the opportunity to reflect on how I relate to the idea of death, especially sudden death. It seems to me that this helps me to better manage what we are living." Valeria seemed to echo: "This course has given me the tools to overcome that step of anguish that makes death fearful and unthinkable and has taught me to look at the theme in its entirety, without taking anything for granted."

Relating to this, Luigi (24 years old) expressed as well how the course helped him understand the pandemic situation and live it with more maturity: "I do not know if I am more serene than it would normally have been, but certainly opening my eyes from a scientific point of view on the topics covered in the course was the basis for reading this situation with maturity and awareness."

According to Lucia, during the course she was finally able to face the fear to talk about death she had always had: "Precisely in this period, I have given shape to this fear of talking about death, I was able to understand its origin and the great shortcomings that there are in our society." According to the participants, being able to understand topics of this magnitude allows us to treat them from a more objective point of view and with less emotional involvement, as for example Elisa (23 years old)

explained: "What helped me most was hearing about death with a critical eye and a scholar helped me to make the topic more normal and more treatable. This fact has allowed me to distance myself from the fear that death inevitably implies." The positivity of the course was also linked to the fact that it allowed to focus on life and to recognize the importance it deserves. Dealing with these issues, as Manuela (23 years old) said, makes it possible "to give more relevance to the meaning and significance of lived existence rather than the fear of the finitude of life," while in a very similar way Federica (27 years old) expressed herself: "Talking about death gives meaning to life, makes you feel more alive. This course has allowed me to face the lockdown by valuing every moment."

DISCUSSION

The present study, which has been summarized from its elaboration to its main results in **Figure 2**, aimed to explore psychology students' experiences and perspectives concerning the present COVID-19-related mortality salience situation and especially lockdown measures, in light of the death education course they attended. Concerning the theme of death and the end-of-life, international studies have indeed already highlighted how other healthcare students, especially medical and nursing ones, report not to feel adequately prepared to face these issues and support a dying patient, and how the intense need for proper death education and palliative care trainings is indeed still extremely high (31, 32).

The current COVID-19 pandemic has exacerbated this critical issue, causing intense feelings of uncertainty and high distress among healthcare students, who had to face, generally unprepared, an unprecedented sanitary crisis with extremely high deathrates (33, 34).

The present research findings have highlighted these critical aspects as well in relation to psychology students, concerning whom less studies have been conducted, who had to live and learn in the COVID-19 period, and who had to deal with a related abrupt increase in mortality salience, while attending a death education course. From the obtained results, three main forms of discovering that characterized students' feeling, and learning have emerged: first, the discovering of the removal of death in contemporary culture; second, of the importance of community, of rituals, and of funeral, but also of spirituality; and third, of the significance of the death education for future health professionals.

With respect to the first thematic area, the most important feeling students experienced was to become aware of the social strategies that characterize the removal of death from the consciousness of everyday life, realizing how this has led to a general inability to deal with the shocking experience of the pandemic. This paralyzing lack of adequate skills related to death and the end-of-life, exacerbated, and made even more evident by the pandemic, has already been reported by other healthcare students' as well in literature, especially undergraduate nurses and doctors, as has already been highlighted, who have reported how overwhelmingly unprepared they felt concerning the present sanitary emergency (35, 36). We think that the study of the TMT contents helped participants to develop a broader perspective of this problem (4). Some students also reported personal experiences, very specific ones that we omitted in this report, because they could make the participants recognizable. These testimonies described important losses and unanswered requests and needs for support. Supporting literature addressed the importance of reflecting on fundamental existential themes for healthcare students in order to acquire broader categories of thought and a suitable language to give meaning to life and the pain of loss and acquire the adequate professional skills to be able to deal with these themes in their future job (37).

The second thematic area highlighted a further discovery, significantly related to the first one, that is, the importance of the accompanying rites of those who die and funerals. This has made it possible to pay attention to and understand the suffering of those who had to deal with the loss of a loved one during the pandemic without being able to accompany him or her and without being able to celebrate an appropriate funeral ritual, and this is in line with other literature findings, which have highlighted how healthcare professionals, students, and trainees in general felt the painful burden of having to assist and support patients who were indeed dying alone and to support family members who could not properly accompany and later mourn their loved one (38, 39). In this scenario, reflection on the spiritual dimension took shape, until then underestimated. All this has been linked by students to their need for closeness with others and sharing the negative feelings caused by the pandemic, since forced isolation made them feel isolated in the moment of most intense fear. Therefore, they identified themselves with those who in hospitals could not be in contact with their loved ones. The course has therefore allowed students to discover the importance of the funeral rite and spirituality, allowing some to reconnect and explore their inner dimension regardless of their attitude toward religion (9). Other studies in literature have indeed highlighted how essential healthcare students believe receiving proper training also concerning spiritual aspects in patients' care is, and on the contrary the current lack of information and reflection upon these themes in healthcare University courses (40–42).

Lastly, the last thematic area concerned indeed the importance of death education courses for University students who will pursue careers in healthcare in the future. The issues that comprised this theme were the acquisition of awareness and personal reflection that allow recognition and control of the negative emotions that death and dying arouse; consequently, they also allow people to focus attention on life. Through the dissolution of taboos related to these topics, they have become aware and learned to recognize the negative emotions that occur in situations related to death. Finally, the positivity of the course was substantially derived from its focus on life and on the recognition of its importance. In general, all participants recognized the need for adequate preparation regarding the topics covered by the course, not only to live better and deal with these issues more serenely, but also for their future as health professionals. All participants therefore expressed only positive psychological and educational effects, valuing how much the course had allowed them to better manage the social trauma

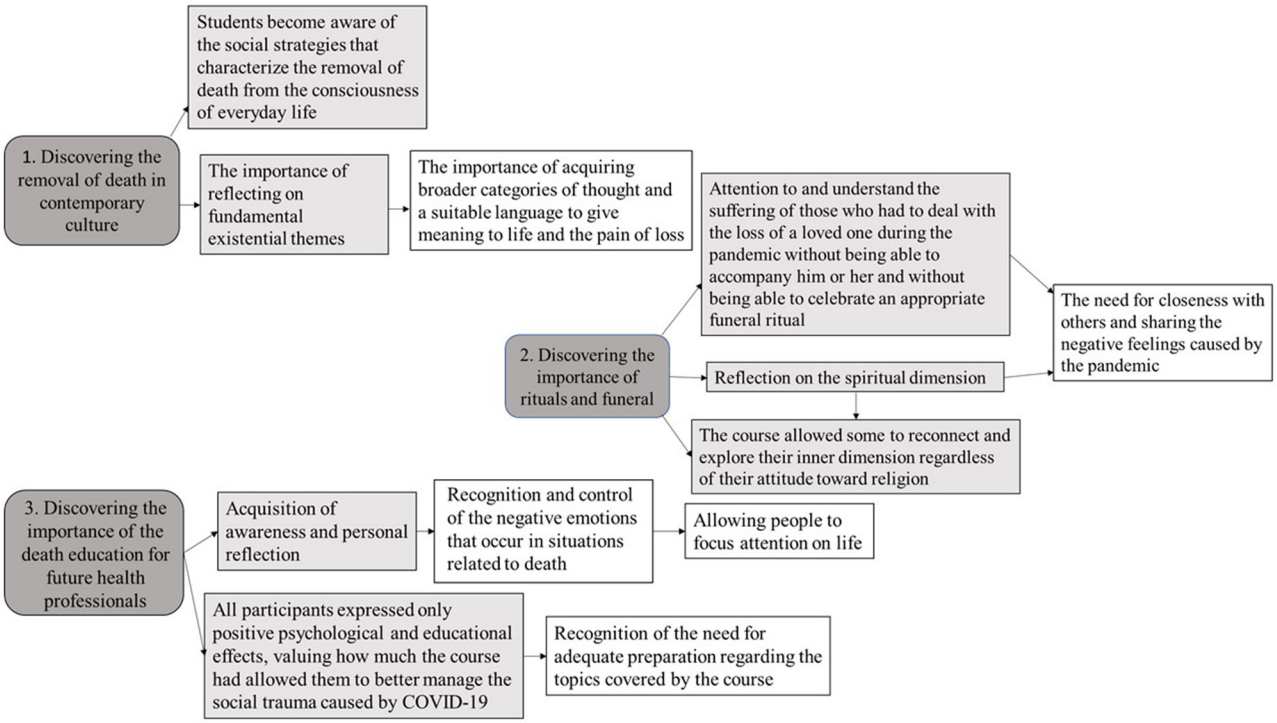

FIGURE 2 | Findings of qualitative data analysis. Main themes and their relationships.

caused by COVID-19, and this appears to be in line with other literature, and especially studies involving also other healthcare students as well, which have confirmed how important it is to implement death education pathways for University students, especially for those studying to become health professionals (43, 44), as the present results highlighted as well.

CONCLUSIONS

The present study highlighted how the death education course, conducted during the first phase of the COVID-19 pandemic in Italy, helped students become more aware of the issues addressed through contents and dialogues that encouraged participants to develop their own critical thinking. It allowed them to rediscover the value of reflection on the sense of limit, finitude of life, and the different representations of death. Since these meanings are usually taken for granted despite a general lack of awareness about the representations of death, the possibility to freely reflect upon and discuss these issues offered by the course rendered it therefore a significant tool to support participants during the confusing and highly dramatic period of the pandemic. Related to this, the research results showed also that the course helped participants consider the religious and spiritual aspect corresponding to the distal defenses indicated by TMT (4). Indeed, in line with the TMT perspective, religious and spiritual vision mitigates the concerns that arise from the awareness of death and allows people to focus their attention on everyday life without being assailed by death anxiety. Another fundamental element that has emerged from the research has been the rediscovered importance of funeral rites and to maintain a sense of community especially while facing extremely painful historical periods significantly characterized by grief. The study highlighted indeed a concrete need to address these problems and to link them to wider existential issues, such as the ability to improve reflection on the meaning of life and address the sense of limit. These results confirm once again the effectiveness of reflection on death and dying in critical periods, such as the COVID-19 pandemic, because it permits awareness of unconscious aspects that characterize the terror of death and gives them cultural and relative dimensions. This is especially important for healthcare professionals, who already find it generally difficult and rather distressing to manage the end of life of a patient due to lack of proper training on these aspects, and who therefore have to face, in this pandemic period, the additional psychological burden of dealing with even higher mortality salience and lack of proper personal and professional tools to elaborate it and break the silence and taboo that generally surrounds the experience of death, even for them. Considering this, the COVID-19 pandemic, its extremely high number of deaths and their massive burden for healthcare professionals who actively deal with them on a daily basis, represent a significant public health challenge to which more and more attention should be given in the near future. Given the current study findings therefore, the introduction and increase of death education pathways in University courses could be of great importance especially in the present situation

of COVID-19 pandemic. They could indeed help young adults obtain the proper resources and personal skills they need to adequately face this period of intense uncertainty and mortality salience, and any other future challenge there might be in store, especially for healthcare students like psychologists for example, who will need to be able to properly address these themes with their patients in the near future. Proper Death Education courses should therefore be implemented keeping in mind the need to allow students to openly discuss, without prejudices or fear, the theme of death and human vulnerability, and express the related emotions through any mean they feel could be helpful.

LIMITS AND FUTURE PERSPECTIVES

The research reports encouraging results that demonstrate the positive effects of death education; however, some limitations should be taken into account, including the inability to generalize the results given the specificity of conditions. Concerning this, future research should focus on significantly broaden the number of participants. In addition to this, the idea of a longitudinal study can be considered to see if the approach and discussion of the existential issues addressed can actually be changed and kept stable over time. Moreover, since the research participants were mostly all female, even though psychology students are usually more female than male future research could explore more precisely more male psychology students' point of view, comparing it to the one of female students. Other interesting aspects that could be investigated in future studies could also be the perspective of medical, nursing and social services students, as well as being conducted in other cultural contexts, since comparing psychology students' perspectives to the point of view of other healthcare and social services professionals could be particularly interesting and informative.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethical Committee for the Psychological Research of the University of Padua N 57BC2002FDF5CBD4292F5F86AA077F23. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

IT contributed to the research design and project planning, supervision of the research, analysis of the texts, methodology, and article writing. EI contributed to the project planning, analysis of the texts, and article writing. CC contributed to the interviews and analysis of the texts. LD contributed to the supervision, cooperation, and organization of the teamwork, and writing. SP contributed to the analysis of the texts, cooperation, and organization of the team work. HO and MW contributed to the writing. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

We thank Davide Viezzoli, Marco Antonellini, Alice Culcasi, and Gianmarco Biancalani for the help in some critical phases of the work.

REFERENCES

1. Solomon S, Greenberg J, Pyszczynski T. *The Worm at the Core: On the Role of Death in Life*. Manhattan: Random House (2015). p. 274.
2. Kosloff S, Anderson G, Nottbohm A, Hoshiko B. Proximal and distal terror management defenses: a systematic review and analysis. In: Routledge C, Vess M, editors. *Handbook of Terror Management Theory*. Cambridge, MA: Elsevier Academic Press (2019). p. 31–63. doi: 10.1016/B978-0-12-811844-3.00002-0
3. Pyszczynski T, Lockett M, Greenberg J, Solomon S. Terror management theory and the COVID-19 pandemic. *J Humanist Psychol.* (2020) 2020:0022167820959488. doi: 10.1177/0022167820959488
4. Solomon S, Testoni I, Bianco S. Clash of civilzations? Terror management theory and the role of the ontological representations of death in contemporary global crisis. *Test Psychom Methodol Appl Psychol.* (2017) 24:379–98. doi: 10.4473/TPM24.3.5
5. Courtney EP, Goldenberg JL, Boyd P. The contagion of mortality: a terror management health model for pandemics. *Br J Soc Psychol.* (2020) 59:607–17. doi: 10.1111/bjso.12392
6. Testoni I. Psicologia del lutto e del morire: dal lavoro clinico alla death education. *Psicoter Sci Uma*. (2016) 2:229–52. doi: 10.3280/PU2016-002004
7. Testoni I, Piscitello M, Ronconi L, Zsák É, Iacona E, Zamperini A. Death education and the management of fear of death via photo-voice: an experience among undergraduate students. *J. Loss Trauma.* (2019) 24:387–99. doi: 10.1080/15325024.2018.1507469
8. Testoni I, Iacona E, Fusina S, Floriani M, Crippa M, Maccarini A, et al. "Before I die I want to …": an experience of death education among University students of social service and psychology. *Health Psychol.* (2018) 5:2055102918809759. doi: 10.1177/2055102918809759
9. Testoni I, Cordioli C, Nodari E, Zsak E, Marinoni GL, Venturini D, et al. Language re-discovered: a death education intervention in the net between kindergarten, family and territory. *Ital J Sociol Educ.* (2019) 11:331–46. doi: 10.14658/pupj-ijse-2019-1-16
10. Wong W. The growth of death awareness through death education among University students in Hong Kong. *Omega.* (2009) 59:113–28. doi: 10.2190/OM.59.2.b
11. Wass H. A perspective on the current state of death education. *Death Stud.* (2004) 28:289–308. doi: 10.1080/07481180490432315
12. Kramer BJ. Preparing social workers for the inevitable. *J Soc Work Educ.* (1998) 34:211–27. doi: 10.1080/10437797.1998.10778918
13. Arndt J, Goldenberg JL. Where health and death intersect: insights from a terror management health model. *Curr Dir Psychol Sci.* (2017) 26:126–31. doi: 10.1177/0963721416689563
14. Testoni I, Palazzo L, Calamarà N, Rossi G, Wieser MA. "Imagine you have ALS": death education to prepare for advance treatment directives. *Behav Sci (Basel).* (2021) 11:6. doi: 10.3390/bs11010006

15. Testoni I, Tronca E, Biancalani G, Ronconi L, Calapai G. Beyond the wall: death education at middle school as suicide prevention. *Int J Environ Res Publ Health*. (2020) 17:2398. doi: 10.3390/ijerph17072398
16. Morris KL, Goldenberg JL, Arndt J, McCabe S. The enduring influence of death on health: insights from the terror management health model. *Self Identity*. (2019) 18:378–404. doi: 10.1080/15298868.2018.1458644
17. The Lancet. Palliative care and the COVID-19 pandemic. *Lancet*. (2020) 395:1168. doi: 10.1016/S0140-6736(20)30822-9
18. Testoni I, Ronconi L, Cupit IN, Nodari E, Bormolini G, Ghinassi A, et al. The effect of death education on fear of death amongst Italian adolescents: a nonrandomized controlled study. *Death Stud*. (2019) 44:179–88. doi: 10.1080/07481187.2018.1528056
19. Testoni I, Palazzo L, de Vincenzo C, Wieser MA. Enhancing existential thinking through death education: a qualitative study among high school students. *Behav Sci*. (2020) 10:113. doi: 10.3390/bs10070113
20. Gazzetta Ufficiale della Repubblica Italiana. *Serie Generale n.65*. Roma (19 March 2010). Available online at: https://www.gazzettaufficiale.it/eli/gu/2010/03/19/65/sg/pdf (accessed June 8, 2020).
21. Ministry of Health of Italy. *Covid-19 - Situation in Italy (Covid-19 - Situazione in Italia)*. (2020). Available online at: http://www.salute.gov.it/portale/nuovocoronavirus/dettaglioContenutiNuovoCoronavirus.jsp?area=nuovoCoronavirusandid=5351andlingua=italianoandmenu=vuoto (accessed September 15, 2020).
22. Rodríguez P, Herrán ADL, Miguel VD. The inclusion of death in the curriculum of the Spanish regions. *Compare*. (2020) 1:19. doi: 10.1080/03057925.2020.1732192
23. Rodríguez Herrero P, de la Herrán Gascón A, Pérez-Bonet G, Sánchez-Huete JC. What do teachers think of death education? *Death Stud*. (2020) 1:11. doi: 10.1080/07481187.2020.1817176
24. Camic PM, Rhoes JE, Yardley LE. *Qualitative Research in Psychology: Expanding Perspectives in Methodology and Design*. Washington DC: American Psychological Association (2003). doi: 10.1037/10595-000
25. Glaser BG, Strauss AL. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York, NY: Aldine de Gruyter (1967). doi: 10.1097/00006199-196807000-00014
26. Pietkiewicz I, Smith JA. A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychol J*. (2014) 20:1. doi: 10.14691/CPPJ.20.1.7
27. Morgan DL. *Focus Groups as Qualitative Research*. Newbury Park, CA: Sage (1997). doi: 10.4135/9781412984287
28. Testoni I, Franco C, Palazzo L, Iacona E, Zamperini A, Wieser MA. The endless grief in waiting: a qualitative study of the relationship between ambiguous loss and anticipatory mourning amongst the relatives of missing persons in Italy. *Behav Sci*. (2020) 10:110. doi: 10.3390/bs10070110
29. Testoni I, Parise G, Visintin, EP, Zamperini A, Ronconi L. Literary plastination: from body's objectification to the ontological representation of death, differences between sick-literature and tales by amateur writers. *Test Psychom Methodol Appl Psychol*. (2016) 23:247–63. doi: 10.4473/TPM23.2.8
30. Testoni I, Marrella F, Biancalani G, Cottone P, Alemanno F, Mamo D, et al. The value of dignity in prison: a qualitative study with life convicts. *Behav Sci*. (2020) 10:6. doi: 10.3390/bs10060095
31. Dimoula M, Kotronoulas G, Katsaragakis S, Christou M, Sgourou S, Patiraki E. Undergraduate nursing students' knowledge about palliative care and attitudes towards end-of-life care: a three-cohort, cross-sectional survey. *Nurse Educ Today*. (2019) 74:7–14. doi: 10.1016/j.nedt.2018.11.025
32. Galoro-Corradi ML, Duim E, Rodrigues CIS. Death and end of life: perceptions throughout the career about death, palliative care, and educational process. *J Palliat Care*. (2020). 2020:0825859720923435. doi: 10.1177/0825859720923435
33. Huang L, Lei W, Xu F, Liu H, Yu L. Emotional responses and coping strategies in nurses and nursing students during Covid-19 outbreak: a comparative study. *PLoS ONE*. (2020) 15:e0237303. doi: 10.1371/journal.pone.0237303
34. Sutherland, R. Focus: death: dying well-informed: the need for better clinical education surrounding facilitating end-of-life conversations. *Yale J Biol Med*. (2019) 92:757–64.
35. Gallagher TH, Schleyer AM. "We signed up for this!"—Student and trainee responses to the Covid-19 pandemic. *N Engl J Med*. (2020) 382:e96. doi: 10.1056/NEJMp2005234
36. Savitsky B, Findling Y, Ereli A, Hendel T. Anxiety and coping strategies among nursing students during the covid-19 pandemic. *Nurse Educ Pract*. (2020) 46:102809. doi: 10.1016/j.nepr.2020.102809
37. Henoch I, Melin-Johansson C, Bergh I, Strang S, Ek K, Hammarlund K, et al. Undergraduate nursing students' attitudes and preparedness toward caring for dying persons–a longitudinal study. *Nurse Educ Pract*. (2017) 26:12–20. doi: 10.1016/j.nepr.2017.06.007
38. Galvin J, Richards G, Smith AP. A longitudinal cohort study investigating inadequate preparation and death and dying in nursing students: IMPLICATIONS for the aftermath of the COVID-19 pandemic. *Front Psychol*. (2020) 11:2206. doi: 10.3389/fpsyg.2020.02206
39. Ho CY, Kow CS, Chia CHJ, Low JY, Lai YHM, Lauw SK, et al. The impact of death and dying on the personhood of medical students: a systematic scoping review. *BMC Med Educ*. (2020) 20:516. doi: 10.1186/s12909-020-02411-y
40. Nahardani SZ, Ahmadi F, Bigdeli S, Arabshahi KS. Spirituality in medical education: a concept analysis. *Med Health Care Philos*. (2019) 22:179–89. doi: 10.1007/s11019-018-9867-5
41. Scholz-Osório IH, Gonçalves LM, Pozzobon PM, Gaspar JJ Jr, Miranda FM, Lucchetti AL et al. Effect of an educational intervention in "spirituality and health" on knowledge, attitudes, and skills of students in health-related areas: a controlled randomized trial. *Med Teach*. (2017) 39:1057–64. doi: 10.1080/0142159X.2017.1337878
42. Smothers ZPW, Tu JY, Grochowski C, Koenig HG. Efficacy of an educational intervention on students' attitudes regarding spirituality in healthcare: a cohort study in the USA. *BMJ Open*. (2019) 9:e026358. doi: 10.1136/bmjopen-2018-026358
43. Testoni I, Bottacin M, Fortuna BC, Zamperini A, Marinoni GL, Biasco G. Palliative care and psychology education needs in nursing courses: a focus group study among Italian undergraduates. *Psicol Salute*. (2019) 20:80–99. doi: 10.3280/PDS2019-002004
44. Gocmen Baykara Z, Keles S, Demir Karabulut S, Gul S, Eren H, Durmus Iskender M, et al. The effect of professional education on medical and nursing students' attitudes toward death. *Death Stud*. (2020) 2020:1–13. doi: 10.1080/07481187.2020.1850546

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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published: 20 April 2021
doi: 10.3389/fpsyt.2021.648498

The Relationship of Fear of Death Between Neuroticism and Anxiety During the Covid-19 Pandemic

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After a lockdown, particularly one where human life is at risk, there are expected to be psychological consequences. The examination of personality traits, where different adaptative and non-adaptative behaviors in the face of adversity are expected, is our interest. The aim of this research was to analyze the role fear of personal death played during the Covid-19 outbreak in relation to personality and anxiety. The main results can be described as follows: women displayed higher scores on anxiety and fear of personal death; gender, fear of personal death, neuroticism, and extraversion predicted anxiety; in men, the fear of personal death mediated the relationship between neuroticism and anxiety.

Keywords: fear to personal death, anxiety, personality, gender, COVID-19

OPEN ACCESS

Edited by:
Efosa Kenneth Oghagbon, Benue State University, Nigeria

Reviewed by:
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Specialty section:
This article was submitted to Mood and Anxiety Disorders, a section of the journal Frontiers in Psychiatry

Received: *31 December 2020*
Accepted: *22 March 2021*
Published: *20 April 2021*

Citation:
Pérez-Mengual N, Aragonés-Barbera I, Moret-Tatay C and Moliner-Albero AR (2021) The Relationship of Fear of Death Between Neuroticism and Anxiety During the Covid-19 Pandemic. Front. Psychiatry 12:648498. doi: 10.3389/fpsyt.2021.648498

INTRODUCTION

The Coronavirus Disease 2019 (Covid-19) was first detected around December 2019 in the town of Wuhan, China. While a variety of restriction measures were employed by different countries, home isolation was one of the most common (1). Lockdown is understood as the restriction of movement with the aim to reduce the virus spread across a population. Side effects due to this drastic measure have been described in the literature (2). From a psychological level, the current situation generates concern and anxiety in individuals. Despite the fact that there is still not enough scientific literature to observe the long-term consequences, negative effects are anticipated (3). However, mortality information is widespread in the media and not surprisingly, feelings such as hopelessness, uncertainty, and fear of death are present in the population (4). These feelings can also be the consequence of perceived threat or triggering behaviors in search of self and community safety because life as we have known it up until now is changing. With time, they can become maladaptive, as well as result in hypervigilance and avoidance (5).

With regards to mental health, levels of anxiety, depression, and stress during the outbreak of Covid-19 have been described in the literature. According to Roma et al. (6), during a 2-month follow-up study carried out using an online questionnaire in Italy, an increase in stress and depression, but not in anxiety, was reported during confinement. Negative affect and detachment were also associated with higher levels of depression and stress. On the other hand, an online study by González-Sanguino et al. (7), described high levels of anxiety and depression, but also found a gender divide. They determined that women were more likely to report symptoms related to anxiety, depression, and post-traumatic stress disorders (8–10).

Regarding individual variables, it seems important to remember that personality traits have been associated with health behavior. Particularly, one of the most studied traits is neuroticism, which is often associated with inherent health concerns (11). Moreover, Mortensen et al. (12) showed that other features such as pleasantness, extraversion, and openness to experience are related to the prevention of infectious diseases and healthy behaviors. Furthermore, using the Big Five Traits model in a study aimed to address the protection factors for anxiety and depression during the Covid-19 pandemic in relation to personality traits, researchers found that extraversion, agreeableness, conscientiousness, and openness were negatively associated with generalized anxiety, but not neuroticism, which was positively correlated with generalized anxiety and depression. This is of interest as neuroticism is significantly related to generalized anxiety and depression (13).

In a prior study, Fitzpatrick et al. (14); Muris et al. (15) linked the neurotic personality to generalized anxiety. In this study, we will address this relationship when the fear of death manifests, as in the current pandemic, as well as explore what gender differences are expected. The literature has suggested that certain human behaviors could be explained through an attempt to receive psychological equanimity in the face of death (16). In this regard, outcomes inherent to individuals with a history of substance abuse employ suicide as a way to have control over their death, or fear of death (17). According to Ghazaei et al. (18), there is a paradoxical relationship between the evidence that death is inevitable and the instinctive desire to live. This work aims to measure the risk of these students based on religious orientation and fear of death. The results suggested that religious orientation and high-risk behavior was mediated by fear of death. Even if this mediation has not been examined in the current pandemic, to our knowledge, Liu et al. (19) highlight the importance of knowing the mediators between personality and stress to develop effective interventions designed to manage stress symptoms during a pandemic. Thus, the aim of this research is to study the mediation role of fear of death in the relationship between personality and generalized anxiety during the Covid-19 outbreak. It is hypothesized that fear of death mediates the prediction between neuroticism and anxiety, and differences between men and women are expected.

METHOD

Participants

A total of 303 Spanish participants volunteered to participate in the current study, from whom 40.9% were men and 59.1% were women. The age mean was 39.42 (SD = 12.01) with a range from 18 to 72. With regards to marital status, 31.7% were single, 62.7% were married or living with their partner, 1% widowed, and 4.6% were divorced. A total of 71.6% of the participants had to manage work with other familiar responsibilities, 10.6% were unemployed, 4% were retired, 8.6% were students, and 5.3% worked as a domestic helper without a fixed contract. The study was carried out in accordance with the Declaration of Helsinki and approved by the University ethical committee (UCV/2020-2021/041). Participants gave online consent to participate in the study.

Materials

After a battery on sociodemographic data prepared for the present study, where the question "*I fear for my life because of Covid-19,*" was developed *in situ* with a similar procedure as Murphy and Moret-Tatay (8). This statement was answered in a Likert scale from 1 to 10 points. Next, the Generalized Anxiety Scale was employed [GAD-7; (20)] in its Spanish adaptation by Garcia-Campayo et al. (21). This is 7-item screening scale for anxiety disorders in the last 2 weeks, e.g., "*You have had difficulty relaxing*." According McDonald's ω, the internal consistency was = 0.92.

Lastly, the BFI10 [Short Personality Scale; (22)] was also included in its Spanish adaptation (23). The questionnaire based on the MCF (Openness, Extraversion, Kindness, Responsibility, and Emotional Stability) presents an internal consistency between 0.80 and 0.90 in the literature. The BFI10 has 10 short statement items, two for each dimension, e.g., *I see myself as an extraverted person*. According McDonald's ω, the internal consistency was = 0.42. Even if this was not an optimal value, researchers have reported similar results in the literature. As stated by Gosling et al. (24) that criteria like alpha and clean factor structures are only meaningful to the extent they reflect improved validity and a more appropriate index would be test-retest reliability.

Procedure

The study was carried out during the last week of December 2020. A cross-sectional design, relying on online self-reports under a snowball sampling was employed. Thus, sampling procedure was incidental, under a small pool of initial informants who shared the online questionnaire in their institutional and social networks. The questionnaire was self-administered, and participants were volunteers who completed the necessary informed consent documentation.

Data Analysis

Data analysis was performed using JASP (Version 0.12.2) [Computer software]. Descriptive analysis and correlational analysis under Pearson coefficient were carried out. Moreover, a *t*-test for independent samples across gender, as well as its effect size under Cohen's d', and a linear regression model on the prediction of anxiety were carried out. This procedure was also taken into consideration as different confounders might occur, but it also to previously examine and avoid collinearity across variables. This involved procedures such as evaluating outliers or the independence of linearly uncorrelated residuals as depicted in previous literature (25). The statistical analysis for the mediation model was performed using SPSS 22 (IBM) under the Process macro for SPSS (26) to test the hypothesis that death fear mediates the effect of personality on anxiety. This is described as the Model 4 in the Hayes' Process Marco. In this way, Regression-based procedures were executed employing bootstrapping procedures using 10,000 samples (27, 28). The average estimate for indirect effect from the bootstrap samples, standard error, and lower and upper confidence limits were calculated. In this way, if the 95% confidence limits include zero, the indirect effect test is not significant (29).

TABLE 1 | Descriptive statistics on the variables under study and correlations among each other's.

	Mean (SD)	1	2	3	4	5	6	7	8
Age (1)	39.42 *(12.01)*	–							
Death fear (2)	5.43 *(2.52)*	0.19**	–						
Anxiety (3)	9.18 *(5.52)*	−0.09	0.41**	–					
Openness (4)	7.50 *(1.52)*	0.13*	−0.05	−0.15**	–				
Extraversion (5)	7.24 *(1.98)*	0.03	0.02	−0.17**	0.31**	–			
Conscientiousness (6)	7.52 *(1.74)*	0.21**	0.04	−0.17**	0.12*	0.17**	–		
Agreeableness (7)	8.08 *(1.52)*	0.09	−0.09	−0.25**	0.19**	0.06	0.30**	–	
Neuroticism (8)	4.94 *(2.01)*	−0.19**	0.21**	0.60**	−0.17**	−0.17**	−0.40**	−0.50**	–

*$p < 0.05$, **$p < 0.01$.

TABLE 2 | Regression coefficients on the prediction of anxiety.

Model	B	SE	β	*t*	*p*
(Intercept)	−1.380	2.600		−0.531	0.596
Death fear	0.615	0.102	0.280	6.020	<0.001
Extraversion	−0.257	0.127	−0.092	−2.015	0.045
Conscientiousness	0.072	0.157	0.023	0.459	0.647
Agreeableness	0.122	0.183	0.034	0.665	0.507
Neuroticism	1.449	0.152	0.527	9.528	<0.001
Openness	−0.075	0.166	−0.021	−0.453	0.651
Age	−0.028	0.021	−0.062	−1.364	0.174
Gender	1.301	0.523	0.116	2.489	0.013

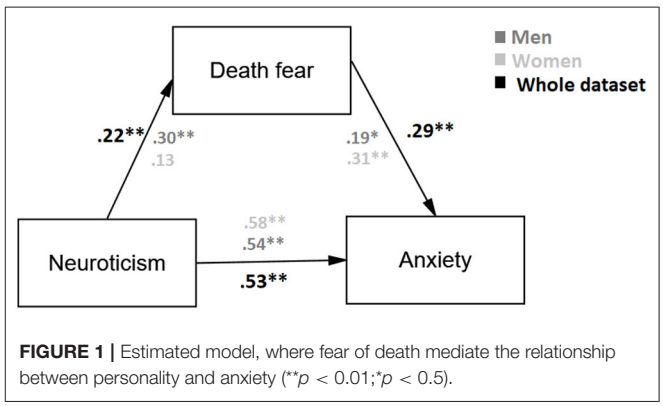

FIGURE 1 | Estimated model, where fear of death mediate the relationship between personality and anxiety (**$p < 0.01$;*$p < 0.5$).

RESULTS

Descriptive analysis was carried out on the variable of interest for the whole dataset, as well as Pearson's correlations, as depicted in **Table 1**. The strongest relationships were found between neuroticism and anxiety, and fear of death and age. A student's *t*-test between gender was carried out for the variables under study. As expected, the scores were higher for women than men and these statistical differences were found for fear of death (M_{ean} = 4.58 vs. M_{ean} =6.02; $t_{(301)} = 5.11$; $p < 0.001$; Cohen's $d = -0.59$) Conscientiousness ($M_{ean} = 7$ vs. $M_{ean} = 7.88$; $t_{(301)} = 4.49$; $p < 0.001$; Cohen's $d = -0.46$) and Anxiety ($M_{ean} = 7.69$ vs. $M_{ean} = 10.21$; $p < 0.001$; $t_{(301)} = 3.99$; Cohen's $d = -0.52$).

A linear regression was carried out on the prediction of anxiety and on the target variables under the study predictors. The gender variable was included in the analysis as a dummy variable. The Adjusted R^2 for the whole data set was 0.47, and the resulting model was statistically significant; $F_{(8,\ 302)} = 32.72$; MSE = 543.15; $p < 0.001$. **Table 3** depicts the coefficients and variables included in the model. **Table 2** depicts the regression coefficients for the model. These indicated that the highest coefficient to predict anxiety was neuroticism, followed by fear of death, gender, and extraversion.

Lastly, a mediation analysis was carried out. Personality was considered an independent variable; fear of death was considered a mediator, and anxiety was a dependent variable. As expected, the only trait of personality that had statistical significance was Neuroticism. This model was conducted between women and men of the whole data set (see **Figure 1**). **Table 3** depicts the confidence interval (CI) at 95% was statistically significant and a confidence interval that does not include the zero value.

TABLE 3 | Effect of X (Neuroticism) on Y (Anxiety), Standard error (SE), statistical significance, and lower and upper (LLCI and ULCI) levels.

Model	X on Y effect	Effect	SE	*t*	*p*	LLCI	ULCI
Whole dataset	Total	0.60	0.04	13.90	<0.001	0.51	0.68
	Direct	0.54	0.07	12.07	<0.001	0.44	0.62
	Indirect	0.06	0.02	–	–	0.02	0.11
Men	Total	0.60	0.06	9.47	<0.001	0.47	0.72
	Direct	0.54	0.07	7.27	<0.001	0.39	0.69
	Indirect	0.05	0.02	–	–	0.01	0.13
Women	Total	0.58	0.06	9.84	<0.001	0.46	0.69
	Direct	0.54	0.05	9.41	<0.001	0.43	0.65
	Indirect	0.04	0.02	–	–	−0.001	0.09

CONCLUSIONS AND DISCUSSION

After lockdown, psychological consequences in the population are expected. According to literature of the most common mental symptoms in the general population, are related to symptoms of depression. The traits that are of interest for the current the pandemic include being a woman, young age, being a student, a low level of education or even "overeducation" (30, 31). Overeducation is defined as having a level of education

higher than what is required for a specific job (32). Since personality traits are of interest, it is important to note that we expect different adaptative and non-adaptative behaviors to face adversity (12, 15). The aim of this research was to analyze the role of fear of personal death during the Covid-19 outbreak in the relationship between personality and anxiety. Findings can be described as followed; women displayed higher scores on anxiety and fear of personal death; gender, fear of personal death, neuroticism, and extraversion all predicted anxiety; in men, but not women, the fear of personal death mediated the relationship between neuroticism and anxiety.

Current results support that neuroticism, as a personality trait, is significantly associated with anxiety during the Covid-19 outbreak and other factors such as worry related to fear (14, 33). Moreover, a mediation effect was found for men, suggesting that this group might experience higher anxiety when comparing fear of death found in women. Eshbaugh and Henninger (34) pointed out that women report a greater level of anxiety related to death than men do, however, as also indicated by the authors, mediation analysis are lacking in the field. Thus, the case of women would be more complex. This might depict a vulnerable situation for this profile; that is why these results might be of interest for both theoretical and applied levels of personality traits and death awareness.

According to Ahorsu et al. (35), infectious disease such as Covid-19 lead to psychosocial challenges including stigmatization and/or discrimination. Particularly, men with the high levels of fear, may not think clearly and rationally when reacting to Covid-19 because of high levels of anxiety. Thus, we consider that understanding its role might shed light for health programs from a holistic perspective. Furthermore, it has also been hypothesized that women often have the role of providing care for older relatives and in the raising and care of children, attributed in most cases to the gender role, which leads to an increase in workload. Thus, the "pandemic fear" might involve more agents in this group, as depicted in previous literature (36). Blurring situation between work, health, and life obligations might buffer fear to personal death in this profile, but its relationship might be even more complex for women. In fact, previous literature found that anxiety sensitivity and panic-related appraisals mediated gender differences in phobic avoidance (37). Moreover, González-Sanguino et al. (7), in a study assessing the emotional consequences of the COVID-19 pandemic, concluded that women were more likely to develop anxiety, depressive and post-traumatic stress symptoms. Pappa et al. (9) also found similar results regarding gender, observing that women who were dedicated to the field of health, obtained higher results than men who worked in the same occupational field. These gender differences can be considered as a way of gender inequality.

On the other hand, and according to the traditional Terror Management Theory (TMT), which is not as cited or popular of a theory today, self-preservation gives rise to a certain existential terror that can act raising anxiety to attitudes and cultural aspects or shared beliefs about reality, as well as other variables (38, 39). The emergence of different and, most of the time, polarized views on the Covid-19 could describe the dynamic interaction between individual and cultural differences which might also be related, among others, to gender roles (40). In this scenario, the main implications of the current results might be linked to understanding individual differences. These can be crucial and helpful recognizing the Covid-19 health footprint.

As differences between gender on the role of fear of death have been found, future lines of research should address differences between emotional and problem focus coping when facing adversity, since gender differences have been described in previous literature (31). This might depict differences strategies that might interfere with gender that are of interest in order to avoid potential confounders in a mediation analysis. The main limitation that arises in this study is that the sample was selected through non-probability sampling under a cross-sectional design, which can introduce distortions in the results. Moreover, data was recruited in a self-informed way. Furthermore, validated tools in assessing fear of death were not employed. In this way, future lines of research should adapt tools such as the "Fear of COVID-19 Scale" (35) in the Spanish population. One should not ignore fear of Covid-19 when studying fear of death. Thus, we expect that these results will be a starting point for future research along these lines. Another variable of interest would be if participants have experienced the loss of relatives/friends because of Covid-19, as it might increase the psychological suffering and the process of fear of personal death (41). Lastly, specific mental health conditions were not recruited in the current study since a higher susceptibility to stress compared with the general population might occur, this is also of interest for further research in the field (42).

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by UCV. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial equally, direct and intellectual contribution to the work, and approved it for publication.

ACKNOWLEDGMENTS

We would like to thank the participants involved in the study, Abigail G. Wester, the Editor, and the reviewers for all their invaluable time, all their commentaries, and help. We would also like to thank Frontiers for funding the current research.

REFERENCES

1. Zhu Y, Wang C, Dong L, Xiao M. Home quarantine or centralized quarantine, which is more conducive to fighting COVID-19 Pandemic?. *Brain Behav Immun.* (2020) 87:142–3. doi: 10.1016/j.bbi.2020.05.009
2. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* (2020) 395:912–20. doi: 10.1016/S0140-6736(20)30460-8
3. Rodríguez-Quiroga A, Buiza C, de Mon MÁ, Quintero J. COVID-19 y salud mental. *Medicine.* (2020) 13:1285–96. doi: 10.1016/j.med.2020.12.010
4. Sandín B, Valiente RM, García-Escalera J, Campagne DM, Chorot P. Psychological impact of the COVID-19 pandemic: negative and positive effects in Spanish population during the mandatory national quarantine. *J Psychopathol Clin Psychol.* (2020) 25:1–21. doi: 10.5944/rppc.28107
5. Hisham IN, Townsend G, Gillard S, Debnath B, Sin J. COVID-19–The Perfect Vector for a Mental Health Epidemic. *Br J Psychiatry.* (2020) 217:469–70. doi: 10.1192/bjb.2020.60
6. Roma P, Monaro M, Colasanti M, Ricci E, Biondi S, Di Domenico A, et al. A 2-month follow-up study of psychological distress among Italian people during the COVID-19 lockdown. *Int J Environ Res Public Health.* (2020) 17:8180. doi: 10.3390/ijerph17218180
7. González-Sanguino C, Ausín B, ÁngelCastellanos M, Saiz J, López-Gómez A, Ugidos C, et al. Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain Behav Immun.* (2020) 87:172–6. doi: 10.1016/j.bbi.2020.05.040
8. Murphy M, Moret-Tatay C. Personality and attitudes confronting death awareness during the COVID-19 outbreak in Italy and Spain. *Front Psychiatry.* (2021) 12:627018. doi: 10.3389/fpsyt.2021.627018
9. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Brain Behav Immun.* (2020) 88:901–7. doi: 10.1016/j.bbi.2020.05.026
10. Sartorao Filho CI, Rodrigues WCDLV, de Castro RB, Marcal AA, Pavelqueires S, Takano L, et al. Impact of covid-19 pandemic on mental health of medical students: a cross-sectional study using GAD-7 and PHQ-9 questionnaires. *medRxiv [Preprint].* (2020). doi: 10.1101/2020.06.24.20138925
11. Van Dijk SDM, Hanssen D, Naarding P, Lucassen P, Comijs H, Oude Voshaar R. Big five personality traits and medically unexplained symptoms in later life. *Eur Psychiatry.* (2016) 38:23–30. doi: 10.1016/j.eurpsy.2016.05.002
12. Mortensen CR, Becker DV, Ackerman JM, Neuberg SL, Kenrick DT. Infection breeds reticence: the effects of disease salience on self-perceptions of personality and behavioral avoidance tendencies. *Psychol Sci.* (2010) 21:440–7. doi: 10.1177/0956797610361706
13. Nikčević AV, Marino C, Kolubinski DC, Leach D, Spada MM. Modelling the contribution of the big five personality traits, health anxiety, and COVID-19 psychological distress to generalised anxiety and depressive symptoms during the COVID-19 pandemic. *J Affect Disord.* (2020) 279:578–84. doi: 10.1016/j.jad.2020.10.053
14. Fitzpatrick KM, Drawve G, Harris C. Facing new fears during the COVID-19 pandemic: the state of America's mental health. *J Anxiety Disord.* (2020) 75:102291. doi: 10.1016/j.janxdis.2020.102291
15. Muris P, Roelofs J, Rassin E, Franken I, Mayer B. Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Pers Individ Differ.* (2005) 39:1105–11. doi: 10.1016/j.paid.2005.04.005
16. Chistopolskaya K, Enikolopov S. Defenses against the fear of death in postsuicide. *Proc Soc Behav Sci.* (2013) 86:64–9. doi: 10.1016/j.sbspro.2013.08.526
17. Daradkeh F, Fouad Moselhy H. Death anxiety (thanatophobia) among drug dependents in an Arabic psychiatric hospital. *Am J Drug Alcohol Abuse.* (2011) 37:184–8. doi: 10.3109/00952990.2010.546923
18. Ghazaei M, Mahlegha F, Leyly RS. Testing the high-risk behavior model among the students based on religious orientation with the mediation of fear of death. *OMEGA J Death Dying.* (2020). doi: 10.1177/0030222820941277. [Epub ahead of print].
19. Liu S, Lithopoulos A, Zhang CQ, Garcia-Barrera MA, Rhodes RE. Personality and perceived stress during COVID-19 pandemic: Testing the mediating role of perceived threat and efficacy. *Personal Indiv Differ.* (2020) 168:110351. doi: 10.1016/j.paid.2020.110351
20. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med.* (2006) 166:1092–7. doi: 10.1001/archinte.166.10.1092
21. García-Campayo J, Zamorano E, Ruiz MA, Pardo A, Pérez-Páramo M, López-Gómez V, et al. Cultural adaptation into Spanish of the generalized anxiety disorder-7 (GAD-7) scale as a screening tool. *Health Qual Life Outcomes.* (2010) 8:8. doi: 10.1186/1477-7525-8-8
22. Rammstedt B, Kemper CJ, Klein MC, Beierlein C, Kovaleva A. A short scale for assessing the big five dimensions of personality: 10 item Big Five Inventory (BFI-10). *Methods Data Analy.* (2013) 7:17. doi: 10.12758/mda.2013.013
23. Ortet G, Martínez TM, Mezquita L, Ibáñez Ribes MI. Big five personality trait short questionnaire: preliminary validation with Spanish adults. *Span J Psychol.* (2017) 20:E7. doi: 10.1017/sjp.2017.8
24. Gosling SD, Rentfrow PJ, Swann WB Jr. A very brief measure of the big five personality domains. *J Res Pers.* (2003) 37:504–28. doi: 10.1016/S0092-6566(03)00046-1
25. Wiedermann W, Li X. Confounder detection in linear mediation models: performance of kernel-based tests of independence. *Behav Res Methods.* (2020) 52:342–59. doi: 10.3758/s13428-019-01230-4
26. Hayes AF. An index and test of linear moderated mediation. *Multivar Behav Res.* (2015) 50:1–22. doi: 10.1080/00273171.2014.962683
27. Moret-Tatay C, Lami A, Oliveira CR, Beneyto-Arrojo MJ. The mediational role of distracting stimuli in emotional word recognition. *Psicologia.* (2018) 31:1. doi: 10.1186/s41155-017-0082-8
28. MacKinnon DP, Fairchild AJ. Current directions in mediation analysis. *Curr Dir Psychol Sci.* (2009) 18:16–20. doi: 10.1111/j.1467-8721.2009.01598.x
29. Hayes AF, Scharkow M. The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: does method really matter? *Psychol Sci.* (2013) 24:1918–27. doi: 10.1177/0956797613480187
30. Bracke P, Pattyn E, von dem Knesebeck O. Overeducation and depressive symptoms: diminishing mental health returns to education. *Sociol Health Illn.* (2013) 35:1242–59. doi: 10.1111/1467-9566.12039
31. Moret-Tatay C, Beneyto-Arrojo MJ, Laborde-Bois SC, Martínez-Rubio D, Senent-Capuz Gender N. Coping, and mental health: a bayesian network model analysis. *Soc Behav Personal Int J.* (2016) 44:827–35. doi: 10.2224/sbp.2016.44.5.827
32. McGuinness S. Overeducation in the labour market. *J Econ Surv.* (2006) 20:387–418. doi: 10.1111/j.0950-0804.2006.00284.x
33. Morales-Vives F, Dueñas JM, Vigil-Colet A, Camarero-Figuerola M. Psychological variables related to adaptation to the COVID-19 lockdown in Spain. *Front Psychol.* (2020) 11:2438. doi: 10.3389/fpsyg.2020.565634
34. Eshbaugh E, Henninger W. Potential mediators of the relationship between gender and death anxiety. *Indiv Differ Res.* (2013) 11:22–30.
35. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The fear of COVID-19 Scale: development and initial validation. *Int J Ment Health Addict.* (2020). doi: 10.1007/s11469-020-00270-8. [Epub ahead of print].
36. Ornell F, Schuch JB, Sordi AO, Kessler FHP. "Pandemic fear" and COVID-19: mental health burden and strategies. *Brazilian J Psychiatry.* (2020) 42:232–5. doi: 10.1590/1516-4446-2020-0008
37. Schmidt NB, Koselka M. Gender differences in patients with panic disorder: evaluating cognitive mediation of phobic avoidance. *Cognit Therapy Res.* (2000) 24:533-50. doi: 10.1023/A:1005562011960
38. Ahmed R, Ahmed A, Barkat W. Behavioral limitations of individuals for coping with COVID-19: a terror management perspective. *J Hum Behav Soc Environ.* (2020) 1–22. doi: 10.1080/10911359.2020.1835778
39. Pyszczynski T, Greenberg J, Solomon S. A dual-process model of defense against conscious and unconscious death-related thoughts: an extension of terror management theory. *Psychol Rev.* (1999) 106:835. doi: 10.1037/0033-295X.106.4.835
40. Pyszczynski T, Lockett M, Greenberg J, Solomon S. Terror management theory and the COVID-19 pandemic. *J Hum Psychol.* (2020) 61:173–89. doi: 10.1177/0022167820959488

41. Júnior JG, Moreira MM, Neto MLR. Silent cries, intensify the pain of the life that is ending: the COVID-19 is robbing families of the chance to say a final goodbye. *Front. Psychiatry*. (2020) 11:773. doi: 10.3389/fpsyt.2020.570773
42. Júnior JG, de Sales JP, Moreira MM, de Lima CKT, Neto MLR. spiritual beliefs, mental health and the 2019 coronavirus (2019-nCoV) outbreak: what does literature have to tell us? *Front Psychiatry*. (2020) 11:439. doi: 10.3389/fpsyt.2020.570439

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer PR declared a shared affiliation with one of the authors CM-T, to the handling editor at time of review.

frontiers in Sociology

BRIEF RESEARCH REPORT
published: 30 April 2021
doi: 10.3389/fsoc.2021.648149

Rituals of Containment: Many Pandemics, Body Politics, and Social Dramas During COVID-19 in Pakistan

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Infecting millions of people, causing around two million deaths, and affecting billions of people worldwide during January 2021, the coronavirus 2019 (COVID-19) pandemic is not merely one pandemic but many. These many pandemics, which I identify herein, have revealed the overt and subtle entanglements among religion, science, and politics around COVID-19. Building on my current ethnographic research on COVID-19 using purposive sampling and interview guide in Pakistan, and borrowing from various anthropological concepts such as "social drama," proposed by Victor Turner, and ritual, I have developed a concept that I call *rituals of containment.* With this concept, I extend my previous argument regarding "symbolic ownership" to show a visible "body politics" by demonstrating how religion, science, and politics around COVID-19 are entangled at individual and government levels. This has become observable through the rituals of the Pakistani government of containment to deal with COVID-19. Such entanglements are visible in the case of strategies to tackle infected "viral bodies," as the government has enacted its authority: (1) to bury what I am terming the *dead viral body* without its beloved ones present; (2) to return or not to return this body to family members in a coffin; (3) or to provide the grieving family with a symbolic empty coffin. These Covidian politics have led to the question: Who in actuality owns the body? In conclusion, I argue that the problem lies in the discriminatory and contradictory rituals of containment of the government, not in using scientific evidence and guidelines.

Keywords: COVID-19, death rituals, many pandemics, political pandemic, social pandemic, body politics, social drama, Pakistan

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Achmad Nurmandi, Muhammadiyah University of Yogyakarta, Indonesia
Eko Priyo Purnomo, Eko Priyo Purnomo, Indonesia

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Specialty section:
This article was submitted to Medical Sociology, a section of the journal Frontiers in Sociology

Received: *31 December 2020*
Accepted: *25 March 2021*
Published: *30 April 2021*

Citation:
Ali I (2021) Rituals of Containment: Many Pandemics, Body Politics, and Social Dramas During COVID-19 in Pakistan. Front. Sociol. 6:648149. doi: 10.3389/fsoc.2021.648149

INTRODUCTION: MULTIPLE PANDEMICS

Starting in late 2019 and becoming a pandemic in the spring of 2020, the almost yearlong the coronavirus 2019 (COVID-19) pandemic has directly or indirectly, visibly or invisibly affected us all. By January 2021, the novel coronavirus had infected around 102 million people and caused around 2.2 million deaths worldwide (Johns Hopkins University, 2021). These epidemiological data, although significant, demonstrate only some of the critical implications of the pandemic. Numbers alone cannot reveal the structured vulnerabilities and politics at play around COVID-19, yet critical anthropological analysis can. From an anthropological perspective, I see COVID-19 as much more than a medical pandemic. It is also an "economic pandemic," a "social pandemic," a "structural pandemic," an "emotional/psychological pandemic," and a "political pandemic."

With the term "economic pandemic," I index the financial or resource-related impacts of the pandemic as, globally, COVID-19 has caused and is continuing to cause a significant increase in poverty (see Pereira and Oliveira, 2020). By "social pandemic," I mean the implications of COVID-19 for social systems worldwide, as values, norms, and mores have been greatly influenced and significantly changed, including those within individual families. With "structural pandemic," I refer to the social, ethnic, geographic, and economic stratifications that have allowed the impacts of this disease to fall most heavily on the poor and marginalized.

The term "emotional/psychological pandemic" connotes the enormous emotional and psychological tolls the coronavirus pandemic has taken on individuals around the world (see for example Cullen et al., 2020). These include the emotional impacts on families due to the interruption of death rites caused by the common prohibitions on group gatherings, often robbing people of the chance to say their final goodbyes (Gonçalves Júnior et al., 2020). I use the label "political pandemic" to index the contested politics and governmental mistrust that have been woven around COVID-19 at local, national, and global levels (see Liu and Bennett, 2020). The well-publicized political contestations between China and the US constitute a good example (Ali, 2020b,c), as does the mistrust shown by many Pakistanis toward the government viral containment policies, which they perceive as efforts to monitor them and control their movements (Ali, n.d.). Different narratives have emerged worldwide (Ali, 2020b,c; Mukhtar, 2021) as politicians have played various "political cards," such as using militarized terminology and invoking religion, patriotism, or nationalism in the "war" against the coronavirus (see Whyte, 2020). These metaphors are "conceptual apparatuses," or "rhetorical tool[s]" embedded in sociocultural, political, economic, and ideological structures and processes that influence imaginaries and behaviors (Bates, 2020; Castro Seixas, 2021). Revealing "securitization" (Buzan et al., 1998), metaphors have exposed "the discursive acts of justification of extraordinary means to eliminate a threat" while working "as a strategic persuasive master frame that is articulated by elites and passed through media coverage, to convince various publics of the appropriateness of the employed [containment] measures" (Lukacovic, 2020).

All of these pandemics, be it economic, social, structural, emotional/psychological, or political, are relevant to my discussion below of *dead viral bodies* and how these are treated by the Pakistani government, as they all involve, what I term, *rituals of containment*. Informed by the definition by Robbie Davis-Floyd (2003 [1992]) of a ritual as "a patterned, repetitive, and symbolic enactment of a cultural (or individual) belief or value," by this term, I index dealings of the Pakistani government (and, later on, of the individual families) with the pandemic. Such rituals symbolically enact the values of the government on the kinds of politics that employ religion, language, and science to accomplish its goals. In these rituals of containment, which involve containing the virus, containing the bodies it kills, and containing the emotional reactions of people to its treatment of these dead viral bodies, the Pakistani government, like many worldwide, exerts what Galtung (1969) called "invisible violence" or what Paul Farmer (2004) termed "structural violence" or Kleinman et al. (1997) called "social suffering."

Building on my previous work on shifting the meaning of a "normal body" to a "viral body" in Pakistan, which is a concept I developed to index the still-contagious nature of a body that died due to COVID-19 (Ali, 2021), and on the relevant literature, herein, I will construct a thorough picture of rituals of containment.

METHODS AND MATERIALS

Research Design

It is indispensable to mention that this is a brief report article that is part of my long-term project on COVID-19, approved by Pakistan's National Bioethical Committee (reference No. 4-87/NBC-471-COVID-19-09/20/). Building on various data resources, primarily ethnographic fieldwork conducted during the COVID-19 pandemic initially reported in Pakistan in March 2020, I have adopted a qualitative research study design with an interview guide to gathering data, so as to study and comprehend the perspectives on COVID-19 in Pakistan. The central question of the entire COVID-19 project is how various stakeholders such as laypeople and the government have dealt with the pandemic in Pakistan and how they have negotiated and contested it. Since this is an ongoing project to explore the impact of the pandemic, including on death rites and mourning rituals, I draw on interviews of a few interlocutors who experienced the deaths of their dear ones due to COVID-19. All the interlocutors were informed about the project and asked to give their consent.

Data Collection and Analysis

Using the purposive sampling method to select interlocutors and employing an interview guide, I started collecting the data virtually and physically with the help of a small team in Pakistan. Under this project, around 300 individual/narrative interviews, informal discussions, *Kachahari* sessions, and two online surveys were conducted from March 2020 to April 2020 and January 2021. Kachahari is similar to a group discussion but has significant dissimilarities as it is a socio-culturally rooted qualitative method that allows interlocutors to lead the discussion and be at ease, as opposed to a focus group discussion in which the researcher leads (Ali, 2020a). Also, I did content and document analysis of news reports and various surveys, mainly government reports, to contextualize the pandemic in Pakistan. The data were collected from Sindh and Punjab provinces in the Sindhi, Seraiki, and Urdu languages and later were transcribed into English and thematically examined. In addition to these current data, I also build on my almost 15 years of long-term ethnographic fieldwork conducted for my Master's, M.Phil., and Ph.D. degrees in the country, including Sindh province, with a focus on studying and analyzing various forms of politics and disparities, especially those revolving around infectious diseases and vaccination programs.

As far as the data analysis is concerned, it commenced right from the beginning of the data collection in March 2020. The data gathered from interviews and media were subjected to content

analysis. To be familiarized with the data and allow for iteration, I constantly read and re-read it and have identified salient themes.

RITUALS OF CONTAINMENT: SOCIAL DRAMA, METAPHORS, AND SECURITIZATION

When one panoramically revisits the effects of the pandemic and various strategies to deal with it, one can observe a sequence of repetitive activities involving policies, practices, gestures, words, and actions (see Leach, 1966; Bloch, 1974; Davis-Floyd, 2003 [1992]) that have been performed at local, national, and global levels. Again, I call such repetitive performances "rituals of containment," as in, rituals created to contain the viral spread in various ways and for other, related purposes. Since such rituals of containment have tended to construct and perpetuate forms of social class, authority, and power, these performances can also be viewed as political rituals (see Geertz, 1980). Rituals induce "acceptance, compliance, or at least forbearance with regard to any overt challenge" (Bell, 1997), as can be seen right from the beginning of the pandemic. A convincing example from Pakistan is the first media briefing from the Prime Minister (PM) of Pakistan in March 2020, in which he repeatedly stated, *Ghabrana nahi hai* (don't panic,) or "there is no reason to worry" (Dawn, 2020b). Thereafter, the PM and health officials repeatedly conducted meetings, introduced and implemented various preventive measures, and used *soft* and *hard* power to get people to follow them. On the one hand, the public was *asked* to behave in a particular way (soft power), and on the other hand, it was strongly *declared* that there would be legal consequences against those who failed to comply (hard power) (see Bates, 2020), as the government even deployed the army and the police to ensure compliance. The standard operating procedures (SOPs) that the Pakistani government created, namely repetitive hand washing, mask wearing, physical distancing, social isolation, and how to deal with a dead viral body, can all be seen as rituals of containment, as they cause people who follow them to behave in ritualized ways.

Digging deeper, we can see that these rituals of containment demonstrate what Turner (1974, p. 37) called "social drama," which he defines as "units of harmonic or disharmonic social process, arising in conflict situations." Turner divided a conflict into four stages: breach; crisis; redressive action; and either reintegration or schism. During such conflict situations, public action contains an arrangement of processual acts and scenes with dynamic shifts in scripts, characterizations, rhetoric, and symbolism.

The situation of COVID-19 in Pakistan, as elsewhere, reveals a constant negotiation of just such a social conflict. In terms of the four stages of a conflict proposed by Turner, the pandemic can be seen as the "breach" of normal, as it has affected the societal fabric, and brings "fundamental aspects of society, normally overlaid by the customs and habits of daily intercourse, into frightening prominence" (Turner, 1974). The "crisis" has appeared in the country as people and government become divided in this social conflict, as they take differing positions and dramatize them. Turner sees a liminal quality in these kinds of public crises, "betwixt and between" more or less stable social process phases. Within this liminality, social upheaval occurs as antagonists criticize each other, with each group trying to generate some sort of societal change, which is what Turner would term "redressive action." In the resulting "schism," the government has criticized the public for failing to comply and some citizens have criticized the government for trying to make them comply. For example, some people in Pakistan consider COVID-19 as a sort of national or global "plot," while the government tries to show them that it is a reality (see Ali, 2020b,c, 2021). Both camps employ differing types of logic and "proof." In such ideological clashes, one can see the social dramas of COVID-19 denying movements and COVID-19 accepting movements.

Analogous to the world, people in Pakistan have been continuously working and reworking with the tensions between "normals" and "abnormals" during the pandemic. At its beginning, there was great fear, and many people, especially in urban areas, were adjusting their acts according to the constantly realigning imaginaries. They created different strategies to make sense of an unfolding critical situation (Ali, 2020b,c). These processes and the types of social confusion they generated extensively continued during the second waves of the pandemic. Yet by now, although COVID-19 is still a major threat, and turning again to the four conflict stages as defined by Turner (1974), we can see that many people have "reintegrated" either into the "old normal" or "new normal" patterns of social life, depending on how seriously they take that threat. Yet, though reintegration has occurred for some, the conflict "schism" remains for others. In their process of reintegration, those who believe that COVID-19 is real have become accustomed to following the rituals of containment of the government, namely the SOPs listed above. Those who do not, who live mainly in rural areas, continue the schism by living life as usual, for example, continuing to arrange marriages and hold other large group gatherings. Many rural people in Pakistan do not believe that COVID-19 is real; such groups of course are at major risk of viral spread (Ali, 2020c).

As Liu (2020) has found in China, rituals of containment in Pakistan have demonstrated significantly contested public domains in that ongoing schism. Drawing on a repertoire of socio-cultural forms, e.g., traditional values, religion, geopolitics, history, and current affairs at the national and global levels, the major players negotiating the pandemic include the Pakistani government, the opposition political parties, laypeople, and "netizens" who get their information from the Internet. The dealings of the Pakistani government or the "redressive actions" very much resemble the findings by Liu (2020) about the Chinese government, which, as a strong actor, has used its political hegemony to control or censor everything related to the pandemic *via* its own rituals of containment (though Liu does not use that term), including manipulating the epidemiological data about the numbers of infections and deaths (Ali, 2021), thereby containing information about the true extent of viral spread. Although netizens and laypeople have criticized the Pakistani

government, especially its fabrication of facts, the government has given an outstanding performance of showing both laypeople and international agencies, *via* statistics demonstrating a very low (0.0025) infection rate and *via* the use of various metaphors and rituals of containment, that it has done a great job of dealing with the pandemic.

From a more global perspective, the performance of the Pakistani government can be seen as a "meta-theater," which Turner views as a mode of reflexivity for, of, and by everyday actors to communicate consciously to give spectators active roles and make them part of the performance. This meta-theater, which involves dialectics of trust and mistrust, criticism, and appreciations, may be over sooner or later, but it is always recorded in what I have called *societal memory* (Ali, 2020a): the good or bad characters, scenes, and acting are preserved in this memory and reappear during similar situations that re-evoke them. Social dramas involving what can be called either *micro-* or *meta-performances* can pause for a time, then later re-appear in different forms when events reawaken that societal memory, as COVID-19 has done in Pakistan by reawakening societal memories of, for example, the highly contested vaccination campaigns that have been repeatedly carried out throughout the country. These vaccination campaigns, which I have intensively studied, can themselves be seen as rituals of containment, in this case, efforts to contain the spread of infectious diseases such as measles, polio, mumps, and rubella. They became major sites of conflict and social drama after the fake vaccination campaign conducted by the US CIA to discover the whereabouts of Osama-bin-Laden, and for many other reasons too complex to discuss here (but see Ali, 2020a,c). A major and tragic part of this social drama was the killing of around 100 vaccinators and their security guards. This schism around vaccination is reflected in the schism around COVID-19 and will again become a major issue once COVID-19 vaccines are available. Many people, especially in the rural areas of Pakistan, are likely to refuse these vaccines and their rituals of containment, thereby generating yet another major social drama around COVID-19 and its "political pandemic".

BACKGROUND AND CONTEXT, RESULTS, AND DISCUSSION

Reporting its first COVID-19 infection in February 2020, by January 2021, Pakistan had reported COVID-19 infection in over 543,000 people, out of whom around 11,600 have "officially" (according to questionable government statistics) died (Johns Hopkins University, 2021). Like many governments, the Pakistani government has performed various rituals of containment: these have included banning travel; the implementation of lockdown; the deployment of military and police to enforce lockdown; a later switch to "smart lockdown" (called "targeted lockdown" in the US); the creation of a Corona Relief Tiger Force; and educating people about the severe consequences of violating Article 188 of the Pakistan Penal Code, which demands that people follow the government given SOPs, violations of which incur a penalty of 6 months in prison, a fine, or both.

Many people who violated the SOPs have been booked under this Article. For instance, over 100 laypeople were arrested in Sindh for violating lockdown measures and were irrationally crammed into a police vehicle without masks; the police said that they did not have a sufficient number of masks (The News, 2020). Similarly, in another major social drama in October 2020, the government arrested around 400 workers of opposition parties who had planned a grand rally in Punjab (Tahir, 2020).

Government rituals of containment have also included market closures; banning group gatherings; distributing food items among daily wage workers; the approval of the PKR financial assistance program of Rs. 1.2 billion (Ali, 2020a; Ali and Davis-Floyd, 2020); and monitoring the burial of dead viral bodies, which this article addresses. During the pandemic, many tensions and contestations have arisen between federal and regional governments, and between citizens and these governments, along with negotiations between the local and global worlds. Various local narratives have emerged regarding COVID-19 being considered a "supernatural test," a "Western conspiracy," a "Jewish plot," or a "political game" of the Pakistani government to gain more foreign aid (Ali, 2020b,c). Due to these interpretations, a substantial number of people do not follow SOPs, such as not wearing a mask or maintaining physical distancing. In March 2021, I observed in a famous chain of grocery shops where out of twenty people, including sellers and buyers, only one person was properly wearing a mask, while the rest were without a mask or wearing it at their chin. When I asked the person in charge of that shop, he replied, "Boys are coming here and there. It is difficult for them to wear a mask." He himself was standing at the cash counter, and his response about him not wearing a mask was related to the religious explanation: "I am about to leave for the *Juma* (Friday) prayer [that was still almost 2.5 h from this encounter]. Allah is great. If you offer *Namaz* (prayers) and *Dua* (supplication), then COVID-19 does not affect you".

Likewise, in March 2021, I have been taking private cabs run by *Kareem* in which out of almost 40 drives, only two drivers wore a mask without my asking. Two of them even had no mask to wear, thus, I provided them. One driver, who seemed to be in his forties, with a long black beard also stated while smiling when I asked him to wear a mask, "Sir! Where is COVID-19? These are just rumors. If there is then it can be controlled *via* performing prayers. I have been observing prayers; hence, I haven't contracted the virus during the entire year. Even no one from my family has been sick." Within the political pandemic in Pakistan, these reflect different levels and scales of politics and mistrust and their ensuing social dramas.

Social Drama: Invoking Religion and Patriotism

The social drama around COVID-19 and the political pandemic in Pakistan started as soon as the outbreak began in the country. The government immediately took to the media. Among the first containment rituals were the media briefing from the PM (as mentioned earlier) and a nationally televised broadcast of a *Namaz Aaft* (a prayer to reverse trouble or a curse) at the

PM House of Pakistan[1]. This ritualistic prayer can be seen as the "governmental etiology" of COVID-19 that the pandemic is a "supernatural curse," or "test." Foster (1976, p. 773) might have called it a "personalistic etiology" since it shows the "belief that all misfortune, disease included, is explained in the same way" in which "illness, religion, and magic are inseparable." I think one must replace "magic" with "magical politics" to add to these forms of etiology. This prayer can be ethically viewed as a magical spell cast both as an attempt to end the pandemic and to turn the attention of the laypeople toward prayer to bear any loss; in other words, "don't blame the government for failing to contain the virus, but rather believe that it is a 'supernatural test or punishment' and therefore the will of Allah." Similar findings were observed by Malik (2020) that many people in Pakistan perceived the pandemic as God's wrath and continued religious practices, even believing that those who die due to COVID-19 during these worships would be rewarded by God.

In addition to invoking religion, the government has also invoked patriotism by continually using militarized terms such as "soldiers" fighting a "war" (Ali and Davis-Floyd, 2020). During that first media briefing in March 2020, the PM emphasized, "I want to tell all of you, this virus will spread… We have to win this war as a nation" (Dawn, 2020b). The virus is an "enemy" that needs an "army" to fight against it, hence the creation of the Corona Relief Tiger Force. Using war metaphors certainly is not specific to Pakistan, as almost every government worldwide has used them. These war metaphors instantiate the pandemic as a major social drama, and substantially (re-)frame our thoughts and actions in both positive and adverse ways. They can increase perceptions of COVID-19 as a serious and urgent "threat," or they may lead to a fatalistic attitude, causing people to avoid implementing any preventive measures but rather to rely on the will of Allah (Semino, 2021).

Regarding the rituals of containment of the government for dealing with dead viral bodies, they are clearly based on science (Vidua et al., 2020). The government produced a three-page document, *Burial and Safe Management of [the] COVID-19 Dead Body*, containing guidelines about "the preparation of the [dead] body," "Autopsy, including engineering and environmental controls," and "Burial" (Government of Pakistan, 2020, p. 1). Yet, this science has been applied in discriminatory ways regarding who should or should not be given the "dead viral body." When the COVID-19 outbreak was still escalating in Pakistan, various rumors spread that doctors were "injecting a drug" into the patients that caused them to die. During the "second wave" (Ali, 2020c), when more people were infected and admitted to hospitals, and some died, it was locally perceived that the government did not return the dead viral bodies to their *Waris* (heirs) to perform the final mourning rituals, unless they were wealthy and powerful elites. In contrast, the socio-economically and politically poor have complained about not receiving the dead viral bodies of their beloved ones for a proper burial. One of my female interlocutors who survived COVID-19 shared, "The government was returning the dead bodies to rich people only, but not to the poor. This indeed is not justice."

[1]This house is in actuality an office for the PM, not his place of residence.

In some exceptional cases, one of which I illustrate later on, the government gave the family an empty coffin. This containment of dead viral bodies is an example of this invisible or structural violence and of the emotional/psychological coronavirus pandemic, especially when the family is tricked into believing that there actually is a body in the coffin they receive. Dealing with such bodies according to scientific evidence and guidelines is justifiable; lying to the families is not. Nor is the discriminatory practice of giving what I am terming *influential* dead viral bodies to their families, but not the dead viral bodies of the poor. That discrimination, which forms part of the "structural pandemic," has been purely power-driven, as I show in the section below.

"An Empty Coffin": Who Owns the Body?

According to the government record, around 11,000 people had died due to COVID-19 in Pakistan as of January 2021. If the death rate were calculated according to the total population of the country, as previously noted, the result would be 0.000025%. These epidemiological data are "success stories" for a country of 220 million, where around 25% of its people live below the poverty line, the doctor–patient ratio is around 1/1,000, and the hospital bed per patient ratio is around 1/1,600 (Ali, 2020c). These figures related to COVID-19 indeed are a source to ponder, as they reveal the *data fabrication* performed by the government, which is designed to give an impression that the situation is under control in Pakistan as compared to other countries (Ali, n.d.).

In a previous article, I explained the "symbolic ownership" of the government in the case of a gentle lady who died due to COVID-19 and her family members did receive her viral dead body, with specific instructions to follow SOPs (Ali, 2021). Yet, as previously noted, as part of the structural pandemic, not all people have received the dead bodies of their beloved family members. Some dead viral bodies have been buried by government-chosen teams without the presence of family members.

During my data collection, I came across an account of a family who had lost their young son. Developing critical symptoms, he was admitted to a government hospital in Punjab province. His situation deteriorated over time, and ultimately, he succumbed to death from COVID-19. The *Waris* (heirs) were informed that their family members had died. With heavy hearts, some of them went to the hospital to collect the dead body. However, painfully, they were refused. As a result, the family staged a protest, and the government was compelled to hand over the dead viral body (again, by "dead viral body," I mean a body that has died from COVID-19 and is still infectious) to family members on the condition that the body be packed in a coffin by the government. This reasonable condition stemmed from the fact that dead viral bodies, if exposed for viewing, might constitute a significant risk factor for those performing burial rituals, who might succumb to the desire to touch or kiss the body of their loved one, as used to be commonly done pre-COVID.

Considering it as a kind act of the government, the family agreed. The coffin was delivered, but it contained no glass window to view the face. It is necessary to mention that in Pakistan, viewing the face of the dead body is a socio-culturally

valued practice and a source of religious rewards (Ali, 2021). And a coffin usually has a small piece of glass in it for this purpose. Thus, having no glass window was a puzzle for the family. Everyone accepted the order of not viewing the face placed by the government, except the sister of the deceased person. My interlocutor stated:

> She [his sister] lived in a different city, and she had not seen her brother for many months. Hence, she emphasized seeing her brother's face. She continually cried and hugged the coffin. Since no one obliged to help her to open the coffin, she did this job on her own. And a most surprising thing occurred when the box was open. [My interlocutor sighs.] The coffin was empty. This was a great shock for the family. Consequently, they protested again, but nothing was given back to them. This is the situation that led me not to visit a hospital although I was infected and do have comorbidities such as cardiovascular problems, diabetes, and cancer. I remained at home. I wanted to die at home. During this time, government officials frequently visited my house many times, but I showed that I am okay.

In May 2020, the Pakistani media broadcast similar news about another such social drama, in which a mob attacked the Jinnah Postgraduate Medical Centre (JPMC) in Karachi after they were not given the dead body of their beloved family member who died due to COVID-19 (Dawn, 2020a). The story mentions the views of one doctor from that hospital, who said, "When a COVID-19 patient dies, the hospital administration calls the district health officer, who arranges the *ghusl* (bathing of a body) and burial with Edhi staff. They bury the body in a far-off graveyard" (quoted in Dawn, 2020a).

Constituting parts of the emotional/psychological and social pandemics, this fear of not receiving the dead bodies of their COVID-19-infected family members led many people not to disclose the deaths of those loved ones who died at home due to COVID-19. One interlocutor shared:

> Although one of our acquaintances died due to COVID-19 at home, their family members hid the cause. Interestingly, most family members, acquaintances, and friends knew that the person died due to COVID-19. Despite that, those who could attend the funeral rites came. It appeared that the family was scared by the government that it may take the body and bury it on its own.

During my data collection, a substantial number of people shared such accounts of hiding COVID-19 infection and information about those family members who died due to this virus. This hiding can be seen as local level censorship to avoid governmental control of the dead viral body and as the ritual of containment of the family; in this case, the "containment" is not to prevent viral spread, but rather to contain the news of the cause of death.

CONCLUSION

In this article, I have shown that that COVID-19 is not one pandemic but many, namely medical, economic, social, structural, emotional/psychological, and political, and have demonstrated some of the ways in which all of these pandemics play out in Pakistan and the social dramas they entail. Borrowing from various eminent anthropologists and building on their critical concepts, such as ritual (Leach, 1966; Bloch, 1974; Geertz, 1980; Davis-Floyd, 2003 [1992]); social drama (Turner, 1974, 1982, 1985); and structural violence and social suffering (Kleinman et al., 1997; Farmer, 2004), I have developed a new concept that I call *rituals of containment*, in part to show how the Pakistani government has invoked both religion and science in its political responses to the pandemic, revealing discrimination and the manipulation of body politics (Scheper-Hughes and Lock, 1987). This is a good example of the regulation and control of individuals and populations, which Foucault (1990) calls "bio-power."

I have noted how these rituals of containment include all of the SOPs developed by the government to contain the viral spread. I have presented the government as the protagonist of COVID-19, in which it has hegemonic power to censor and control the behaviors of the people, epidemiological data about COVID-19, and viral dead bodies, and have illustrated some of the social and political schisms around that control (see for example Jamil and Appiah-Adjei, 2020). I conclude that dealing with such bodies according to scientific evidence and guidelines is justifiable; the problem lies in the discriminatory and contradictory government policies and practices, which in my analysis are part of both the political and the structural pandemics in Pakistan. Although they often do, governments should avoid lies that has critical consequence and do not discriminate against their vulnerable and marginalized populations. I envision a world in which structural disparities and discrimination cease to exist, and in which all rituals of containment are both evidence-based and widely implemented by popular consent.

STUDY LIMITATIONS

Although this study is a part of a major project on COVID-19, the results cannot be generalized. Nonetheless, these perspectives reveal considerable evidence of how COVID-19 has been dealt with in Pakistan. Based on the provocations in this article, more anthropological and sociological studies can be carried out in Pakistan and other countries to explore the interplays among religion, science, and politics and how they are intertwined in social dramas and rituals of containment.

DATA AVAILABILITY STATEMENT

Since these data are part of my long project, they are not shareable. However, most of the data are reflected in the article. Requests to access the datasets should be directed to inayat_qau@ahoo.com.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The National Bioethics Committee of Pakistan. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

IA designed the study, reviewed the literature, drafted, and revised the article.

FUNDING

Since my Ph.D. work has substantially informed this work, I acknowledge the Higher Education Commission (HEC) of Pakistan's grant (PD/OSS-II/Batch-IV/Austria/2012/9903) to support my doctorate.

ACKNOWLEDGMENTS

I also would like to thank Robbie Davis-Floyd, Shahbaz Ali, and Salma Sadique for their immense help and support in multiple ways that have shaped the current article. My sincere thanks to my interlocutors for their valuable data and time.

REFERENCES

Ali, I. (2020a). *Constructing and Negotiating Measles: The Case of Sindh Province of Pakistan*. (PhD), University of Vienna, Vienna, Austria.

Ali, I. (2020b). COVID-19: Are we ready for the second wave? *Disaster Med. Public Health Prep*. 14, e16–e18. doi: 10.1017/dmp.2020.149

Ali, I. (2020c). Impacts of rumors and conspiracy theories surrounding COVID-19 on preparedness programs. *Disaster Med. Public Health Prep*. 1–6. doi: 10.1017/dmp.2020.325

Ali, I. (2021). From normal to viral body: death rituals during ordinary and extraordinary COVIDian times in pakistan. *Front. Sociol.* 5:133. doi: 10.3389/fsoc.2020.619913

Ali, I., and Davis-Floyd, R. (2020). The interplay of words and politics during COVID-19: contextualizing the universal pandemic vocabulary. *Pract. Anthropol.* 42, 20–24. doi: 10.17730/0888-4552.42.4.20

Bates, B. R. (2020). The (in)appropriateness of the war metaphor in response to sars-cov-2: a rapid analysis of donald j. Trump's rhetoric. *Front. Commun.* 5:50. doi: 10.3389/fcomm.2020.00050

Bell, C. M. (1997). *Ritual: Perspectives and Dimensions*. New York, NY: Oxford University Press

Bloch, M. (1974). Symbols, song, dance and features of articulation: is religion an extreme form of traditional authority? *Eur. J. Sociol.* 15, 55–81. doi: 10.1017/S0003975600002824

Buzan, B., Wæver, O., Wæver, O., and De Wilde, J. (1998). *Security: A New Framework for Analysis*. London: Lynne Rienner Publishers.

Castro Seixas, E. (2021). War metaphors in political communication on COVID-19. *Front. Sociol.* 5, 1–11. doi: 10.3389/fsoc.2020.583680

Cullen, W., Gulati, G., and Kelly, B. (2020). Mental health in the COVID-19 pandemic. *QJM Int. J. Med.* 113, 311–312. doi: 10.1093/qjmed/hcaa110

Davis-Floyd, R. E. (2003 [1992]). *Birth as an American Rite of Passage: With a New Preface*. Berkeley: University of California Press.

Dawn (2020a). Mob vandalises jpmc ward after hospital's refusal to hand over COVID-19 patient's body *Dawn*. Retrieved from: https://www.dawn.com/news/1557115 (accessed May 15, 2020).

Dawn (2020b). Pm imran tells nation to prepare for a coronavirus epidemic, rules out lockdown. *Dawn*. Retrieved from: https://www.dawn.com/news/1541689 (accessed March 17, 2020).

Farmer, P. (2004). An anthropology of structural violence. *Curr. Anthropol.* 45, 305–325. doi: 10.1086/382250

Foster, G. M. (1976). Disease etiologies in non-western medical systems. *Am. Anthropol.* 78, 773–782. doi: 10.1525/aa.1976.78.4.02a00030

Foucault, M. (1990). *The History of Sexuality: An Introduction, Volume i*. New York, NY: Vintage.

Galtung, J. (1969). Violence, peace, and peace research. *J. Peace Res.* 6, 167–191. doi: 10.1177/002234336900600301

Geertz, C. (1980). *Negara Ubud: The Theatre-State in Twenty-First-Century Bali*. Princeton, NJ: Princeton University Press.

Gonçalves Júnior, J., Moreira, M. M., and Rolim Neto, M. L. (2020). Silent cries, intensify the pain of the life that is ending: The COVID-19 is robbing families of the chance to say a final goodbye. *Front. Psychiatry* 11, 1–3. doi: 10.3389/fpsyt.2020.570773

Government of Pakistan (2020). *Guidelines: Burial and Safe Management of COVID-19 Dead Body*. Islamabad: Government of Pakistan. Retrieved from: http://COVID.gov.pk/new_guidelines/01June2020_20200505_Guidelines_for_Burial_and_Safe_management_of_COVID_19_dead_body_0803_may.pdf

Jamil, S., and Appiah-Adjei, G. (2020). Battling with infodemic and disinfodemic: the quandary of journalists to report on COVID-19 pandemic in pakistan. *Media Asia* 47, 88–109. doi: 10.1080/01296612.2020.1853393

Johns Hopkins University (2021). Coronavirus COVID-19 global cases. Retrieved from: https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6 (accessed January 22, 2021).

Kleinman, A., Das, V., and Lock, M. (1997). *Social Suffering*. Berkeley: University of California press.

Leach, E. R. (1966). G. Ritualization in man: ritualization in man in relation to conceptual and social development. *Philos. Trans. R. Soc. B* 251, 403–408. doi: 10.1098/rstb.1966.0026

Liu, X., and Bennett, M. M. (2020). Viral borders: COVID-19's effects on securitization, surveillance, and identity in mainland china and hong kong. *Dialogues Hum. Geography* 10, 158–163. doi: 10.1177/2043820620933828

Liu, J. (2020). From social drama to political performance: China's multi-front combat with the COVID-19 epidemic. *Critical Asian Stud.* 52, 473–493. doi: 10.1080/14672715.2020.1803094

Lukacovic, M. N. (2020). "Wars" on COVID-19 in slovakia, russia, and the united states: Securitized framing and reframing of political and media communication around the pandemic. *Front. Commun.* 5, 1–14. doi: 10.3389/fcomm.2020.583406

Malik, N. (2020). Intimacy with god and coronavirus in pakistan. *Anthropol. Action* 27, 78–81. doi: 10.3167/aia.2020.270316

Mukhtar, S. (2021). Psychology and politics of COVID-19 misinfodemics: why and how do people believe in misinfodemics? *Int. Sociol.* 36, 111–123. doi: 10.1177/0268580920948807

Pereira, M., and Oliveira, A. M. (2020). Poverty and food insecurity may increase as the threat of COVID-19 spreads. *Public Health Nutrition* 23, 3236–3240. doi: 10.1017/S1368980020003493

Scheper-Hughes, N., and Lock, M. M. (1987). The mindful body: a prolegomenon to future work in medical anthropology. *Med. Anthropol. Quarterly* 1, 6–41. doi: 10.1525/maq.1987.1.1.02a00020

Semino, E. (2021). "Not soldiers but fire-fighters" – metaphors and COVID-19. *Health Commun.* 36, 50–58. doi: 10.1080/10410236.2020.1844989

Tahir, Z. (2020). Over 400 opposition workers held for 'flouting COVID sops'. *Dawn*. Retrieved from: https://www.dawn.com/news/1585091 (accessed October 15, 2020).

The News (2020). Over 100 held for defying govt's COVID-19 steps let go by court. *The News*. Retrieved from: https://www.thenews.com.pk/print/633947-over-100-held-for-defying-govt-s-COVID-19-steps-let-go-by-court (accessed March 25, 2020).

Turner, V. (1974). *Dramas, Fields, and Metaphors: Symbolic Action in Human Society*. Cornell University Press.

Turner, V. (1982). *From Ritual to Theatre: The Human Seriousness of Play*. New York, NY: Performing Arts Journal Publication.

Turner, V. (1985). "On the edge of the bush: anthropology as experience," in *The Anthropology of Form and Meaning,* ed E. L. Turner. Tucson, AZ: University of Arizona Press.

Vidua, R. K., Duskova, I., Bhargava, D. C., Chouksey, V. K., and Parthasarathi, P. (2020). Dead body management amidst global pandemic of COVID-19. *Medico Legal J*. 88, 80–83. doi: 10.1177/0025817220926930

Whyte, D. (2020). Viral intimacy and catholic nationalist political economy: COVID-19 and the community response in rural ireland. *Anthropol. Action* 27, 39–43. doi: 10.3167/aia.2020.270309

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

COMMUNITY CASE STUDY
published: 03 May 2021
doi: 10.3389/fpsyt.2021.608973

End of Life Intervention Program During COVID-19 in Vall d'Hebron University Hospital

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OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: 22 September 2020
Accepted: 06 April 2021
Published: 03 May 2021

Citation:
Beneria A, Castell-Panisello E, Sorribes-Puertas M, Forner-Puntonet M, Serrat L, García-González S, Garriga M, Simon C, Raya C, Montes MJ, Rios G, Bosch R, Citoler B, Closa H, Corrales M, Daigre C, Delgado M, Dip ME, Estelrich N, Jacas C, Lara B, Lugo-Marin J, Nieto-Fernández Z, Regales C, Ibáñez P, Blanco E and Ramos-Quiroga JA (2021) End of Life Intervention Program During COVID-19 in Vall d'Hebron University Hospital. Front. Psychiatry 12:608973. doi: 10.3389/fpsyt.2021.608973

Introduction: The coronavirus disease 19 (COVID-19) and its consequences have placed our societies and healthcare systems under pressure. Also, a major impact on the individual and societal experience of death, dying, and bereavement has been observed. Factors such as social distancing, unexpected death or not being able to say goodbye, which might predict Prolonged Grief Disorder (PGD), are taking place. Moreover, hospitals have become a habitual place for End of Life (EOL) situations but not in the usual conditions because, for example, mitigation measures prevent families from being together with hospitalized relatives. Therefore, we implemented an EOL program with a multidisciplinary team involving health social workers (HSW) and clinical psychologists (CP) in coordination with the medical teams and nursing staff.

Objectives: We aim to describe an EOL intervention program implemented during COVID-19 in the Vall d'Hebron University Hospital (HUVH). We present its structure, circuit, and functions. Descriptive analyses of the sample and the interventions that required psychological and social attention are reported.

Material and methods: The total sample consists of 359 relatives of 219 EOL patients. Inclusion criteria were families cared for during the COVID-19 pandemic with family patients admitted to the HUVH in an EOL situation regardless of whether or not the patient was diagnosed with COVID-19.

Results: Our program is based on family EOL care perceptions and the COVID-19 context features that hinder EOL situations. The program attended 219 families, of which 55.3% were COVID-19 patients and 44.7% had other pathologies. The EOL intervention

program was activated in most of the EOL situations, specifically, in 85% of cases, and 78% of relatives were able to come and say goodbye to their loved ones. An emotional impact on the EOL team was reported. It is necessary to dignify the EOL situation in the COVID-19 pandemic, and appropriate psychosocial attention is needed to try to minimize future complications in grief processes and mitigate PGD.

Keywords: end of life, intervention program, COVID-19, mental health, grief, prolonged grief disorder, death, mourning

INTRODUCTION

On March 11, 2020, the World Health Organization (1) declared the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or COVID-19) outbreak a pandemic disease. In Spain, the first case of COVID-19 was diagnosed on January 29 (2). On March 14, the Spanish Government declared a national emergency, which implied the imposition of quarantine on the entire population (3). Such mitigation measures clearly helped contain the disease and flatten the curve (4) but they had an impact on psychological health (5) and important socio-economic repercussions (6).

The pandemic has seriously challenged our national healthcare system (7), as well as the professionals' mental health (8). One of the key features of COVID-19 is its severity, with a mortality rate around 5.7% (9). To date, more than 100 million cases of COVID-19 have been confirmed, and 2,455,331 deaths have been registered (10). Therefore, death has been around more than ever before.

Death and grief are universal, inevitable, and multidimensional experiences and imply losses which can occur at any stage of life (11). The grieving process reflects a unique convergence of responses (affective, cognitive, behavioral, physiological, and spiritual adjustments) which affect both the individual (12) and the family system (13). In 2013, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (14) proposed Persistent Complex Bereavement Disorder (PCBD) and recently prolonged grief disorder (PGD) was formally included in the 11th revision of the International Classification of Diseases (15). Despite the fact that bereavement is a typically severe stressor that implies painful grief symptoms which can interfere in peoples' lives through higher symptom intensity and/or duration, there is usually no need for clinical intervention (16).

However, it has been observed that COVID-19 conditions might exacerbate the chance of developing PGD (17). Several studied factors associated with PGD occur and challenge the mourning processes (18). From a general perspective, we are aware that PGD is more likely to take place in disasters with many casualties (19). Specific features that increase the chance of PGD appearance include the lack of preparedness or unexpected death, not knowing about the quality of the caregiving or dying experiences, absence of physical social support (20), or grief rituals (e.g., saying goodbye or viewing and burial of the body) (21). Indeed, most recent literature is reporting on bereavement responses during COVID-19. Eisma et al. (22) found more severity in grief reactions after COVID-19-related bereavement compared to natural bereavement (but not unnatural bereavement). Along the same lines, Eisma and Tamminga (23) demonstrated that people who experienced a recent loss during the pandemic had higher grief levels than people who experienced it before the pandemic.

Also closely linked to losses and mourning processes, we would like to focus on End of Life (EOL) situations in the hospitalization context, which have become challenging for families, causing them confusion and distress (24). Partial or total restrictions on relatives' visiting have been imposed, driven by the need to limit spread of the disease (25). Lack of information on the process and inconsistency of the mitigation measures prevent relatives from adapting properly to the situation (24). This might well-affect relatives either with or without family members diagnosed with COVID-19 because government policies applied to all hospitalized people (26). Actually, most recent research reports on the shocking experience of relatives who have lost their loved one in a COVID-19 hospitalization context: being apart during hospitalization and death, cold communication of bad news, lack of social support and death rituals, unexpected and fast death or feeling of unfairness (27).

All these features can hinder proper care of EOL situations (28). Managing death and mourning during COVID-19 has become crucial, not only to avoid situations of dying in absolute isolation but also to give patients and relatives the chance to be accompanied in EOL situations (29). Families definitely care about how their relatives depart, and this includes providing the desired physical comfort, emotional support, the possibility to participate in decision-making processes, treating the end with respect, coordinating the care provided, and taking their emotional needs into account (30). This goes together with the desire of the patients in an EOL situation to relieve their relatives' burden and strengthen contact with them (31).

The COVID-19 pandemic has contributed to increasing difficult circumstances and the potential for amplified grief. Therefore, healthcare clinicians need tools and resources to mitigate the grief with which patients and families must cope with. The Psychiatry Department of Vall d'Hebron University Hospital (HUVH) identified the need to develop an "EOL intervention program" formed by clinical psychologists (CP) and healthcare social workers (HSW) that provided face-to-face support to relatives in EOL situations. We aim to describe the structure, circuit, and functions of the intervention program, and also to analyze which type of sample and interventions required psychological and social attention.

CONTEXT

Socio-Demographic Characteristics of the Population in the HUVH

HUVH is located in the north of Barcelona, within the Horta-Guinardó district. It is a public hospital of the Hospital Network of the Catalan Health Institute and is a referral center in the comprehensive healthcare area of the north of the city, which includes three districts, Horta-Guinardó, Nou Barris, Sant Andreu, and the city of Montcada i Reixac, with a total population of more than 480,000 inhabitants. However, HUVH is a tertiary care hospital, so it receives patients from all over the country.

Among the socio-demographic characteristics of the population that attends the HUVH, we highlight the aging population, which is especially concentrated in the covered areas (47.59% aged over 65) (32, 33). Moreover, Nou Barris is the district of Barcelona with the lowest average annual income per household and person, and has one of the highest percentage of migrants in the city, 17% (32). These socio-demographic characteristics can become risk factors in health-disease processes, and can place them in a situation of high vulnerability and social exclusion (34–37). In the context of the pandemic, these social determinants of health have become notorious in the HUVH (38), especially since Nou Barris became the district most affected by COVID-19 in Catalonia during lockdown.

Some specific factors that may increase the population's burden were observed: first, home-isolation difficulties, due to the overcrowding or infra-housing situation, causing the contagion of entire families or cohabitation units; economic-labor fragility situations such as unemployment or submerged economy (39); and finally, migrated families often without a socio-familial network (40). All these factors have converged and caused stress on grief processes and the reorganization of their family systems.

Setting

One of the main challenges of the pandemic outbreak was the need to transform the activity and capacity of the hospital to attend patients with COVID-19, often withdrawing treatment from other patients who had non-pandemic-related health needs (41).

On March 10, 2020, the contingency plan of the HUVH was approved and subsequently communicated to the staff organization. During the following weeks, the hospital had to reformulate all the spaces progressively, starting with the Emergency Department as well as COVID-19 and non-COVID-19 areas. In this process of transition, the usual 56 intensive care unit (ICU) beds available were multiplied by almost seven. When the epidemic reached its peak, the HUVH had 700 COVID-19 beds, and it was 50 beds away from collapse.

Health professionals had to adapt to the pandemic in a very short time, experiencing changes in their working shift organization, and increasing the burden of care. At the same time, the global surge in demand led to shortages in protection equipment, masks, and other medical devices like respirators. All this exacerbated concerns about the increased risk of infection (8).

In this severe context, national and hospital policies determined whether hospital visits were allowed. In light of COVID-19, much tougher restrictions were established to protect the patients, hospital staff, and visitors (42, 43). Initially, and only for a few days, visits were completely suspended. However, on March 26 visits to patients in EOL situations were allowed. The requirement to attend these families was immediately detected, and from March 30 to April 2, the EOL program was designed, coordinated and structured, starting officially on April 3 and lasting May 31. From May 27, visitors were permitted, with restrictions that were adapted to requirements over time. From then until now, the EOL service has been working, if necessary, with the liaison and inter-consultation unit.

To support those relatives who came to the hospital in tough emotional conditions, it was necessary to reorganize and increase the number of specialized staff delivering EOL care. Initially, the EOL care circuit was attended to by professionals from the Citizen Service Unit of the hospital. Subsequently, due to the families' perceived emotional and psychosocial support needs, social work professionals, together with CP, attended to the EOL processes.

Key Programmatic Elements: EOL Intervention Program

The EOL Intervention Program arose from the need to attenuate the hospital's environment restrictions during the COVID-19 pandemic (44). HSW and CP assessed the importance of addressing this moment of change to facilitate the mourning process. The aims of the intervention program are based on the importance of a dignified farewell (see **Table 1**). These experiences will become part of the family's history, and the team considered them a basic rightfor both the dying patient and the family to be able to say goodbye to each other (45).

Six HSW from the Social Work Department and eighteen CP from the Psychiatry Department (eleven physicians and seven residents) were included in the program. Both teams were trained in psychopathology related to somatic issues, working with integrative theoretical models of reference. Main clinicians'

TABLE 1 | Aims of the EOL intervention program.

1	Minimize the impact of the state of alarm produced by the COVID-19 pandemic on families in a hospitalization context How: supporting families in a farewell situation in a hostile context
2	Give the family the chance to say goodbye to their dying loved one and support them during this moment of crisis How: Allow relatives to say farewell to their loved one face to face with all the required protective measures and offer support during this process
3	Care for an individual's mourning process, consequently guiding them toward the most healing path, as well as reducing risks How: Offer psychosocial support during the EOL process and address identified risk factors for PGD development
4	Ease access to clinical psychologists in case of excessive pain, too intense and lasting, which requires specialized attention How: Psychological assessment of the relatives' emotional state, needs and risk factors and consequently refer them to the appropriate public mental health services

EOL, end of life.

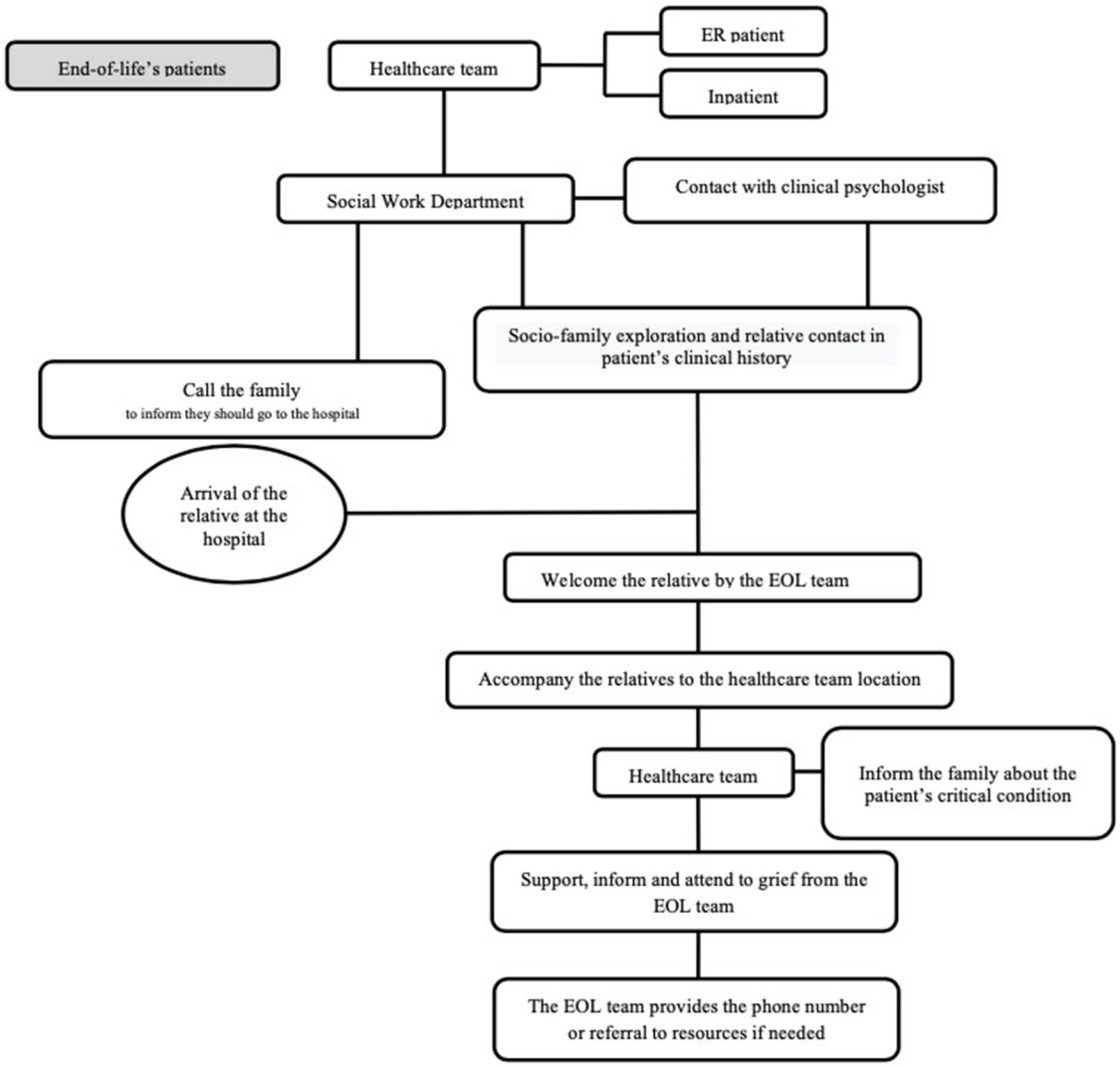

FIGURE 1 | Action circuit for EOL program. ER, emergency room; EOL, End of Life.

therapy approaches were cognitive-behavioral, systemic, and humanistic. Part of the team was trained in grief counseling, and moreover a few of them belonged to the health consultation-liaison psychology and social work service. Main HSW tasks were to identify social vulnerability settings and needs in order to address them (e.g., inform on funeral procedures, refer to social service centers). CP were able to assess the emotional state and needs of relatives and consequently intervene (e.g., facilitate emotional expression, refer to specialized grief or family support programs). Coordination with healthcare teams (HCT), consisting of doctors and nurses, was required in every attended case. The EOL program covered 24-h shifts every day of the week, and each shift was made up of two professionals from each of the aforementioned categories. The night shift, lasting from 8:00 p.m. to 8:00 a.m., was covered by just one HSW who could contact the Psychiatry Ward if necessary. The action circuit followed in the EOL Intervention Program is presented in **Figure 1**.

The interventions delivered by the EOL team were divided into two basic kinds of cases: (1) EOL situations (see **Table 2**) and (2) family interventions to communicate a loss to an inpatient (see **Table 3**). All the interventions were based on studied factors of EOL family caring such as proper communication, respect, compassion, emotional support, and promotion of emotional expression (46, 47). An essential key of the program was non-intrusive emotional accompaniment, respecting the variability and individuality of reactions and emotional expressions in the face of a crisis (e.g. some needed a safe place to express the sorrow they felt; others required more technical information about funeral procedures). In some cases, this meant accompanying in silence; in others, it consisted of active listening, and in a few the team had to resort to specific techniques for anxiety or crisis

TABLE 2 | EOL psychosocial intervention.

Phases	Setting	Content
Activation and coordination	Telematic coordination between HCT and EOL team after detection of an EOL situation.	Basic information gathering - Prognosis of the patient - Number of relatives - What information relatives have - Relatives' contact information
Social assessment	Telematic contact between Social Worker and relatives.	Social assessment - Patient's support network - Main caregivers - Socioeconomic situation Schedule an appointment to come to the hospital
Psychological assessment and pre-intervention	Face-to-face meeting of the EOL team with the relatives in the hospital hall.	First basic psychological assessment - Explore necessity of psychological support - Emotional state - Emotional needs - Psychopathological background, if required
Bad news communication	Face-to-face meeting of the EOL and HCT with the relatives in a private room.	Information of bad news: - Explanation of the evolution - Explanation of the prognosis Psychological support - Promote emotional expression - Promote the expression of doubts and worries regarding the disease course and death - Facilitate the farewell when difficulties facing it
Farewell	Face-to-face and private farewell in the patients' room.	Assure privacy in the farewell moment Provide protection measures to prevent contagion
Post-intervention	Face-to-face meeting of the EOL team with the relatives in a large private room.	Psychological support - Promote emotional expression - Validate experience of loss - Give meaning to the experience - Validate common grief reactions - Promote identified protective factors - Psychoeducate on phases of mourning - Inform about mourning rituals and how to adapt them to COVID-19 context - Advise on how to deliver the news to children - Specific anxiety techniques (e.g., relaxation) if needed Final psychological assessment - Protective factors: social network support, adaptive reactions, anticipation of alternative grief rituals - Risk factors: psychopathological background, high levels of expressed emotion, other symptomatology suggestive of specialized attention Social information: - Funeral services contact and procedures - Bureaucratic aspects - Public aids in socioeconomic risk situations - Specialized contact information: referral to specific resources if needed (e.g., EOL contact, family support program, grief-specific program…)

EOL, end of life; HCT, health care team.

intervention. We emphasize the fact that working together as a team seems to have promoted higher coordination and also helped with emotional support among the professionals.

We highlight the fact that this entire program was being carried out on the go, and it was modified and improved as regulations in the hospital evolved, and the EOL team faced new problems and needs. For example, at first, there was a strict rule that only one relative could bid farewell to a patient, but as weeks of the pandemic progressed, this was expanded and more relatives were allowed. Also, the location in which to address relatives was problematic, and spaces of every available unit were adapted. Finally, the room for dual pathology and addictions was converted into a temporary room for crisis attention and intervention.

Caring Team's Experience

The EOL team tried to give the best human and emotional attention to the families coming to bid farewell to their loved ones. We shared painful and sad moments, emotions of love and tenderness, and tough situations with each and every family, at a both personal and professional level. Initially, the team had to retrain in crisis care and mourning, adjust to a new daily reality, with newcare cases, while ensuring that they complied with the safety protocols introduced by the pandemic, such as the use of

TABLE 3 | Communication of bad news psychosocial intervention.

Phases	Setting	Content
Activation and coordination	Telematic coordination between HCT and EOL team after detection of the death of an inpatients' loved one.	Coordinate how to manage the information in between patients, HCT and families.
Initial contact	Telematic contact between the EOL team and relatives.	Assessment of needs - Doubts regarding safety issues at the hospital or safepass to come - Doubts about how to deliver the bad news - Emotional state and needs Schedule an appointment to come deliver the bad news
Meeting with the EOL team	Face-to-face meeting of the EOL team with the relative in a large private room.	Psychological support - Promote emotional expression - Normalize associated feelings (e.g., guilt) - Advise on how to deliver the bad news - Information about what reactions to expect - Information about the possibility of psychological intervention with the patient
Bad News Communication	Face-to-face communication of the bad news to the patient by his relative in privacy in the patients' room.	Assure privacy in the delivery of bad news Provide protection measures to prevent contagion Coordinate with HCT
Post-intervention	Offer to the relative face-to-face meeting with the EOL team.	Psychological support Debriefing and closure

EOL, end of life; HCT, health care team.

personal protective equipment. The EOL team was not exempt from a huge emotional impact.

After reviewing the experience with the team, all the EOL professionals expressed this impact, referring to coping with their fears, their work as professionals, wondering whether the program was meeting the needs for which it was created, whether it was worth the trouble, and whether they could help families deal with the pain of their losses. They also mentioned being afraid of their emotions, of reliving the deaths several times a day, of the feelings emerging day by day and having to cope with them during their interventions, of infection and of infecting their relatives. The team also referred to all they had learned, the rewarding aspect of teamwork, the excellent collaboration between coworkers, the need to share with others, to help and be helped, to take care of each other. All the team members appreciate kindness of all the families they helped, who, although undergoing extreme pain, also cared for the professionals who were helping them, and not least, the vast amount of personal health resources human beings have in critical situations.

RESULTS

After approval by the Clinical Research Ethics Committee (CEIm) of Vall d'Hebron University Hospital PR(AG)435/2020, we analyzed descriptive data collected during the EOL program implementation.

The results obtained from data gathering during the EOL program intervention are shown below. **Table 4** shows the socio-demographic data of the patients and their families, describing the main characteristics of the sample. The program attended 359 relatives from a total sample of 219 patients, of which 55.3% were COVID-19 and 44.7% had other pathologies. Mean age of patients in EOL situations was 70.86 (14.85), and 53% were men. As regards relatives, 59.3% were women, and 94.8% had a first-degree relationship, 57.3% being consanguinity related.

Concerning the functioning of the program, it was activated in most situations (85%), although in some cases it was not, mostly during the night shift. This was due to communication difficulties because of the chaotic environment and the shift changes between the usual HCT and ward HCT. In general, up to 78% of relatives were able to come and say goodbye to their loved ones. From among the total sample, in one-third of cases (31.8%), the intervention was performed after the death of the patient (see **Table 5**). This could be explained because the family could not arrive to say goodbye or because the urgency of the situation made it necessary to prioritize the farewell, intervening afterwards.

Main interventions were EOL type (92.5%), and in most cases they were performed face to face (76.2%). Despite that, 23.8% were telephone-based, either because they decided not to come or because of illness or other conditions that prevented them from coming. The main reasons were being infected with COVID-19, belonging to a risk group, or living far away in a lockdown context. In a few cases, families reported not wanting to come because of the emotional impact or the emotional distance with their relative. Despite the telematic intervention, the quality of the setting was taken into account, and relatives had full access to psychological and social work aids if necessary. Regarding communication of loss interventions, almost all were performed in COVID-19 cases (96%). It could be explained because this group had substantially more hospitalized relatives, probably because of family clusters transmission.

DISCUSSION

This study aimed to describe the first face-to-face structured experience of an EOL intervention program during the COVID-19 pandemic. Our experience agrees with the review of Mayland et al. (48), which shows that the pandemic context leads to a disruption, affecting an individual's ability to connect with the

TABLE 4 | Socio-demographic data of the patients and their families*.

	All Patients	COVID-19	Other pathologies
Patients attended	*N* = 219	*n* = 121 (55.3%)	*n* = 98 (44.7%)
Men	116 (53%)	58 (47.9%)	58 (59.2%)
Women	103 (47%)	63 (52.1%)	40 (40.8%)
Mean age	70.86 (14.85)	71.22 (13.95)	70.42 (15.95)
Men	68.37 (12.54)	67.88 (11.51)	68.86 (13.57)
Women	73.67 (16.71)	74.30 (14.34)	72.68 (18.86)
Area of origin			
Barcelona city	169 (77.2%)	105 (86.8%)	64 (65.3%)
Metropolitan area	33 (14.1%)	10 (8.3%)	23 (23.5%)
Other	17 (7.8%)	6 (4.9%)	11 (11.2%)
Date of hospitalization			
Before March	9 (4.1%)	6 (5%)	3 (3.1%)
As of March (included)	210 (95.9%)	115 (95%)	95 (96.9%)
Hospitalization time (days)	12.16 (14.35)	16.51 (16.67)	7.37 (9.21)
Month of intervention			
Attended to in April	130 (59.4%)	86 (66.2%)	44 (33.8%)
Attended to in May	89 (40.6%)	35 (39.3%)	54 (60.7%)
Inpatient death	195 (89%)	103 (85.1%)	92 (93.9%)
Relatives attended	359	212 (58.3%)	147 (41.7%)
Men	146 (40.7%)	94 (44.3%)	52 (35.4%)
Women	213 (59.3%)	118 (55.7%)	95 (64.6%)
Average number of relatives attended to	1.76 (1.11)	1.84 (1.18)	1.65 (1)
Relationship degree*	*N = 211*		
First-degree**	200 (94.8%)	114 (96.6%)	86 (92.5%)
Other	11 (5.2%)	4 (3.4%)	7 (7.5%)
Relationship			
Consanguinity	121 (57.3%)	69 (58.5%)	52 (55.9%)
Affinity	31 (14.7%)	12 (10.2%)	19 (20.4%)
Both	59 (28%)	37 (31.4%)	22 (23.7%)
Families with other members hospitalized	25	23 (92%)	2 (8%)

**The data collection was done for a clinical purpose and there's information lost that caused an attrition of eight subjects in some variables.*
***At least one first-degree relative.*

deceased both before and after death. This can impact grief, and the usual societal and cultural rituals may appear to be rushed, altered, or absent. Since hospitals became the usual place for EOL situations, and families, especially socio-economically vulnerable ones, were under great stress, it was necessary to develop an EOL program. Our program took all this into account and was based on both specific COVID-19 recommendations (e.g., support to adapt funerals or rituals) (44) and families' perceptions of EOL care (e.g., emotional support) (45).

As expected, (27), due to COVID-19-related restrictions, families with COVID-19 patients as well as families with no COVID-19 patients were affected and benefited from the program, even when the curve was finally beginning to flatten. Regarding the interventions, during the day shift most of the face-to-face interventions were psychosocial, while the rest were attended only by the HSW when the need for psychological aid was not detected. Although most of the interventions were EOL, some of them involved supportive communication with the relatives of a deceased person. This is an example of a situation initially not contemplated that the program ended up covering and adapting to. Most EOL interventions took place on the same day or the day before the decease. Also, most of the relatives could come to the hospital in person to bid farewell to their loved ones. Sadly, due to the unpredictability and severity of COVID-19, some relatives arrived after the death of their loved one. In other cases, the team did not even have time to contact them because of the sudden death of the patient while being admitted to the hospital.

Regarding the staff's experience, we highlight the reported emotional impact due to the nature of the work and the fact that it was carried out in unusual conditions (49). Working and sharing as a team, or being on shifts that were not too long was considered by the team as ways to mitigate the perceived impact.

As stated, to our knowledge no other face-to-face EOL programs have been formally presented in the COVID-19 context. Only one similar program during the COVID-19 pandemic was found in a phone-based format (50), and although no quantitative efficacy assessment was reported they identified

TABLE 5 | Types of intervention.

	EOL			Communication of a death		
	COVID-19	**Other pathologies**	**Total**	**COVID-19**	**Other pathologies**	**Total**
Number of interventions	*n* = 123	*n* = 81	*N* = 204	*n* = 26	*n* = 1	*N* = 27
Case type	54,3%	38,2%	92.5%	7%	0.5%	7.5%
Average interventions by case	1,22 (0.48)	1.14 (0.4)	1.19 (0.45)	2 (1)	1	1.93 (1)
Intervention type						
Face-to-face	44.2%	32%	76.2%	50%	7.1%	57.1%
Telephone	14.5%	9.3%	23.8%	42.9%	0%	42.9%
Shift						
Day shift	46.5%	24.4%	70.9%	92.9%	7.1%	100%
Night shift	12.2%	16.9%	29.1%	0%	0%	0%
Localization						
Hospitalization	22.1%	18.6%	40.7%	28.6%	7.1%	35.7%
ICU	24.4%	11.1%	35.5%	64.3%	0%	64.3%
Emergency department	12.2%	11.6%	23.8%	0%	0%	0%
Day of intervention						
Day of death	34.6%	26.5%	61.1%	–	–	–
One day before death	11.1%	6.2%	17.3%	–	–	–
Other	13.6%	8%	21.6%	–	–	–
Moment of intervention						
Before death	33.8%	18.9%	52.7%	–	–	–
After death	14.9%	16.9%	31.8%	–	–	–
Both	10.8%	4.7%	15.5%	–	–	–

ICU, intensive care unit.

several useful roles CP can play in this scenario (29). Other EOL programs in ICU prior to the pandemic were found (45), using different approaches involving multidisciplinary family meetings, communication facilitators, and collaborations with palliative care professionals. Most of the interventions were not found to be effective because they were not guided by families' perceptions and needs, an aspect we made sure to incorporate whenever possible.

STRENGTHS AND LIMITATIONS

Among the strengths of this study, the face-to-face nature of our program, in the midst of the high-restriction pandemic context, constitutes its main effectiveness. Another strength is its feasibility and ability to adapt and grow in an unstable context and chaotic environments. We also value its multidisciplinarity. On creating teams formed of HSW and CP in coordination with the HCT, we managed to provide a combined interdisciplinary intervention.

Nevertheless, it has some limitations. The first one is the lack of efficacy assessment of PGD prevention, basically due to ethical considerations. In further studies, outcomes measured to assess the efficacy of intervention should be taken into account, in order to evaluate the potential impact of the interventions on both families and professionals. Regarding the emotional impact on the team, we believe a higher level of rotation could help to mitigate it. Finally, to create a greater team spirit and to cover night shifts with psychological aid, the shifts should be unified for all professional categories.

CONCLUSION

Structured programs addressing EOL situations and taking care of families and patients during the death and mourning processes should be a priority to prevent PGD and other associated complications. The COVID-19 pandemic placed the health system in a critical situation, where more programs responding to patients' psychosocial needs and those of their families are required.

DATA AVAILABILITY STATEMENT

The datasets used and analyzed during the current study will be made available by the corresponding author upon reasonable request

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Clinical Research Ethics Committee (CEIm) of Vall d'Hebron University Hospital. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

All the authors have contributed to the intervention, design, acquisition, analysis, interpretation, and/or review of the work and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ACKNOWLEDGMENTS

The authors are grateful to the Citizen's Advice Service of the HUVH for all the facilities provided, to the Support Team for its coordination and help during this process, and most especially, to all the families that trusted us in their hardest moments of loss, a sincere thank you for letting us stay.

REFERENCES

1. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Biomedica.* (2020) 91:157–60. doi: 10.23750/abm.v91i1.9397
2. Spiteri G, Fielding J, Diercke M, Campese C, Enouf V, Gaymard A, et al. First cases of coronavirus disease 2019 (COVID-19) in the WHO European Region, 24 January to 21 February 2020. *Euro Surveill.* (2020) 25:2000178. doi: 10.2807/1560-7917.ES.2020.25.9.2000178
3. Real Decreto 463/2020, de 14 de marzo, por el que se declara el estado de alarma para la gestión de la situación de crisis sanitaria ocasionada por el COVID-19. *Boletín Oficial del Estado*. (2020) 67:25390–400.
4. Saez M, Tobias A, Varga D, Barceló MA. Effectiveness of the measures to flatten the epidemic curve of COVID-19. The case of Spain. *Sci Total Environ.* (2020) 727:138761. doi: 10.1016/j.scitotenv.2020.138761
5. Rodríguez-Rey R, Garrido-Hernansaiz H, Collado S. Psychological impact and associated factors during the initial stage of the coronavirus (COVID-19) pandemic among the general population in Spain. *Front Psychol.* (2020) 11:1540. doi: 10.3389/fpsyg.2020.01540
6. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Christos I, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int J Surg.* (2020) 78:185–93. doi: 10.1016/j.ijsu.2020.04.018
7. Legido-Quigley H, Mateos-García JT, Campos VR, Gea-Sánchez M, Muntaner C, McKee M. The resilience of the Spanish health system against the COVID-19 pandemic. *Lancet Public Heal.* (2020) 5:e251–2. doi: 10.1016/S2468-2667(20)30060-8
8. Salazar de Pablo G, Serrano JV, Catalan A, Arango C, Moreno C, Ferre F, et al. Impact of coronavirus syndromes on physical and mental health of health care workers: systematic review and meta-analysis. *J Affect Disord.* (2020) 275:48–57. doi: 10.1016/j.jad.2020.06.022
9. Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. *Lancet Infect Dis.* (2020) 20:773. doi: 10.1016/S1473-3099(20)30195-X
10. World Health Organization. *Coronavirus Disease (COVID-19) Weekly Epidemiological Update: Data as Recieved by WHO From National Authorities, as of 10 am CET 21 February 2021*. Available online at: https://www.who.int/publications/m/item/weekly-epidemiological-update---23-february-2021 (accessed March 06, 2021).
11. Bowlby J. Processes of mourning. *Int J Psychoanal.* (1961) 42:317–40.
12. Lindemann E. Symptomatology and management of acute grief. *Am J Psychiatry.* (1944) 151:155–60. doi: 10.1176/ajp.101.2.141
13. Bowlby-West L. The impact of death on the family system. *J Fam Ther.* (1983) 5:279–94. doi: 10.1046/j.1983.00623.x
14. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders.* 5th ed. Washington, DC: Author (2013).
15. Eisma MC, Rosner R, Comtesse H. ICD-11 prolonged grief disorder criteria: turning challenges into opportunities with multiverse analyses. *Front Psychiatry.* (2020) 11:752. doi: 10.3389/fpsyt.2020.00752
16. Shear MK, Simon N, Wall M, Zisook S, Neimeyer R, Duan N, et al. Complicated grief and related bereavement issues for DSM-5. *Depress Anxiety.* (2011) 28:103–17. doi: 10.1002/da.20780
17. Mortazavi SS, Assari S, Alimohamadi A, Rafiee M, Shati M. Fear, loss, social isolation, and incomplete grief due to COVID-19: a recipe for a psychiatric pandemic. *Basic Clin.* (2020) 11:225–32. doi: 10.32598/bcn.11.covid19.2549.1
18. Farahmandnia B, Hamdanieh L, Aghababaeian H. COVID-19 and unfinished mourning. *Prehosp Disaster Med.* (2020) 35:464. doi: 10.1017/S1049023X20000631
19. Eisma MC, Lenferink LIM, Chow AYM, Chan CLW, Li J. Complicated grief and post-traumatic stress symptom profiles in bereaved earthquake survivors: a latent class analysis. *Eur J Psychotraumatol.* (2019) 10:1558707. doi: 10.1080/20008198.2018.1558707
20. Lobb EA, Kristjanson LJ, Aoun SM, Monterosso L, Halkett GKB, Davies A. Predictors of complicated grief: a systematic review of empirical studies. *Death Stud.* (2010) 34:673–98. doi: 10.1080/07481187.2010.496686
21. Castle J, Phillips WL. Grief rituals: aspects that facilitate adjustment to bereavement. *J Loss Trauma.* (2003) 8:41–71. doi: 10.1080/15325020305876
22. Eisma MC, Tamminga A, Smid GE, Boelen PA. Acute grief after deaths due to COVID-19, natural causes and unnatural causes: an empirical comparison. *J Affect Disord.* (2021) 278:54–6. doi: 10.1016/j.jad.2020.09.049
23. Eisma MC, Tamminga A. Grief before and during the COVID-19 pandemic: multiple group comparisons. *J Pain Symptom Manage.* (2020) 60:e1–4. doi: 10.1016/j.jpainsymman.2020.10.004
24. Bear L, Nikita S, Angland M, Bhogal JK, Bowers R, Cannell F, et al. *'A Good Death' During the Covid-19 Pandemic in the UK: A Report on Key Findings and Recommendations*. London: London School of Economics and Political Science (2020). p. 1–17. Available at: http://eprints.lse.ac.uk/104143/ (accessed September 04, 2020).
25. Social Science in Humanitarian Action. *Key Considerations: Dying, Bereavement and Mortuary and Funerary Practices in the Context of COVID-19.* (2020). Available online at: https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/15236/SSHAP%20COVID-19%20brief.%20Death%20and%20funerals.pdf?sequence=1&isAllowed=y (accessed September 04, 2020).
26. Eisma MC, Boelen PA, Lenferink LIM. Prolonged grief disorder following the Coronavirus (COVID-19) pandemic. *Psychiatry Res.* (2020) 288:113031. doi: 10.1016/j.psychres.2020.113031
27. Menichetti JP, Borghi L, Cao di San Marco E, Fossati I, Vegni E. Phone follow up to families of COVID-19 patients who died at the hospital: families' grief reactions and clinical psychologists' roles. *Int J Psychol.* (2021) 1–14. doi: 10.1002/ijop.12742
28. Arango C. Lessons learned from the coronavirus health crisis in Madrid, Spain: how COVID-19 has changed our lives in the last 2 weeks. *Biol Psychiatry.* (2020) 20:31493–1. doi: 10.1016/j.biopsych.2020.04.003
29. Caswell G, O'Connor M. 'I've no fear of dying alone': exploring perspectives on living and dying alone. *Mortality.* (2019) 24:17–31. doi: 10.1080/13576275.2017.1413542
30. Teno JM, Clarridge BR, Casey V, Welch LC, Wetle T, Shield R, et al. Family perspectives on end-of-life care at the last place of care. *J Am Med Assoc.* (2004) 291:88–93. doi: 10.1001/jama.291.1.88
31. Singer PA, Martin DK, Kelner M. Quality end-of-life care patients' perspectives. *JAMA.* (1999) 281:163–8. doi: 10.1001/jama.281.2.163
32. Ajuntament de Barcelona. Departament d'Estadística i Difusió de Dades. *Indicadors Socials*. (2018). Available online at: https://www.bcn.cat/estadistica/catala/dades/anuari/cap04/C0401010.htm (accessed September 15, 2020).
33. Diputació Barcelona. *Informació Estadística Local: Programa Hermes*. Available online at https://www.diba.cat/hg2/presentacioMun.asp?prId=954&idioma=cat&codi_ine=08125&poblacio.codi_any=DPA2019&agrupacio_demografia=QUIN&format=pantalla (accessed September 15, 2020).

34. Brooke J, Jackson D. Older people and COVID-19: isolation, risk and ageism. *J Clin Nurs.* (2020) 29:2044–6 doi: 10.1111/jocn.15274
35. Dahab M, van Zandvoort K, Flasche S, Warsame A, Ratnayake R, Favas C et al. COVID-19 control in low-income settings and displaced populations: what can realistically be done? *Confl Health.* (2020) 14:54. doi: 10.1186/s13031-020-00296-8
36. Dubey S, Biswas P, Ghosh R, Chatterjee S, Dubey MJ, Chatterjee S, et al. Psychosocial impact of COVID-19. *Diabetes Metab Syndr Clin Res Rev.* (2020) 14:779–88. doi: 10.1016/j.dsx.2020.05.035
37. Marmot, M. Social determinants of health inequalities. *Lancet.* (2020) 365:1099–104. doi: 10.1016/S0140-6736(05)71146-6
38. Baena-Díez JM, Barroso M, Cordeiro-Coelho SI, Díaz JL, Grau M, Impact of COVID-19 outbreak by income: hitting hardest the most deprived. *J Public Health.* (2020) 42:698–703. doi: 10.1093/pubmed/fdaa136
39. Mikolai J, Keenan K, Kulu H. Intersecting household-level health and socio-economic vulnerabilities and the COVID-19 crisis: an analysis from the UK. *SSM Population Health.* (2020) 12:100628. doi: 10.31235/osf.io/4wtz8
40. Mia MA, Griffiths MD. Letter to the editor: the economic and mental health costs of COVID-19 to immigrants. *J Psychiatr Res.* (2020) 128:23–4. doi: 10.1016/j.jpsychires.2020.06.003
41. Thornton J. Clinicians are leading service reconfiguration to cope with Covid-19. *BMJ.* (2020) 369:m1444. doi: 10.1136/bmj.m1444
42. Hermann A, Deligiannidis KM, Bergink V, Monk C, Fitelson EM, Robakis T, et al. Response to SARS-Covid-19-related visitor restrictions on labor and delivery wards in New York City. *Arch Womens Ment Health.* (2020) 793–4. doi: 10.1007/s00737-020-01030-2
43. Wakam GK, Montgomery JR, Biesterveld BE, Brown CS. Not dying alone — Modern compassionate care in the Covid-19 pandemic. *N Engl J Med.* (2020) 382:e88. doi: 10.1056/NEJMp2007781
44. Selman LE, Chao D, Sowden R, Marshall S, Chamberlain C, Koffman J. Bereavement support on the frontline of COVID-19: recommendations for hospital clinicians. *J Pain Symptom Manage.* (2020) 60:81–6. doi: 10.1016/j.jpainsymman.2020.04.024
45. Chen C, Michaels J, Meeker MA. Family outcomes and perceptions of end-of-life care in the intensive care unit: a mixed-methods review. *J Palliat Care.* (2020) 35:143–53. doi: 10.1177/0825859719874767
46. Ó Coimín D, Prizeman G, Korn B, Donnelly S, Hynes G. Dying in acute hospitals: voices of bereaved relatives. *BMC Palliat Care.* (2019) 18:1–16. doi: 10.1186/s12904-019-0464-z
47. Heyland DK, Rocker GM, O'Callaghan CJ, Dodek PM, Cook DJ. Dying in the ICU: perspectives of family members. *Chest.* (2003) 124:392–7. doi: 10.1378/chest.124.1.392
48. Mayland CR, Harding AJE, Preston N, Payne S. Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J Pain Symptom Manage.* (2020) 60:e33–9. doi: 10.1016/j.jpainsymman.2020.05.012
49. Cheng JOS, Li Ping Wah-Pun Sin E. The effects of nonconventional palliative and end-of-life care during COVID-19 pandemic on mental health-junior doctors' perspective. *Psychol Trauma.* (2020) 12:S146–7. doi: 10.1037/tra0000628
50. Borghi L, Menichetti JP, Vegni E. A phone-based early psychological intervention for supporting bereaved families in the time of COVID-19. *Front Public Health.* (2021) 9:625691. doi: 10.3389/fpubh.2021.625691

Conflict of Interest: JR-Q was on the speakers' bureau and/or acted as consultant for Eli-Lilly, Janssen-Cilag, Novartis, Shire, Takeda, Bial, Shionogui, Lundbeck, Almirall, Braingaze, Sincrolab, Medice and Rubió in the last 5 years. He also received travel awards (air tickets + hotel) for taking part in psychiatric meetings from Janssen-Cilag, Rubió, Shire, Takeda, Shionogui, Bial, Medice and Eli- Lilly. The Department of Psychiatry chaired by him received unrestricted educational and research support from the following companies in the last 5 years: Eli-Lilly, Lundbeck, Janssen- Cilag, Actelion, Shire, Ferrer, Oryzon, Roche, Psious, and Rubió.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 07 May 2021
doi: 10.3389/fpsyt.2021.620583

The COVID-19 Disappeared: From Traumatic to Ambiguous Loss and the Role of the Internet for the Bereaved in Italy

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In Italy, in the very first phase of the COVID-19 pandemic there was a dramatic rise in mortality. However, families were forbidden because of lockdown regulations to be with their loved ones at their deathbeds or to hold funerals. This qualitative study examined bereavement experiences among family members, how they processed their grief, and how they used social networks in particular by uploading photographs during the working-through of bereavement. The sample was composed of 40 individuals aged 23–63 (80% women) from different Italian cities severely impacted by the virus, including a subgroup from the province of Bergamo, which was the city with the highest mortality rate during that time. All interviews were conducted by phone, Skype, or Zoom. Then, the transcriptions underwent a thematic analysis using Atlas.ti. The main themes that emerged were: abandonment anger and guilt, dehumanized disappeared, derealization and constant rumination, and social support and the importance of sharing photos on Facebook. Importantly, the use of social networks proved to be a valuable source of support and photographs were a powerful tool in facilitating the process of mourning by encouraging narration and sharing. Grief had a complex profile: on the one hand, it was traumatic and characterized by all the risk factors causing mourners to experience prolonged grief, but on the other, some features were similar to ambiguous loss (that occurs without closure and clear understanding) because of the impossibility to be with their relatives in their final moments. The possible relationships between ambiguous loss, the use of internet, and the risk of prolonged grief are discussed.

Keywords: COVID-19, traumatic loss, ambiguous loss, prolonged grief, photography, facebook

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Laura Orsolini, University of Hertfordshire, United Kingdom
Arndt Büssing, Witten/Herdecke University, Germany
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *23 October 2020*
Accepted: *30 March 2021*
Published: *07 May 2021*

Citation:
Testoni I, Azzola C, Tribbia N, Biancalani G, Iacona E, Orkibi H and Azoulay B (2021) The COVID-19 Disappeared: From Traumatic to Ambiguous Loss and the Role of the Internet for the Bereaved in Italy. Front. Psychiatry 12:620583. doi: 10.3389/fpsyt.2021.620583

INTRODUCTION

After China, Italy was the first country to suffer the dramatic and unexpected consequences of the COVID-19 pandemic (1, 2). The virus exploded in the last week of February, seriously affecting some provinces in Northern Italy, including Bergamo (3). The excess deaths (91% of the total mortality rate beyond the national average in March 2020) was concentrated in the period between February 20 (first COVID-19 deaths) and March 31. Compared to the average for the same period from 2015 to 2019, in those regions, it reached 25,354, of which 54% were the deaths diagnosed

as COVID-19 (13,710) (4). In March, in the provinces most affected by the epidemic, 280% more deaths were reported (including Bergamo: 568%) (4). Local communities and health services were overwhelmed by demands for care that they were unable to handle (5). Many families saw their loved ones get into an ambulance and never return, only to receive their ashes some time later. For most, no funerals could be organized and the bereaved were forbidden to find comfort in a friendly embrace because of the lockdown restrictions.

Under such conditions, these losses can be considered traumatic (6), because they occurred in sudden and tragic circumstances. The lockdown also instituted a prolonged period of restrictions and social distancing (7), which negatively impacted people mental health (8), interfering with work and normal relationships of caring and social support (9), including end-of-life rites and funeral rituals. For this reason, the loss resulted in a traumatic experience, especially because it was impossible to take leave of even the most important attachment figures.

Some of the bereaved spontaneously gathered in virtual groups on Facebook during the lockdown, where they could talk about this painful experience and deal with the unusual death of their loved ones. A virtual community of self-help and mutual aid groups emerged in which participants could express their grief over their loss by posting their thoughts or photographs of their deceased loved ones. The internet became a psychological living space that responded to needs that could not be satisfied in the real world, and allowed individuals to create a dimension where their mourning could be socially shared (10). The term "thanatechnology" refers to the computer tools through which information about deceased persons, forms of commemoration, and forms of psychological and spiritual support can be provided via the internet (11, 12). Research on grief and mourning in digital environments often focuses on the cultural practices and meanings that are played out through digital means (12). Thus, the internet has modified the approach to loss and death, because the image of the deceased can be seen by anyone who accesses the site anywhere in the world. In particular, researchers have described how in many cases, relative and friends can rekindle the memory of the dead by uploading photos on the deceased's personal page (12). This practice seems to be an important source of social support for mourners, who draw strength from the comments and the messages shared within the community (13). The sharing of photos and videos made it possible to involve other individuals and gain visibility, thus attesting to the existence of the presence of the deceased (14). This strategy takes the form of remembering and being remembered (15). Studies have underscored the importance of the use of photographs in the management of grief and mourning, both in real life (16, 17) and on the internet (18).

In Northern Italy, in the areas most affected by the pandemic in the first phase, a virtual community was formed. Its purpose was to offer participants a space for the commemoration of their dead and mutual support. In the present study, we discuss the results of a qualitative investigation of this experience and the elaboration of traumatic grief through the internet by some of mourners who lost their loved ones to COVID-19.

The aim of this qualitative study was to investigate whether and how bereaved individuals coped with their mourning during the lockdown and in its aftermath through the use of Facebook. In particular, we investigated how the photographs uploaded to social networks were used, and how they were shared. We also explored the characteristics of this kind of mourning. We hypothesized that this type of mourning would presents specific characteristics that could best be explored by a grounded (i.e., bottom-up) perspective.

MATERIALS AND METHODS

Participants

The sample was composed of 40 individuals aged 23 = 63 (M = 47, SD = 9.85; 80% female) from different Italian cities hard hit by COVID-19. A subgroup (13 out of 40) lived in the province of Bergamo, one of the areas most severely affected by the virus (3, 19). Three of the participants lived outside Italy but their deceased family member lived in Bergamo. Participants were recruited using a convenience sampling. This non-probabilistic strategy does not allow to generalize the results. Participants were contacted by researchers through a Facebook group founded by those who had lost loved ones because of COVID-19 and expressed their grief by sharing their stories and photographs of their deceased on the forum. The number of participants stopped at 40 as the topics were saturated. The number of participants is appropriate for a qualitative research, according with the standards required for qualitative method (20, 21).

Data Collection and Data Analysis

Each participant was interviewed by phone, Skype, or Zoom, with an average of 60 min for call. The interview method was explained in advance to the participants, so they were asked to choose which channel was most convenient for them. Participants who were less skilled with technological devices opted for a phone call, those who were more skilled opted for the use of Skype or Zoom platforms. A semi-structured interview, specifically created for the collection of research data, was conducted. Specifically, it consists of 12 questions divided into four thematic areas: the narration of the experience (four questions), perceived resources or misses (three questions), funeral rituals (three questions), and personal beliefs about the themes of death (two questions) (see **Appendix A**). The interview aimed to explore the resources the participants drew upon to deal with their pain and the lack of physical support from friends and relatives, when dealing with the trauma of not being able to be physically with or say goodbye to their loved one. The main topics addressed in the interviews were the experiences related to the painful event before and after the news of the death of their relative and the resources they tapped to deal with the event and the mourning process. Particularly, participants were asked how Facebook had been experienced, and were asked to show the interviewer the photos uploaded to the website, to facilitate dialogue and memories. The study was inspired to the Grounded Theory perspective and involved qualitative research in psychology with in-depth interviews, because this approach makes it easier to understand subjective stories (22, 23). The Grounded Theory

TABLE 1 | Results.

Thematic area	Code	Frequency	Example
1. Abandonment: anger and guilt	(a) Feeling abandonment by the health services	34	The healthcare system failed to respect the right to care of its citizens. It did not respect the right of every citizen to be treated. My father told me on the last day that I spoke to him that "we have been abandoned," and I think this is true, not because of the doctors but because of those above them who were unable to handle the emergency. The physicians and nurses are not guilty because it was a terrible experience for them too, and many of them died because they didn't even know what was happening. Both my parents fell ill and were not protected.
	(b) Desire of revenge	17	At that moment I was not thinking about the lack of family but about my mother, who had passed with no one near her to watch over her and certainly did not deserve to die in that inhuman way. They covered her with a sheet and zipped up a black body bag. That's all. It is not the right way to treat a human being who dies in this way.
	(c) Sense of abandonment their loved	19	First of all, what makes us all suffer is the fact that we could not be near her, holding her hand in her last moments. I feel stupid saying this, but I suffer because I feel I abandoned my mother at the most important moment and inside, I imagine her dying alone. When I was finally able to go to her grave, I apologized to her and explained that I was not allowed to be near her when she died.
2. Dehumanized disappeared	(a) Non-acceptance of reality	30	What doesn't allow me to accept reality, like all those who have had an experience similar to mine, is the fact that I abandoned my mother. My mother in this way has become just a number in the daily statistics on the lethality of the virus. I could not see her again. It is as if she had disappeared.
	(b) Lack of humanity	16	It is incredible, but I could not be next to my father during his illness, he died alone, even afterwards I had no opportunity to say goodbye to him. He was treated like a piece of dead meat, he was taken naked, without clothes, they washed him down with disinfectant and he was put in a black bag. It was heart-breaking, these are all things that give me no peace and make me think that my father was just a piece of meat.
	(c) Lack of funeral ceremonies	17	I can't get over what happened. Not being able to hold a funeral for my brother made everything difficult for me. A funeral, whether religious or not, is a moment that unites the bereaved who gather and process the sense of loss and take stock of the reality of the end.
	(d) Derealization	30	Like others with whom I share experiences on Facebook, it often seems like a dream to me too. I still don't really realize what happened. I know he died, rationally, but I can't close the circle without having seen him and without being able to accompany him. It seems to me that everything could go back to the way it was before. He is going to come through the door and that I can wake up from this nightmare.
3. Derealization and constant rumination	(a) Need for clarity	13	It is all too unclear. It is not clear what happened. I'm waiting for the medical records to see, to be able to make sense of it and give me concrete explanations.
	(b) Constant rumination	23	At first I found it hard to believe it because it seemed impossible that it could happen like this. So I started brooding, saying "But no, it's not possible, it can't be like this, what went wrong? It can't have been like that." And the more I think about it, the angrier I get, it's really difficult to manage because the pain of not being able to see my father for 5 weeks, and in the end not being able to be with him when he died is still unbearable and I keep thinking about it.
	(c) Insomnia	14	We are all afraid of getting sick, of infecting others and afraid that everything, when we get back to normal, will be forgotten. We were up all night waiting for calls from the hospital. Even now it is difficult to fall asleep.
4. Social support and the importance of sharing photos on Facebook	(a) - Religion source of support - Religion as an impediment	7	The dialogue with God helped me. Religion supported me. At times like this, you either lose faith or gain faith.
		6	Anger makes me think that my father is now just dust. What God can allow all this? What plan does God have for all this to happen? By now I believe that if a God exists, He is a Nazi. Tonight there will be a mass for my father, but right now I have to say...what do I care?

(Continued)

TABLE 1 | Continued

Thematic area	Code	Frequency	Example
	(b) Support from Social Network	29	I liked sharing this photo because here my mother was lively, she smiled, she could move. It was her wedding anniversary, we had prepared a small cocktail party and she was happy, my mother loved to eat, she ate to sample and enjoy. Remembering her like that gave me relief and helps me to think of her as happy.
	(c) Importance of sharing photos on Facebook	15	I tried to show the anguish through photography. This angel looks out the window. An angel should be in heaven, instead he stands here, looking out the window. I mean we are the angels who are on Earth and the angels who are in heaven are the stars that illuminate us at night.

offers a practical and flexible approach to interpret complex social phenomena not yet sufficiently studied. Indeed this approach does not start with testing an existing hypothesis but uses the empirical data to generate concepts and theories (22, 23). Thus, one of the benefits of this perspective is the actively reflective position of the researcher while interacting with data, which involves the generation of analytical categories and the identification of relationships between them. The thematic analysis method was adopted to analyze the data, because it offers an accessible and theoretically flexible approach, and it is consistent with the framework of the Grounded Theory (24). Indeed, the conversations were recorded and transcribed in preparation for the Thematic Analysis, in which we identified the patterns of themes using a bottom-up approach (8, 25). All the texts were processed using Atlas.ti software (26), which allows researchers to work directly on written texts, highlight portions of them, create labels to be inserted in each text that can adequately represent the fundamental themes, and construct larger clusters of meaning by comparing the data obtained from each text (27). The numbers indicated in each quote in the following description of the results specify the interview number that corresponds to each participant (from 1 to 40) and the order number refers to the place of quote in the working text in Atlas.ti. Four researchers who conducted this study offered their expertise in qualitative data analysis and code identification. The research followed APA Ethical Principles of Psychologists and Code of Conduct and the principles of the Declaration of Helsinki, so participants were explained in detail all the objectives of the research and the methodology of analysis used. They were asked permission to record the conversations, to transcribe their answers and to analyze their contents in order to study the phenomenon. We have guaranteed them to anonymize the contents of the obtained texts and only those who have given written and signed consent have participated in the research. This study was approved by the Ethics Committee for Experimentation of the University of Padua (n. 27331296116C7206D8A5B61A06F4845B). In addition, a written informed consent was obtained from the author of the photographs to freely use the photographs for the publication of this article.

RESULTS

Most of the participant of this study had lost their father (22 people out of 40) or mother (16 people out of 40); six participants had two losses: five had lost both parents and one had lost his father and grandfather; three of the respondents had lost one of their grandparents, three wives had lost their husband, and finally two participants out of 40 had lost their brother. With respect to level of education, 12 subjects of the participants had an academic degree (including PhD), 16 out of 40 had a junior high school level, and the others (12 out of 40) had high school diplomas. All believers were Christian, except one who was a Buddhist. Specifically, 19 participants out of 40 stated they were believers but not practitioners (among whom seven of them who had lost their faith because of COVID-19); 12 subjects out of 40 were believer and practitioners (among whom five of them had lost their faith, whereas three of them had strengthened their faith in God); 6 people out of 40 were atheists and one person did not respond.

The analysis yielded the following four main themes: abandonment anger and guilt, dehumanized disappeared, derealization and constant rumination, and social support and the importance of sharing photos on Facebook (**Table 1**). Illustrating photos are in the online **Supplementary Material** File. All the names cited below are fictitious (pseudonym) to prevent any possibility of identification of the participants.

Theme 1: Abandonment: Anger and Guilt

Feeling Abandonment by the Health Services

All the participants experienced an intense feeling of abandonment by the health services who were unable to provide care in this extraordinary emergency crisis. For example, Amelia talked about here experience: "The healthcare system failed to respect the right to care of its citizens. It did not respect the right of every citizen to be treated. My father told me on the last day that I spoke to him that 'we have been abandoned,' and I think this is true, not because of the doctors but because of those above them who were unable to handle the emergency. The physicians and nurses are not guilty because it was a terrible experience for them too, and many of them died because they didn't even know what was happening. Both my parents fell ill and were not protected" [7:13].

Desire of Revenge

Resentment also characterized all the narratives, accompanied by a desire for revenge that led the participants to join to a committee formed to condemn the situation and take legal action against the health care system. The most outrageous was the impossibility to say goodbye to their relatives and not being able

to hold a funeral. For example, Clara stated "At that moment I was not thinking about the lack of family but about my mother, who had passed with no one near her to watch over her and certainly did not deserve to die in that inhuman way. They covered her with a sheet and zipped up a black body bag. That's all. It is not the right way to treat a human being who dies in this way" [2:19].

Sense of Abandonment Their Loved

The lockdown exacerbated this experience of anger and resentment, loading it further with a strong sense of powerlessness and helplessness caused by the impression of having abandoned loved ones. Cinzia stated "First of all, what makes us all suffer is the fact that we could not be near her, holding her hand in her last moments. I feel stupid saying this, but I suffer because I feel I abandoned my mother at the most important moment and inside, I imagine her dying alone. When I was finally able to go to her grave, I apologized to her and explained that I was not allowed to be near her when she died" [21:19].

Theme 2: Dehumanized Disappeared

Non-acceptance of Reality

This anger and discouragement was accompanied by a non-acceptance of reality because it was unacceptable to have abandoned loved ones to their fate without being able to see them again. Speaking about his mother who died in a nursing home, Mauro said "What doesn't allow me to accept reality, like all those who have had an experience similar to mine, is the fact that I abandoned my mother. My mother in this way has become just a number in the daily statistics on the lethality of the virus. I could not see her again. It is as if she had disappeared" [11:2].

Lack of Humanity

The idea of dehumanization characterized the sense of unreality of the experience, as Ludovica said: "It is incredible, but I could not be next to my father during his illness, he died alone, even afterwards I had no opportunity to say goodbye to him. He was treated like a piece of dead meat, he was taken naked, without clothes, they washed him down with disinfectant and he was put in a black bag. It was heart-breaking, these are all things that give me no peace and make me think that my father was just a piece of meat" [10:4]. Luca discussed the dehumanization of pandemic victims, saying "Even when the numbers are high, they are just numbers. It is not detectable physically, it is ethereal and different from a devastating earthquake where there is solidarity and is palpable, like the tsunami in Indochina where everyone donated a euro to support them. Here no one feels any solidarity. Facebook and the sharing of stories and photos are a form of recognition, a restoring of a human identity to the dead, because no one has given it to them" [11:12].

Edoardo referred to the fact that his city commemorated the victims of COVID-19 with an installation of objects which have a symbolic meaning and commented: "The idea is good, but if we do not put first and last names and photographs on those objects, people are denied once again. People who died had a first name and a last name, so we have to put some history, otherwise this is not a way to remember that they were people and not just numbers."

Lack of Funeral Ceremonies

The further lack of funeral ceremonies did not allow the bereaved to process the loss in a healthy way, as Asia pointed out: "I can't get over what happened. Not being able to hold a funeral for my brother made everything difficult for me. A funeral, whether religious or not, is a moment that unites the bereaved who gather and process the sense of loss and take stock of the reality of the end" [16:23].

Derealization

The impossibility of accompanying one's loved one on their final journey triggered a strong feeling of derealization (i.e., feeling detached from the external world that seems distorted and unreal), an incredulity that was characterized by brooding over negative thoughts, as expressed clearly by Ilaria: "I still can't realize that my mother is dead. I keep thinking about all the possible scenarios of her death… If I had kept her at home maybe she would still be alive. Or if they treated her like an animal. She couldn't breathe and they gave her morphine to make her die. All the dead in this country died in this way, like animals" [19:8]. Denise said: "Until recently, I still believed she was still in the nursing home. My grandmother had underlying conditions but she was fine and …. not having seen it with my own eyes when she died I find it hard to think that she is not there and that I cannot go to see her" [1:7]. Adelaide also described a similar experience "Like others with whom I share experiences on Facebook, it often seems like a dream to me too. I still don't really realize what happened. I know he died, rationally, but I can't close the circle without having seen him and without being able to accompany him. It seems to me that everything could go back to the way it was before. He is going to come through the door and that I can wake up from this nightmare" [15:2].

Theme 3: Derealization and Constant Rumination

Need for Clarity

Federica still felt unable to acknowledge that her beloved was dead because she was convinced that there were too many inconsistencies and for this reason she suspects that there were mistakes that have been concealed to the public: "It is all too unclear. It is not clear what happened. I'm waiting for the medical records to see, to be able to make sense of it and give me concrete explanations" [2:20].

Constant Rumination

The search for evidence triggered constant rumination in almost all participants, as Emily described: "At first I found it hard to believe it because it seemed impossible that it could happen like this. So I started brooding, saying 'But no, it's not possible, it can't be like this, what went wrong? It can't have been like that.' And the more I think about it, the angrier I get, it's really difficult to manage because the pain of not being able to see my father for 5 weeks, and in the end not being able to be with him when he died is still unbearable and I keep thinking about it" [13:5].

Insomnia

Another typical feeling that led to insomnia was fear, as described by Margherita: "we are all afraid of getting sick, of infecting others and afraid that everything, when we get back to normal, will be forgotten. We were up all night waiting for calls from the hospital. Even now it is difficult to fall asleep" [30:31]. Ruminating causes insomnia, as Adriano, said: "I don't sleep much, I wake up in the middle of the night and my thoughts go straight to my mother because I don't know how she spent those 4–5 days in the hospital before she died. She disappeared and I don't know where she went, what happened to her, how she died. I don't sleep anymore and I think about it, I wonder if she was lucid or if they sedated her with some medication. Then I think about my brother and when he was able to see her. At that time, she took off her watch and gave it to him. She never took off her watch. It was a message 'take my time because mine is over.' I keep thinking back to when they loaded her into the ambulance and she disappeared. That was the last time I saw her. I can no longer sleep and I keep thinking about all this" [8:16]. He continues: "I live this loss probably like the relatives of the 85 who died in the [1980] Ustica plane that crashed. Even 40 years later, they still don't know what happened and have not received an explanation" [8:24].

Theme 4: Social Support and the Importance of Sharing Photos on Facebook

Analysis of the participants' descriptions of their sources of support to manage their loss highlighted the importance of close relatives and friends, and sometimes neighbors. Funeral home directors emerged as some of the most pro-social figures who were able to support the bereaved during the funerals and the cremations. Some also found comfort in work, hobbies and volunteering that allowed them to overcome their sense of helplessness.

Religion

Religion was not considered an unequivocal source of support. Some found sustenance in God like Emiliano: "The dialogue with God helped me. Religion supported me. At times like this, you either lose faith or gain faith" [33:6]. Michele said: "Anger makes me think that my father is now just dust. What God can allow all this? What plan does God have for all this to happen? By now I believe that if a God exists, He is a Nazi. Tonight there will be a mass for my father, but right now I have to say...what do I care?" [6:15]

Support From Social Network

The most significant source of help, however, was found on the internet. Most of the participants stated that they found real support especially in the Facebook group dedicated to the COVID-19 grievers, where the participants can upload a photo of the deceased. Matilde said: "In the Facebook group, I felt held in a hug of tears, some like my own, some worse than my own who told me they had lost both their parents. I was happy because sometimes sharing tears makes you feel like you are in an embrace even if they were just tears" [21:15]. Crystal said: "I think that only those who have gone through an experience like mine can understand me. People who have not experienced something like this cannot understand. In the Facebook group I could post my father's photo because I knew that the others were in a very similar condition and were having the same feelings" [3:17]. Rebecca expressed these ideas in a similar way: "That group really made me feel like I belonged to a group of people who had been through the same drama as me and would understand me. We were all united because they had suffered mourning in the same way. That's why interacting with them made me feel good. We wrote to each other that we loved each other even though we didn't know each other and this made me feel good" [22:17].

Importance of Sharing Photos on Facebook

Overall, at the time of the interviews, the participants had posted a total of 292 photographs. Most of them portrayed the deceased and their distinct personalities. During the interview, the participants also produced other photos that depicted family life in moments of happiness and special occasions. Rossana talked about a photo taken when her beloved one was still feeling well: "I liked sharing this photo because here my mother was lively, she smiled, she could move. It was her wedding anniversary, we had prepared a small cocktail party and she was happy, my mother loved to eat, she ate to sample and enjoy. Remembering her like that gave me relief and helps me to think of her as happy" [40:16]. Angelica said: "These dead have only been counted, their names and their lives have not been remembered by anyone. Thanks to sharing the photos in this group, we were able to give a face to them and talk about them" [10:14]. Gina told us: "This trauma has strengthened family ties. Now we see each other more often and we go to my parents' house on Sundays for lunch. We keep these photographs, so we feel they are looking at us, as if our parents were there. But then, when we close the door in the evening, we suffer intensely because it is all over and they are not there" [17:20]. Jonathan explained how photography helped him through this painful juncture. He shared the photos of a project he did for a local magazine that published his photographs on the pandemic, and stated: "I tried to show the anguish through photography. This angel looks out the window. An angel should be in heaven, instead he stands here, looking out the window. I mean we are the angels who are on Earth and the angels who are in heaven are the stars that illuminate us at night" [29:19].

DISCUSSION

The COVID-19 pandemic, with its limitations, forced many people to have difficulty accessing mental health services, at a time when they would be most needed (11). In particular, the loss of a loved one during the pandemic proved to be a strong stressor in more Countries (28). The official data indicate that in the first phase of the COVID-19 pandemic there were massive numbers of sudden deaths (29). The rarity of this type of event, combined with the lack of social support (7) contributed to increasing the levels of suffering caused by the loss. The analysis of our interviews showed that the grief caused by the first emergency phase of the pandemic can be considered traumatic (30). This sudden and tragic loss led to an existential crisis because the

participants' ability to adapt to the new reality and to accept what happened was abnormal and profoundly altered by the pandemic. All the narratives presented typical traumatic traits reflecting shock, anger, frustration, guilt, fear, helplessness, and anxiety. It appears that the participants experienced severe post-traumatic stress (31, 32); namely, rumination, recurring nightmares and insomnia, weight loss, loss of confidence in society, derealization. Several factors exacerbated the experience of loss. Consistent with the literature, this study also suggests that the traumatic characteristics of grief experienced during the pandemic included the multiple deaths that led to an "overload of mourning" that undermined family resilience, the high level of contagiousness of the virus that prevented the mourners from assisting their loved ones during the last days of their lives (generating a sense of helplessness and guilt), the absence of funeral ceremonies and/or in some cases the obligation of cremation in which people found themselves in a conflict between the desires of the deceased and the societal dictates (33).

In addition, the communication of bad news took on exemplary importance. Almost all the participants reported that they were told of the death of their relatives coldly. Being informed of the death of a loved one is a significant moment that can change the life of those who will suffer the loss forever. The terms used to inform the survivors and the nature of the person who provides this information influence the way survivors cope with one of the most difficult moments in their lives (34). Similarly, the perception of dehumanization of their relatives, who were depicted as numbers, or "dead flesh" without a biography, further exacerbated the trauma. Dehumanization is closely linked to de-legitimization. The literature has noted how excessive and collective accumulation of deaths deny the acknowledgment of each individual's bereavement (33).

Studies have suggested that the emotional experiences characterizing the grief experienced during the pandemic (suffering, anger, fear, guilt, remorse, and helplessness) could cause prolonged grief disorders (35). The inability to say goodbye to the deceased (36), excessive guilt (37), and a lack of social support (38) may prevent closure and cause prolonged grief.

This form of prolonged grief may resemble ambiguous loss that occurs without closure or clear understanding. Some studies have in fact described on the one hand how important it is to have direct contact with the corpse for the closure of mourning, because the contact with the corpse and funeral rituals facilitate the work of mourning (39). By contrast, the imposed lack of contact with the corpse of the deceased may lead to derealization and estrangement that impedes the mourning process (40). Thus, the mourning may be prolonged because of the ambiguity generated by a situation of "unreality." The participants' continuous rumination, which oscillated between anger and disbelief, shows that there was a lack of a concrete foothold to which to attach the ritual scenario of loss and farewell. The internet emerged as a substitute for ritual processing made impossible in the real community by the lockdown. Literature on users of social media shows that thanatechnology permits the death of a loved one to be a moment where the deceased can acquire a lasting, infinitely replicable presence (12). As showed by Hieftje (41), posting pictures on social networks such as Facebook may create a sense of belonging and community during the bereavement, while providing continuous connections between the living and the dead. Specifically, photos help create virtual memorials, which help mourners shift death and grief from private to more public experiences. These practices are aimed to create a digital immortality, or a form of survival of the deceased in society (42, 43), because digital data stored online reflect the personality and memories of the deceased and represent the idea of a posthumous maintenance of a personhood that transcends the boundaries of the body (44). In this study, this strategy emerged as particularly useful and supportive since it allowed the participants to feel less lonely, to embrace each other at a distance that was experienced as not so remote. On the one hand, as mentioned in the literature (45), the use of Facebook proved to be fundamental to give the bereaved a space for commemoration by restoring a humanity to their relatives and enabling them to feel understood in their pain and dismay by those who had lived through the same experience. Furthermore, the internet enabled the participants to feel part of a community that alleviated the loneliness experienced during the lockdown. The evocative properties of photography proved particularly useful in creating a common ground between the interviewer and interviewees. Initially they were asked to explain why they decided to post pictures on the Facebook group, and then were asked to show other significant photographs that would tell something about the deceased, which enabled them to grapple with the "suspended" generated by such a sudden and traumatic loss. It was an opportunity to say one last word, to express what they would have liked to say to their loved one. Photography facilitated the dialogue with the interviewers, as it did on Facebook. The use of photography is known to support dialogue even around painful issues (46). The fact that the photographs were posted on Facebook and shared with the interviewer generated a sort of acknowledgment of the COVID-19 victims who were given a face, a name and a story. On the other hand, however, sharing one's experience on social networks may create a sense of immortality for the deceased, strengthening the social relationships that one has with the deceased (13), instead of placing the loved one in a symbolic dimension (47). Other creative approaches, including arts therapies and psychodrama (48–53), are likely to be helpful in processing taxing emotional experiences of trauma, loss and bereavement.

CONCLUSION

This study lends weight to the claim that the grief caused by COVID-19 can be considered both traumatic and de-legitimized, and in this sense comparable to the effects of ambiguous loss. All these characteristics are linked to the experiences of dehumanization of the deceased, the lack of contact with the dying relative and the corpse of the deceased, and the absence of funeral rituals. In this scenario, for our participants, the use of social networks proved to be a significant source of personal support, which enabled them to restore an identity to the deceased. The Facebook group created a space for sharing in

which they could express their experiences and feel understood. Photography has proved to be a useful tool to facilitate the elaboration of grief, encouraging a process of narration and sharing that re-equilibrated the relationship with the deceased and helped reflect on the loss, and also proved to be a vehicle of recognition of the deceased. However, numerous factors described in the literature lead us to suspect that these people could develop a form of grief without closure, because of the use of the internet, although it is still too early to come to a conclusion. In fact, the main limitation of the study is the absence of a follow-up that would allow us to verify the condition of the participants with respect to their use of the internet. Furthermore, one of the major limitations of the research is the non-generalizability of the results for three main reasons: the first one is that the group of participants is too small; the second one is that the group of participants consists mostly of sons/daughters who have lost their parents; the last but not the least is that qualitative studies are not aimed to obtain generalizable results. In particular research inspired to he Grounded Theory approach highlights possible scenarios that could be further investigated in a second time, utilizing different methodologies. In this case, it would be useful to investigate the possible presence of continuing bonds and their effect on grief counseling. These could constitute the groundwork for future research with the same participants.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

This study was approved by the Ethics Committee for Experimentation of the University of Padua. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

IT is the scientific director of this research project. She designed the study and supervised its implementation. She also contributed to the data analysis the interpretation of the results, supervised the preparation of the manuscript, and wrote its final version. CA and NT were the researchers directly responsible for the data collection and its analysis. GB and EI supervised the data collection and analysis. HO contributed to the writing of this article. BA participated in discussions on the results. All authors contributed to the article and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.620583/full#supplementary-material

Figure S1 | This is my little prince looking at, or rather suffering for, the Earth.

Figure S2 | This angel is looking at the sky out of the window, instead of where an angel should be, in the heavens. However, the difference is that we are angels on earth and the others, who are above, are the stars that light up the night.

Figure S3-S5 | Tonight I want to share with you some pictures that are very important to me, somehow concerning one of the situations exasperated by COVID-19: the silence inside homes. Sexual abuse and violence against women who right now cannot find any relief. Do not remain alone; love exists. Do not hesitate to contact the number 1522 (free and active 24 hours a day). Let's help change the world to make it better! True love is there. He managed to bend you; he managed to mortify your body until you got down on your knees and made you believe you had to hide. He, full of himself, tries to look at his image in that mirror, but the mirror refuses to reflect that horror. He dragged you into the darkness because your light scares him. Your light, so pure and strong, forces him to recognize the darkness he has inside. Turn around, get up. Feel and taste your light again. No one is as bright as someone who trembles in the dark.

Figure S6 | Our Presolana is crying, the Serio river carry the tears of the Valley ... I want to dedicate to all those People who have left us and now, from up there, close to the stars, will illuminate our sky and our dreams ... They are the people that have contributed to the growth of life, who have made the history of our countries. Never shall we forget them, for everyone has a story to tell...

Figure S7 | This represents the image of this person with an umbrella, going for a journey.

REFERENCES

1. Forster P, Forster L, Renfrew C, Forster M. Phylogenetic network analysis of SARS-Cov-2 genomes. *Proc Natl Acad Sci U S A*. (2020) 117:9241–3. doi: 10.1073/pnas.2004999117
2. World Health Organization. *Mental Health and Psychosocial Considerations During the COVID-19 Outbreak, 18 March 2020 (No. WHO/2019-nCoV/MentalHealth/2020.1)*. (2020). Available online at: https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf (accessed July 15, 2020).
3. Senni M. COVID-19 experience in Bergamo, Italy. *Eur Heart J*. (2020) 41:1783–4. doi: 10.1093/eurheartj/ehaa279
4. Istat. (2020). *Impatto Dell'epidemia Covid-19 Sulla Mortalità Totale Della Popolazione Residente*. Primo Trimestre (2020). Available online at: https://www.istat.it/it/files//2020/12/Rapp_Istat_Iss.pdf (accessed April 4, 2020).
5. Lazzerini M, Putoto G. COVID-19 in Italy: momentous decisions and many uncertainties. *Lancet Global Health*. (2020) 8:e641–e2. doi: 10.1016/S2214-109X(20)30110-8
6. Dyregrov, K., Cimitan, A., and De Leo, D. Reactions to traumatic death. In: De Leo D, Cimitan A, Dyregrov K, Grad O, Andriessen K, editors. *Bereavement After Traumatic Death: Helping the Survivors*. Canada: Hogrefe Publishing (2014). p. 19–35.
7. Saltzman LY, Hansel TC, Bordnick PS. Loneliness, isolation, and social support factors in post-COVID-19 mental health. *Psychol Trauma Theory Res Pract Policy*. (2020) 12:S55–S7. doi: 10.1037/tra0000703
8. Testoni I, Wieser MA, Kapelis D, Pompele S, Bonaventura M, Crupi R. Lack of truth-telling in palliative care and its effects among nurses and nursing students. *Behav Sci*. (2020) 10:88. doi: 10.3390/bs10050088
9. Rauch SA, Simon NM, Rothbaum BO. Rising tide: responding to the mental health impact of the COVID-19 pandemic. *Depress Anxiety*. (2020) 37:505–9. doi: 10.1002/da.23058
10. Robinson C, Pond R. Do online support groups for grief benefit the bereaved? Systematic review of the quantitative and qualitative literature. *Comput Hum Behav*. (2019) 100:48–59. doi: 10.1016/j.chb.2019.06.011
11. Ramalho R, Adiukwu F, Gashi Bytyçi D, El Hayek S, Gonzalez-Diaz JM, Larnaout A, et al. Telepsychiatry during the COVID-19 pandemic:

development of a protocol for telemental health care. *Front Psychiatry*. (2020) 11:552450. doi: 10.3389/fpsyt.2020.552450
12. Sofka CJ, Cupit IN, Gilbert KR. Thanatechnology as a conduit for living, dying, and grieving in contemporary society. In: Sofka C, Cupit IN, editors. *Dying, Death, and Grief in an Online Universe: For Counselors and Educators*. New York, NY: Springer Publishing Company (2012).
13. Irwin, M. D. (2015). Mourning 2.0-Continuing bonds between the living and the dead on Facebook. *OMEGA J Death Dying* 72:119–50. doi: 10.1177/0030222815574830
14. Casilli AA. *Les Liaisons Numériques. Vers une Nouvelle Sociabilité?: Vers une Nouvelle Sociabilité? [The Digital Bonds: Towards a New Sociability?]*. Paris: Seuil (2010).
15. Hénaff N. "Blog: un journal intime pour exister, voir et être vu" [Blog: A personal journal to exist, to see and to be seen]. In: Aubert N, Haroche C, editors. *Les Tyrannies de la Visibilité. Être Visible Pour Exister? [Tyrannies of Visibility. Be Visible to Exist?]*. Toulouse: Érès (2011). p. 145–70.
16. Harris J, Edmonds J. Exploring grief with photography. *Bereavement Care.* (2015) 34:76–80. doi: 10.1080/02682621.2015.1064583
17. Riches G, Dawson P. Lost children, living memories: the role of photographs in processes of grief and adjustment among bereaved parents. *Death Stud.* (1998) 22:121. doi: 10.1080/074811898201632
18. Keskinen N, Kaunonen M, Aho AL. How loved ones express grief after the death of a child by sharing photographs on Facebook. *J Loss Trauma.* (2019) 24:609–24. doi: 10.1080/15325024.2019.1586186
19. COVID-19 map. *Johns Hopkins Coronavirus Resource Center*. (2020). Retrieved from: https://coronavirus.jhu.edu/map.html (accessed September 28, 2020).
20. Denzin NK, Lincoln YS. *The SAGE Handbook of Qualitative Research*, 3rd ed. Sage Publications (2005).
21. Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods.* (2006) 18:59–82. doi: 10.1177/1525822x05279903
22. Charmaz K. Grounded theory. In: Smith JA, Harre R, Van Langenhove L, editors. *Rethinking Methods in Psychology*. London: Sage Publications (1995). p. 27–49.
23. Corbin J, Strauss A. Grounded theory research: procedures, canons, and evaluative criteria. *Qual Soc.* (1990) 13:3–21. doi: 10.1007/BF00988593
24. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol.* (2006) 3:77–101 doi: 10.1191/1478088706qp063oa
25. Testoni I, Marrella F, Biancalani G, Cottone P, Alemanno F, Mamo D, et al. The value of dignity in prison: a qualitative study with life convicts. *Behav Sci.* (2020) 10:95. doi: 10.3390/bs10060095
26. Muhr T. ATLAS/ti-A prototype for the support of text interpretation. *Qual Sociol.* (1991) 14:349–71. doi: 10.1007/BF00989645
27. Testoni, I., Iacona, E., Fusina, S., Floriani, M., Crippa, M., Maccarini, A., et al. "Before I die I want to…": an experience of death education among university students of social service and psychology. *Health Psychol Open*. (2018) 5:2055102918809759. doi: 10.1177/2055102918809759
28. Ransing R, Adiukwu F, Pereira-Sanchez V, Ramalho R, Orsolini L, Teixeira AL, et al. Mental health interventions during the COVID-19 pandemic: a conceptual framework by early career psychiatrists. *Asian J Psychiatry*. (2020) 51:102085. doi: 10.1016/j.ajp.2020.102085
29. Mayland CR, Harding AJ, Preston N, Payne S. Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J Pain Symp Manag.* (2020) 60:e33–e9. doi: 10.1016/j.jpainsymman.2020.05.012
30. Mortazavi SS, Assari S, Alimohamadi A, Rafiee M, Shati M. Fear, loss, social isolation, and incomplete grief due to COVID-19: a recipe for a psychiatric pandemic. *Basic Clin Neurosci.* (2020) 11:225. doi: 10.32598/bcn.11.covid19.2549.1
31. Lenferink LI, Nickerson A, de Keijser J, Smid GE, Boelen PA. Trajectories of grief, depression, and posttraumatic stress in disaster-bereaved people. *Depress Anxiety.* (2020) 37:35–44. doi: 10.1002/da.22850
32. Keyes KM, Pratt C, Galea S, McLaughlin KA, Koenen KC, Shear MK. The burden of loss: unexpected death of a loved one and psychiatric disorders across the life course in a national study. *Am J Psychiatry.* (2014) 171:864–71. doi: 10.1176/appi.ajp.2014.13081132
33. Kokou-Kpolou CK, Fernández-Alcántara M, Cénat JM. Prolonged grief related to COVID-19 deaths: do we have to fear a steep rise in traumatic and disenfranchised griefs?. *Psychol Trauma.* 12:S94. doi: 10.1037/tra0000798
34. De Leo D, Zammarrelli J, Viecelli Giannotti A, Donna S, Bertini S, Santini A, et al. Notification of unexpected, violent and traumatic death: a systematic review. *Front Psychol.* (2020) 11:2229. doi: 10.3389/fpsyg.2020.02229
35. Goveas JS, Shear MK. Grief and the COVID-19 pandemic in older adults. *Am J Geriatr Psychiatry*. (2020) 28:1119–25. doi: 10.1016/j.jagp.2020.06.021
36. Otani H, Yoshida S, Morita T, Aoyama M, Kizawa Y, Shima Y, et al. Meaningful communication before death, but not present at the time of death itself, is associated with better outcomes on measures of depression and complicated grief among bereaved family members of cancer patients. *J Pain Symp Manag.* (2017) 54:273–9. doi: 10.1016/j.jpainsymman.2017.07.010
37. Li J, Tendeiro JN, Stroebe M. Guilt in bereavement: its relationship with complicated grief and depression. *Int J Psychol.* (2019) 54:454–61. doi: 10.1002/ijop.12483
38. Stroebe MS, Schut HH, Stroebe W. Health outcomes of bereavement. *Lancet*. (2007) 370:1960–73. doi: 10.1016/S0140-6736(07)61816-9
39. Testoni I, Zielo A, Schiavo C, Iacona E. The last glance: how aesthetic observation of corpses facilitates detachment in grief work. *Illness Crisis Loss.* (2020) 1–17. doi: 10.1177/1054137320933592
40. Testoni I, Franco C, Palazzo L, Iacona E, Zamperini A, Wieser MA. The endless grief in waiting: a qualitative study of the relationship between ambiguous loss and anticipatory mourning amongst the relatives of missing persons in Italy. *Behav Sci.* (2020) 10:110. doi: 10.3390/bs10070110
41. Hieftje K. The role of social networking sites in memorialization of college students. In: Sofka C, Cupit I, Gilbert K, editors. *Dying, Death, and Grief in an Online Universe*. New York, NY: Springer (2012). p. 31–46.
42. Carroll E, Romano J. *Your Digital After Life: When Facebook, Flickr and Twitter are Your Estate, What's Your Legacy?*. Berkeley, CA: New Riders (2010).
43. Walter J. How the dead survive: ancestor, immortality, memory. In: Jacobsen MH, editor. *Postmortal Society: Towards a Sociology of Immortality*. London: Routledge (2017). p. 19–39.
44. Meese J, Nansen B, Kohn T, Arnold M, Gibbs M. Posthumous personhood and the affordances of digital media. *Mortality*. (2015) 20:408–20. doi: 10.1080/13576275.2015.1083724
45. Hård Af Segerstad Y, Kasperowski D. A community for grieving: affordances of social media for support of bereaved parents. *New Rev Hypermedia Multimedia.* (2015) 21:25–41. doi: 10.1080/13614568.2014.983557
46. Testoni I, Tomasella E, Pompele S, Mascarin M, Wieser MA. Can desire and wellbeing be promoted in adolescents and young adults affected by cancer? Phototherapy as a mirror that increases resilience. *Front Psychol.* (2020) 11:966. doi: 10.3389/fpsyg.2020.00966
47. Bassett DJ. Who wants to live forever? Living, dying and grieving in our digital society. *Soc Sci.* (2015) 4:1127–39. doi: 10.3390/socsci4041127
48. Feniger-Schaal R, Orkibi H. Integrative systematic review of drama therapy intervention research. *Psychol Aesthetics Creat Arts.* (2020) 14:68–80. doi: 10.1037/aca0000257
49. Orkibi H, Azoulay B, Snir S, Regev D. In-session behaviours and adolescents' self-concept and loneliness: A psychodrama process-outcome study. *Clin Psychol Psychother*. (2017) 24:O1455–O1463. doi: 10.1002/cpp.2103
50. Orkibi H, Feniger-Schaal R. Integrative systematic review of psychodrama psychotherapy research: trends and methodological implications. *PLoS One.* (2019) 14:e0212575. doi: 10.1371/journal.pone.0212575
51. Orkibi H, Ram-Vlasov N. Linking trauma to posttraumatic growth and mental health through emotional and cognitive creativity. *Psychol Aesthetics Creat Arts.* (2019) 13:416–30. doi: 10.1037/aca0000193
52. Shafir T, Orkibi H, Baker FA, Gussak D, Kaimal G. Editorial: the state of the art in creative arts therapies [Editorial]. *Front Psychol.* (2020) 11:68. doi: 10.3389/fpsyg.2020.00068

53. Testoni I, Cichellero S, Kirk K, Cappelletti V, Cecchini C. When death enters the theater of psychodrama: perspectives and strategies of psychodramatists. *J Loss Trauma.* (2019) 24:516–32. doi: 10.1080/15325024.2018.1548996

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

APPENDIX A. INTERVIEW

1. Narration of the Experience

a May I ask you to tell me about your experiences before and after the news of the decease?
b Tell me what it means to you to have published this photograph; in particular, what made you choose this one instead of another?
c May I ask where and by whom this photograph was taken? In your opinion, what aspect(s) of your loved one does this photograph represent?
d Are there any photos other than this one that you feel are particularly significant, the most beautiful ones?

2. Perceived Resources or Misses

a Can I ask you to tell me, during the lockdown period, what/who you missed in order to cope with this grieving situation? Is there something/someone you were able to find some support from instead?
b Which tools did you find useful to share your experience? Have you used the psychological support numbers made available by institutions?
c How did posting this photograph on Facebook make you feel? Was there any feedback from other participants? If so, what kind?

3. Funeral Rituals

a How did you experience the lack of funeral ritual? How was the body handled?
b How do you feel about cremation? (and if the deceased loved one's body was cremated) Would you have chosen it as a form of funeral rite at a time other than COVID-19? Has your opinion about cremation changed during this period?
c To date, having been able to participate in a religious ritual again, what has it made you feel?

4. Personal Beliefs about the Themes of Death

a If your deceased loved one were here, if you could imagine yourself standing next to him/her right now (use the photograph if necessary) what do you think he/she would say? What would you say to him/her?
b According with what you expressed in the biographical form, you told me regarding beliefs that you believe in the afterlife/you do not believe in the afterlife; can I ask you where you imagine your deceased loved one is right now if you think about him/her?

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 10 May 2021
doi: 10.3389/fpsyt.2021.627044

Confinement and the Hatred of Sound in Times of COVID-19: A Molotov Cocktail for People With Misophonia

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OPEN ACCESS

Edited by:
Mohammed A. Mamun, Centre for Health Innovation, Networking, Training, Action and Research - Bangladesh, Bangladesh

Reviewed by:
Mercede Erfanian, University College London, United Kingdom
Thomas H. Dozier, Misophonia Treatment Institute, United States
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *07 November 2020*
Accepted: *13 April 2021*
Published: *10 May 2021*

Citation:
Ferrer-Torres A and Giménez-Llort L (2021) Confinement and the Hatred of Sound in Times of COVID-19: A Molotov Cocktail for People With Misophonia. Front. Psychiatry 12:627044. doi: 10.3389/fpsyt.2021.627044

Forced strict confinement to hamper the COVID-19 pandemic seriously affected people suffering from misophonia (M+) and those living with them. Misophonia is a complex neurophysiological and behavioral disorder of multifactorial origin, characterized by an intense physiological and emotional response produced by intolerance to auditory stimuli of the same pattern, regardless of physical properties. The present work studied the secondary impact that strict confinement caused in 342 adults (224 women: 118 men) regularly attending a medical psychological center in Barcelona. Misophonia, usually underdiagnosed, showed a prevalence of 35%, the same for women (37%) than men (31%). A retrospective analysis using a physical-psychological-social inventory of 10 variables evaluated the number of individuals that during confinement and self-confinement (March 11 - June 29, 2020) canceled (mostly M-) and/or requested a therapeutic intervention, the reasons for their request, and the strategies they used to self-manage the situation. Ten main variables indicated that the confinement exponentially increased the effects of misophonia compared with results from the same individuals during the last quarter of 2019. Most people diagnosed with misophonia continued with tele-assistance during the confinement because of this impact's self-concern. Besides the impacts as part of the general population, M+ also developed different symptoms causing significant personal, social, and job/occupational imbalance, as compared to M-. Health, fears, conflicts with neighbors, study-related difficulties were outstanding reasons for consultations. The LSB-50 test for 'Psychological and Psychosomatic Symptoms' applied to M+ revealed the increase of 8 of 9 items of this psychopathological test. Sleep disorders (coronasomnia), hostility, depression, and somatization were more severe than in previous assessments. Women presented the worst psychological and psychosomatic states (eight out of nine, as compared to one out of nine in males). The study unveiled the complex physical-psychological-social burden, the need for dissemination and a gender perspective to understand the secondary impact of COVID-19 pandemic on the mental health of the population with misophonia.

The results also show that in this new COVID era people suffering from misophonia need to develop coping strategies addressing modifiable risk and protective factors. They deserve familial/social comprehension, stronger clinical support and a gender medicine perspective.

Keywords: confinement, COVID-19, Coronasomnia, psychologic symptoms, psychosomatic symptoms, sleep disorders, secondary impact, gender medicine

INTRODUCTION

On March 11, 2020, the WHO declared the global pandemic by COVID-19 (1). In Spain, 6 days later, an unprecedented period of strict confinement of the entire 47 million population began as part of the "declaration of the state of alarm for managing the health crisis caused by COVID-19". Subsequently, other countries in Europe and other continents adopted similar measures in the face of the evident advance of the pandemic and tragedy left behind (2, 3). One year later, confinement still is an option to hamper the spread of the virus even though severe confinement measures, quarantine, and social isolation exert a significant economic, social, and psychological impact (4). At the psychological level, the feelings of frustration, restlessness, irritability, hostility, uncertainty, sadness, fear, and anger are just a sample of the long list of negative emotions that people in a situation of "forced confinement" describe (5–7). Besides, the domestic space's reorganization, shared daily life, home multitasking, and intrusion into intimate life through virtual systems are among many other stressors imposed by the current sanitary crisis. The emergency and uncertainty on the coronavirus outbreak have not allowed the necessary physical or emotional adaptation in a rapidly changing scenario, which results in highly stressful situations in the individuals and society (8).

Epidemics are known to increase psychiatric morbidity and exert remarkable emotional distress (9). Besides the distress induced by the COVID-19 pandemic, the people with misophonia - a quite unknown, underdiagnosed, and untreated neurophysiological disorder, also referred to as "the hatred of sounds" (10)- confronted the constant and inescapable exposure to unwanted/unpleasant sounds [for the definition of noise please refer to the review by Erfanian et al. (11)] potentially disturbing for them. This complex neurophysiological and behavioral disorder is characterized by increased physiological responsiveness and a high degree of emotional reactivity due to intolerance to specific auditory stimuli, as described by (12). Since then, research of misophonia have considerably evolved (10, 13–17)]. People with misophonia experience intense physical, behavioral, and emotional "misophonic responses" when exposed to the so-called "misophonic sounds" or "aversive triggers" that are part of every day's sound, but they differ from one individual to another (14, 18, 19). The most disturbing sounds are mouth-related sounds followed by nose-related ones (20), but other humans, animals, objects, and environmental sounds are part of an extensive list of triggers. People with misophonia may also experience an aversion to stimuli in movement known as misokinesia (13) or "visual triggers" (15, 16).

As with any other pathology or disorder, the therapeutic or social protection that could allow the individuals with misophonia to cope with the confinement was scarce. The stay-home restriction was a potential Molotov cocktail. As reported by the news (21–25), the different Spanish autonomous communities were forced to reinforce citizen security measures, launch extra mediation services, and promote campaigns for coexistence to alleviate neighborhood conflicts that occurred during confinement. According to the same sources, intra-family conflicts were expressed more frequently and forcefully in this stressful situation.

This study aimed to examine a secondary impact of COVID-19, the physical-psycho-social effects that the exceptional situation of confinement during March and April 2020 generated in a sample of patients regularly attending a medical psychology center in Barcelona, among them, people diagnosed with misophonia. Most misophonic individuals exhibited a "self-confinement" behavior once the mandatory reclusion was over because of their fear of getting infected, ill, or dying of COVID-19. Therefore, the study was extended until the end (29th) of June 2020 to consider these aspects. Four specific aims were defined to know (1) the changes in the individuals' behavior concerning the request for help or consultation and the therapeutic intervention they were carrying out. (2) the reason for the request or consultation regarding the therapeutic intervention, (3) if they could self-manage the situation reason for consultation or request for help, and (4) the identification and assessment, using the LSB-50 scale, of 'Psychological and Psychosomatic Symptoms' in adults diagnosed with misophonia, and the interference in the individual's personal and social functioning.

MATERIALS AND METHODS

Subjects

This study was carried out with a total sample of 342 people regularly attending a Medical and Psychological Center in the city of Barcelona (Spain). The data were analyzed in a double-blind manner to eliminate the confirmation bias.

Inclusion criteria were defined as follows: Women and men over 16 years of age that signed (legal tutors, in the case of minors) the informed consent; diagnostic test battery before August 2019; agreement to participate in the study. In the second phase of the study with patients with misophonia: at least mouth-related and nose-related trigger sounds; self-confinement, leaving home only to carry out emergency or essential situations.

Exclusion criteria were defined as follows: Adults or minors whose parents or guardians did not sign the informed consent or refused to participate in the study; those under 16 years of

age; blind people; people with profound deafness. M+ without mouth-related and nose-related sounds as triggering stimuli. During the study, those people who during confinement and self-confinement carried out social gatherings or leisure activities outside the family home were discarded.

Evaluation Tools

Record of Request and Reason for Consultation (2RC, Phase I)

The 2RC is a self-report questionnaire developed by the medical psychology center used as a historical record that begins with the first contact and ends with discharge. All the individuals' requests, comments, and consultations are also recorded, regardless of the therapeutic work. Four categories are distinguished: (1) registration of visits, cancellations, and changes in programming; (2) physical health; (3) psychological health; (4) social well-being: relationships (family, friends, and neighbors), work, economy, and studies.

Misophonia Scale

The participants were classified as diagnosed with misophonia (M+ > = 5) or not (M-< = 4), according to the A-MISO-S = Amsterdam misophonia scale (13).

Psychological and Psychosomatic Symptoms (PPS, Phase II)

In the sample of participants with a positive diagnosis of misophonia (M+), a psychopathological evaluation tool, the *LSB-50 Brief Symptom List* (26), was used for a pre-post evaluation of the symptoms the test refers as PPS. This tool contains nine clinical scales and subscales, as follows: Psychoreactivity, Hypersensitivity, Obsessive-compulsive, Anxiety, Hostility, Somatization, Depression, Sleep disturbances (Sleep disorder and Amplified sleep disorder).

Procedure

Phase I – Request and Reason for Consultation (2RC) in People Attending the Center

A retrospective analysis of 2RC of the participants was carried out to compare the quarter of the pandemic (March 11 to June 29, 2020) with the last quarter of 2019 (September to December), used as a reference (see **Figure 1**). The criteria by which this reference quarter was chosen were: (a) the data from the 2RC during this quarter was an average reference for the quarters analyzed during the years 2017 to 2019; (b) since both quarters were temporally close, there would have been few registrations, and therefore the participants in both studied periods would be the same and, (c) it was ruled out to compare them with January and February 2020 because together with July and August, they are periods where the number of individuals attending the center is irregular. On March 11, 2020, all individuals were informed that, as a preventive measure to stop the coronavirus pandemic spread, all group activities were canceled, but the face-to-face visits would remain open for those who need to maintain the quarterly schedule. This support was provided through telephone, videoconferences, e-mails, and WhatsApps.

From the 2RC, the number of participants, frequency, and reasons for requests was extracted as follows:

(1) *Number of participants and frequency of requests, before and after the confinement:* The sample of participants, the number of individuals who canceled their visits, and those that requested new programming after a cancellation were recorded for each period. The advancement of a visit and the extra visits were also recorded. Regardless of attendance at scheduled visits, the individuals could request a series of extra resources. New consultations contacting the center for one or more reasons and requests of visits were noted. 'Consultation items' refers to the number of items, topics, problems, or aspects that the individuals requested.

(2) *Reason for requests or inquiries.* The 2RC recorded concerns, problems, doubts, fears, and other aspects of the request for help or an extra resource. Analysis of requests was done according to the physical-psychological-social dimensions and categories (see **Tables 1**, **2**). The data were also analyzed in a segregated manner, according to sex and misophonia diagnosis (as depicted in **Figure 1**).

Phase II – Psychological and Psychosomatic Symptoms (PPS, LSB-50) in People With Misophonia

The second phase of the study focused the investigation on the participants with a positive diagnosis of misophonia. Once the mandatory confinement finished, during self-confinement, the LSB-50 was administered to participants in person from June 2 to 29, 2020. The results were compared with those obtained during the patient's diagnostic evaluation, which was carried out between 6 and 9 months before the quarter of the pandemic. The nine clinical scales and subscales of LSB-50 were taken into account. Changes in the patients' "Psychological and Psychosomatic Symptoms" (PPS) during the pandemic quarter were calculated through the percentage difference to the quarter of reference (September to December 2019). The LSB-50 questionnaire was corrected using a computerized system to eliminate any confirmation bias from the first part of the study.

Statistical Analysis

SPSS 20.0 software was used. Continuous variables are expressed as mean ± SD, percentage, or percentile. Sex and Misophonia ratios are shown in percentage as W: M, woman:men, M+:M-patients with misophonia: patients without misophonia. The chi-square with Yates' correction, or when necessary Fisher's exact test, was used for between-groups comparisons. A $p < 0.05$ was considered statistically significant.

RESULTS

Demographic data

The sample of 342 participants had a 65:35 W: M ratio and a mean age of 44.66 ± 14.09 years (min 16, max 89 years). Half of them were married or cohabiting (51%), 25% were single, a similar percentage were divorced (23%), while 2% were widows (all of them, women).

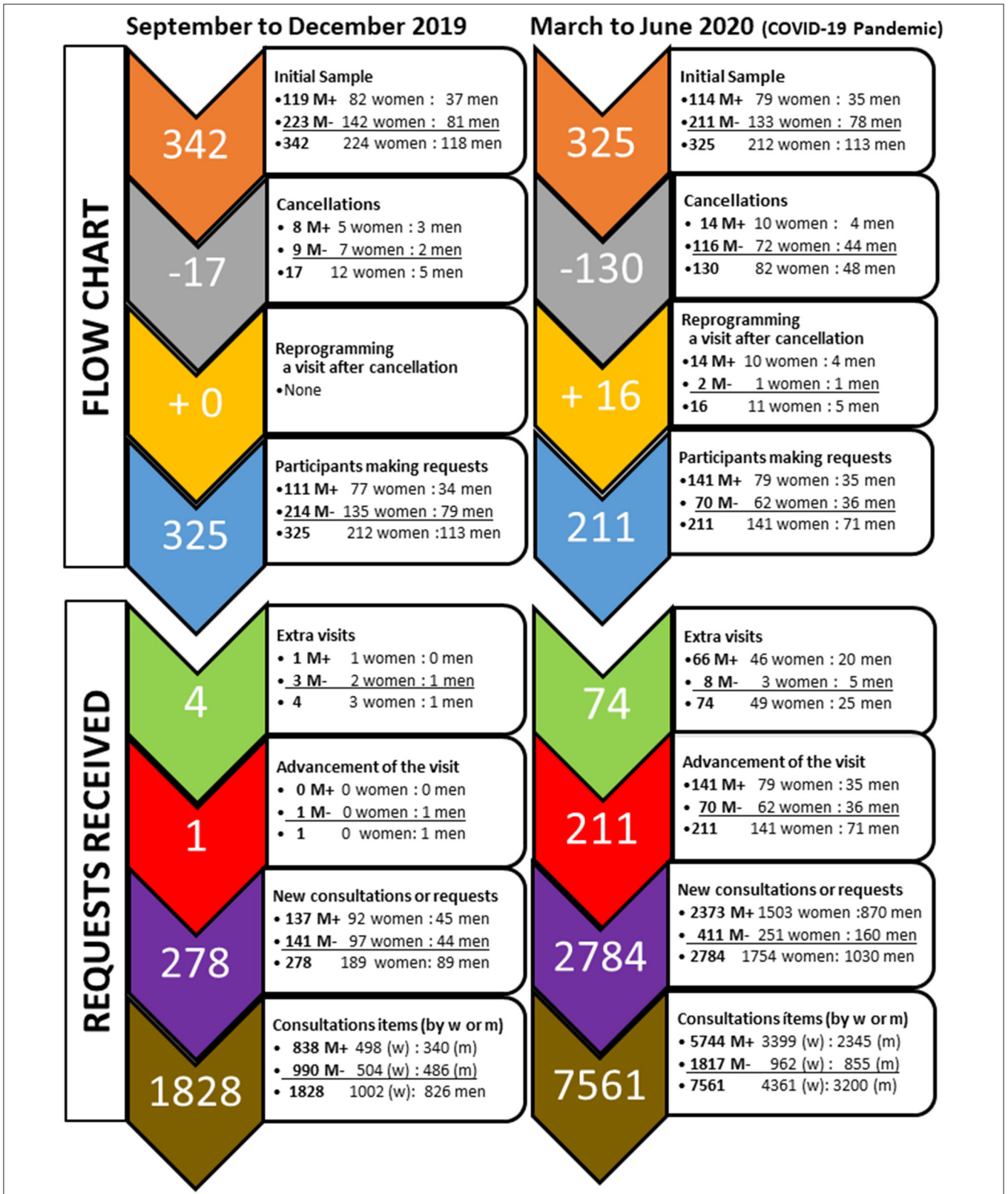

FIGURE 1 | Flow chart of participants in the two periods studied and number of requests received in the medical psychology center.

TABLE 1 | Results are expressed as total number and, in parenthesis, as the percentages.

	September to December 2019			March to June 2020			Fold increase and Statistics		
	Total (%)	Women (%W)	Men (%M)	Total (%)	Women (%W)	Men (%M)	Total	Women	Men
Participants									
Sample of participants (*n*, %)	342 (100)	224 (65)	118 (35)	325 (100)	212 (65)	113 (35)	1.0	0.9	1.0
M+: M-	119:223	82:142	37:81	114:211	79:133	35:78	1:1		
(%M+: %M-)	(35:65)	(37:63)	(31:69)	(35:65)	(37:63)	(31:69)	*n.s.*		
Cancellation (*n*, %)	17 (5)	12 (4)	5 (1)	130 (40)	82 (63)	48 (37)	7.6***	6.8***	9.6***
M+: M-	8:9	5:7	3:2	14:116	10:72	4:44	1.8:13		
(%M+: %M-)	(47:53)	(42:58)	(60:40)	(11:89)	(12:88)	(8:92)	M, $p < 0.001$		
Reprogramming (*n*, %)	0 (0)	0 (0)	0 (0)	16 (5)	11 (69)	5 (31)	**16.0*** **	**11.0*** **	5.0*
M+: M-	0:0	0:0	0:0	14:2	10:1	4:1	14:2		
(%M+: %M-)	(0)	(0:0)	(0:0)	(88:12)	(91:9)	(80:20)	M, $p < 0.001$		
Making requests (*n*, %)	325 (95)	212 (65)	113 (35)	211 (65)	141 (67)	70 (33)	0.6***	0.7***	0.6***
M+: M-	111:214	82:130	37:76	114:98	79:62	35:35	1:0.5		
(%M+: %M-)	(34:66)	(39:61)	(33:67)	(54:46)	(56:44)	(50:50)	M, $p < 0.001$		
Extra visits (*n*, %)	4 (1)	3 (75)	1 (25)	74 (35)	49 (66)	25 (34)	**18.5*** **	3.0***	**25.0*** **
M+: M-	1:3	1:2	0:1	66:8	46:3	20:5	66:2.7		
(%M+: %M-)	(25:75)	(33:67)	(0:100)	(89:11)	(94:6)	(80:20)	M, $p < 0.001$		
Advancing the visit (*n*, %)	1 (0.31)	0 (0)	1 (100)	10 (5)	6 (60)	4 (40)	10.0***	6.0**	4.0 *n.s.*
M+: M-	0:1	0:0	0:1	6:4	4.2	2:2	6:4		
(%M+: %M-)	(0:100)	(0:0)	(0:100)	(60:40)	(64:36)	(50:50)	M, $p < 0.01$		
Consultations									
New consultations (*n*, %)	278 (100)	189 (68)	89 (32)	2,784 (100)	1,754 (63)	1,030 (37)	10.0 n.a.	9.3 n.a.	11.6 n.a.
M+: M-	137:141	92:97	45:44	2,373:411	1,503:251	870:160	140:2.9		
(%M+: %M-)	(49:51)	(49:51)	(51:49)	(85:15)	(86:14)	(84:16)	M, $p < 0.001$		
Consultation items (*n*, %)	1,828 (100)	1,002 (55)	826 (45)	7,561 (100)	4,361 (58)	3,200 (42)	4.1 n.a.	4.4*	3.9*
M+: M-	838:990	498:504	340:486	5,744:1817	3,399:962	2,345:855	7:1.8		
(%M+: %M-)	(46:54)	(50:50)	(41:59)	(76:24)	(78:22)	(73:27)	M, $p < 0.001$		

*In the totals, percentages are calculated vs. the initial sample. (0), <1%. In women and men, (%W) and (%M) percentages represent the women:men ratio. Statistics: Chi-square with Yates' correction or Fisher's exact test; n.a., not applicable; n.s. not statistically significant *p < 0.05; **p < 0.01; ***p < 0.001, relative increase vs. the global increase observed in the "March to June 2020" period. Factor M, Misophonia; p < 0.01; p < 0.001 as compared to fold increase in the M- counterpart. The significance of the bold values is that they are the values that have presented a higher increment from the first phase to the final phase.*

Phase I – Request and Reason for Consultation (2RC) in People Attending the Medical Psychology Center

Number of Participants and Frequency of Requests

The flow chart of participants and frequency of requests during the two periods of time are summarized in **Figure 1**. The records of 2RC for the two studied quarters are described in **Table 1**. First, the data for the sample and each sex are given. The data are further depicted to detect distinct behaviors between participants according to a positive (M+, prevalence of 35%) or negative (M-) diagnosis of misophonia.

During the reference quarter, the standard behavior of individuals concerning attendance to the center was characterized as a low cancelation ratio, it was independent of the diagnosis of misophonia, and no one requested an extra visit. A few other people requested to increase the number of visits (half of them were M+) or advance them. The standard number of consultations was 278 to approach a total of 1828 items.

During the pandemic, cancellations increased compared to the quarter of reference. Women and men exhibited similar cancellation ratios. However, the cancellations were mainly associated with M-, while the cancellation ratio in M+ was not modified. The patients' behavior regarding reprogramming a visit after cancellation, extra visits, and advancement of visits was also modified. Most people preferred to postpone their visit once the risk of contagion had passed. Very few referred or justified the requests due to unforeseen events and variations in their agenda. A few participants requested a reprogramming after the cancellation, a behavior not observed in the previous quarter. In contrast, most of M+ maintained their schedules through telematic service despite the confinement. For these reasons, the 16-fold increase in visits was mainly associated with M+ people.

Concerning the number of participants making requests, 95% of them (M+ and M-) did so before the pandemic. Since the number of cancellations from March to June was high among the M- individuals, the number of them that finally made a request was reduced to half.

In the sample of 211 participants who made a request during the pandemic (see **Figure 1**, bottom and **Table 1**), the number of extra visits and advanced visits increased

TABLE 2 | Results are expressed as total number and (percentages).

		September to December 2019			March to June 2020			Fold increase & Statistics		
Dimension	**Level**	**Total (%)**	**Women (%W)**	**Men (%M)**	**Total (%)**	**Women(%W)**	**Men (%M)**	**Total**	**Women**	**Men**
Global	Global	1,828 (100)	1,002 (55)	826 (45)	7,561 (100)	4,361 (58)	3,200 (42)	4.1 n.a.	4.4*	3.9*
Physical	Physical health	182 (10)	105 (58)	77 (42)	406 (5)	231 (57)	175 (43)	2.2***	2.2***	2.3***
	M+: M-	90:92	57:48	33:44	339:67	184:47	155:20	3.8: 0.7		
	(%M+: %M-)	(49:51)	(54:46)	(43:57)	(84:16)	(80:20)	(89:11)	M, $p < 0.001$		
Psychological	Psychology	1,272 (70)	676 (53)	596 (47)	5,544 (73)	3,193 (58)	2,351 (42)	4.4**	4.7***	3.9
	M+: M-	667:605	350:326	317:279	5,137:407	2,987:206	2,150:201	7.7:0.7		
	(%M+: %M-)	(52:48)	(52:48)	(53:47)	(93:7)	(93:6)	(91:9)	M, $p < 0.001$	S, $p < 0.01$	
Social	Total Social	374 (21)	221 (60)	153 (40)	1,611 (20)	937 (58)	674 (42)	4.3	4.2	4.4
	M+: M-	199:175	126:96	74:80	1,310:301	787:151	564:111	6.6: 1.7		
	(%M+: %M-)	(53:47)	(57:43)	(48:52)	(81:19)	(84:16)	(84:16)	M, $p < 0.001$		
	Family	121 (7)	77 (64)	44 (36)	473 (6)	275 (58)	198 (42)	3.9	3.6	4.5
	M+: M-	66:55	45:32	21:23	358:115	221:54	177:21	5.4: 2.1		
	(%M+: %M-)	(55:45)	(58:42)	(48:52)	(76:24)	(80:20)	(89:11)	M, $p < 0.001$		
	Friends	19 (1)	12 (63)	7 (37)	26 (0)	16 (62)	10 (38)	1.4***	1.3**	1.4
	M+: M-	9:10	5:7	4:3	13:13	9:7	4:6	1.4: 1.3		
	(%M+: %M-)	(47:53)	(42:58)	(57:43)	(50:50)	(56:44)	(40:60)	*n.s.*		
	Neighbors	49 (3)	29 (59)	20 (41)	413 (5)	248 (60)	165 (40)	8.4***	8.6***	8.3**
	M+: M-	34:15	20:9	14:6	361: 52	224:24	137:28	10.6: 3.4		
	(%M+: %M-)	(69:31)	(69:31)	(70:30)	(87:13)	(90:10)	(83:17)	M, $p < 0.01$		
	Work	91 (5)	49 (54)	42 (46)	317 (4)	182 (57)	135 (43)	3.5	3.7	3.2
	M+: M-	38:53	23:26	15:27	282:35	162:20	120:15	7.2: 0.7		
	(%M+: %M-)	(42:58)	(47:53)	(36:64)	(89:11)	(89:11)	(89:11)	M, $p < 0.001$		
	Economy	62 (3)	34 (55)	28 (45)	201 (3)	116 (58)	85 (42)	3.2	3.4	3.0
	M+: M-	32:30	20:14	12:16	133:68	80:36	53:32	4.1: 2.6		
	(%M+: %M-)	(52:48)	(59:41)	(43:57)	(66:34)	(69:31)	(62:38)	M, $p = 0.0546$		
	Studies	30 (2)	19 (63)	11 (37)	179 (2)	99 (55)	80 (45)	6.0	5.2	7.3
	M+: M-	19:11	12:7	7:4	162:17	90:9	72:8	8.5: 1.5		
	(%M+: %M-)	(63:37)	(63:37)	(64:36)	(90:10)	(91:9)	(90:10)	M, $p < 0.001$		
	Other	2 (0)	1 (50)	1 (50)	2 (0)	1 (50)	1 (50)	1.0	1.0	1.0
	M+: M-	1:1	1:1	1:1	1:1	1:1	1:1	1:1		
	(%M+: %M-)	(50:50)	(50:50)	(50:50)	(50:50)	(50:50)	(50:50)	*n.s.*		

*In the totals, percentages are calculated vs. the initial sample. (0), <1%. In women and men, (%W) and (%M) percentages represent the women:men ratio. Statistics: Chi-square with Yates' correction or Fisher's exact test; n.a., not applicable; n.s. not statistically significant *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$, relative increase vs. the global increase observed in the "March to June 2020" period. Factors: M, Misophonia; S, sex; $p < 0.01$; $p < 0.001$ as compared to fold increase in the counterpart.*

compared to the quarter of reference. The number of extra visits exhibited an 18.5-fold increase. This represented a 2.7-fold increase in M- group and a 66-fold increase in M+. Requests for extra visits were similar for M+ women and men, at a rate of approximately 0.6 extra visits per person. This was significantly higher than the rate of requests for extra visits by M- men and women, at a rate of 0.04 extra visits per person. Advancement of the visit, also scarce during the quarter of reference, increased 10-fold during the pandemic, as it happened for the first time in M+ people. In the case of M-, statistics yield their 4-fold increase as not reaching statistical significance.

Overload of demands in the pandemic resulted in a 10-fold increase in new requests. Also, there was a 4.1-fold increase in the consultation items. New consultations per person were 10 times greater for M+ than M- (20.8 per M+ patient, 1.9 per M- patient). The increase of new consultations for M+ translated into an increase in the consultation items.

Reason for Requests or Inquiries

As detailed in **Table 2**, in the quarter of reference, the most frequent topic for requests or inquiries was referred to psychology. In a lower number, requests referred to social and physical aspects. In the social context, the family and work questions were more frequent, while a minor part referred to neighbors and the economy. Finally, a few were related to studies and friends.

During the pandemic, the total number (global) consultation items exhibited a 4.1-fold increase. Significant differences with the quarter of reference were found as an increase in the number of concerns about psychology, that in women raised to a 4.7-fold increase, significantly higher than the 3.9 increase

observed in men. The psychological burden was significantly increased in M+ patients as compared to M-. At the social level, most consultations referred to neighbors. The total amount of concerns about friends and physical health were smaller but still significant. The increases were higher in patients diagnosed with misophonia than M- in the total social items, family issues, work and studies, and neighbors.

In both quarters, the fear that worried the patients the most was related to hypervigilance to noise and/or movement. In both cases, this fear was formulated by people diagnosed with misophonia. The requests referred to a state of expectation and greater sensory sensitivity to the experience of living (during confinement and self-confinement), a higher amount of auditory and visual stimuli, both related to neighbors and the family. The aversive sounds reported were related to the intensified and overlapped activities (walking, homework, playing, tv, keyboard, singing) of their own family or neighbors. They also included new social expressions of support (songs, hand-clapping, music, etc.) from neighbors standing in the balconies as they irrupted the silenced cities. According to clinical interviews, this hypervigilance and hypersensitivity affected other aspects of health, neighborhood, and family life.

Phase II – Psychological and Psychosomatic Symptoms (PPS) in People With Misophonia

Concerning the prevalence of misophonia, the diagnosis was positive in 114 of the 325 participants (35% of the patients) and was similar for women (37%) than for men (31%). Interestingly, only 2% of them initially went to the center to be treated for this problem since most of them (98%) were admitted due to other psychological or psychosomatic problems and were unaware of misophonia. In this second part of the study, these 114 M+ were studied to determine the pandemic's secondary impact on psychological and psychosomatic symptoms.

In the interviews conducted during the LSB-50 assessment, most of the patients diagnosed with misophonia, women and men, self-reported a progressive increase in symptoms during the pandemic quarter. These results were in agreement with the patient records in the first part of the study.

As illustrated in **Figure 2** and depicted in **Table 3**, in the reference period, the nine 'Psychological and Psychiatric Symptoms' assessed with LSB-50 showed similar results for women and men, with the lowest percentiles for "sleep disorder" and the maximum percentiles in "anxiety". Interestingly, during the pandemic quarter, 8 of the nine symptoms were found significantly increased in women, 1 of the nine in men. The symptoms showed different degrees of severity and gender bias since they were worse in women. In particular, "hostility" reached the higher percentiles in both sexes, followed by "anxiety." "Sleep disorders" and "amplified sleep disorders" showed the highest increases, mainly in women. Percentiles of psychoreactivity and hypersensitivity were increased in women, while men did so in a lower percentage.

DISCUSSION

This research studied the secondary impact of the COVID-19 pandemic on people attending a medical psychological center in the city of Barcelona during the first quarter March-June, 2020. We analyzed the frequency and reasons for requests for help and therapeutic interventions. Among them, their fear of death or the death of others and worries about the multiple loss caused by COVID-19, including work, economy, and studies. The descriptive study compared their behavior with the behavior shown in the quarter of September-December, 2019, chosen as reference quarter. The number of cancellations due to the fear of being infected was high. When the presence of a positive diagnosis of misophonia was analyzed, the results showed

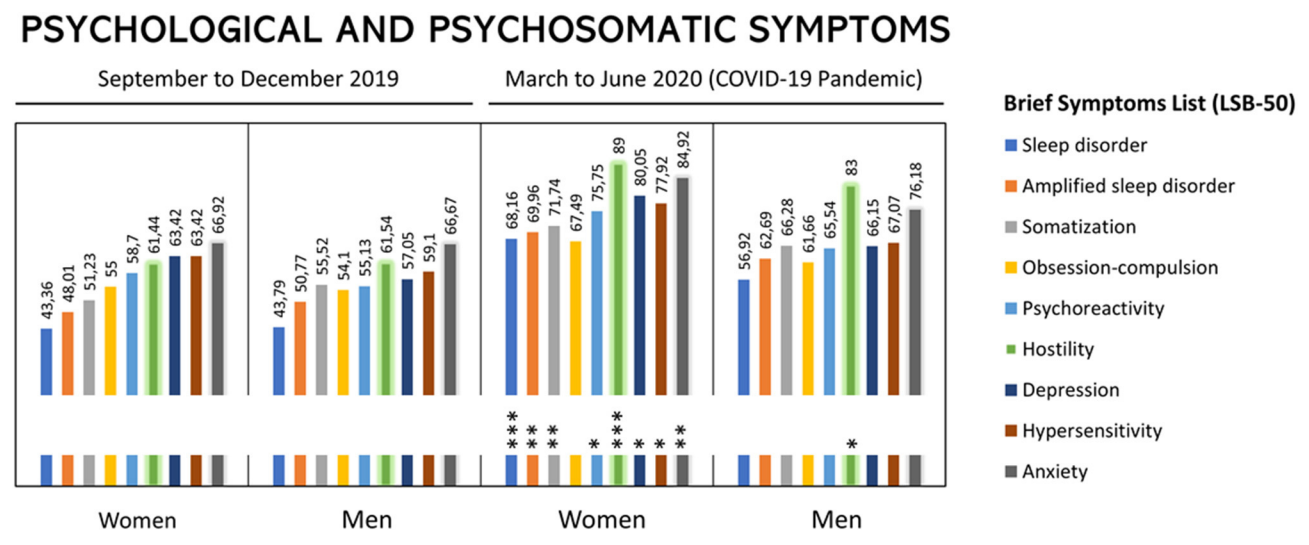

FIGURE 2 | Changes in the Psychological and Psychosomatic Symptoms during the confinement (Barcelona, March to June, 2020) due to COVID-19 pandemic in with women and men with a positive diagnosis of misophonia. Results are expressed as percentiles. Brief symptoms list (LBS-50) as provided in the legend. Asterisks refer to symptoms that increased dramatically in the second period of the study.

TABLE 3 | Phase II - Psychological and psychosomatic symptoms (PPS) in people with misophonia.

Brief Symptom List	September to December 2019		March to June 2020		Increase	
(LSB-50)	Women	Men	Women	Men	Women (%)	Men (%)
Psychoreactivity	58.7	55.1	75.8*	65.5	17.1 (29)	10.4 (19)
Hipersensitivity	63.4	59.1	77.9*	67.1	**14.5 (23)**	**8.0 (14)**
Obsession-compulsion	55.0	54.1	67.5	61.7	**12.5 (23)**	**7.6 (14)**
Anxiety	**66.9**	**66.7**	84.9**	76.2	**18.0 (27)**	**8.7 (14)**
Hostility	61.4	61.5	**89.0***	**83.0***	**27.6 (45)**	21.5 (35)
Somatization	51.2	55.5	71.7**	66.3	**20.5 (40)**	**10.8 (16)**
Depression	63.4	57.1	80.1*	66.2	16.7 (26)	9.1 (16)
Sleep disorder	43.4	43.8	68.2***	56.9	**24.8 (57)**	**13.1 (30)**
Amplified sleep disorder	48.0	50.8	70.0**	62.7	**22.0 (46)**	**11.9 (23)**

*Results are expressed as total percentiles or increase in units or (percentage) segregated for women and men with misophonia. Statistics: Chi-square with Yates' correction; *p < 0.5; **p < 0.01; ***p < 0.001 vs. the period before the pandemic. The significance of the bold values is that they are the values that have presented a higher increment from the first phase to the final phase.*

that most (96 %) of participants diagnosed with misophonia maintained their visits. Therefore, the second part of the study was aimed to analyze with LSB-50 the impact of confinement and self-confinement in the PPS of this specific sample population, since worsening of hostility, depression, and anxiety can be triggers of difficult situations in such scenarios.

Variations in the Treatment Schedule in People Attending the Center

The first remarkable observation was the greater number of requests and cancellations than those made during the reference quarter. Half of the patients canceled their quarterly schedule, and most of them justified this decision due to the state of alarm decreed by the government. When the alarm had risen, they argued the fear of being infected and infecting others, resulting in self-confinement behaviors. A small percentage of individuals indicated personal reasons unrelated to the pandemic situation. This behavior has also been described in other clinical scenarios and in many countries [i.e., (27)], where the number of patients regularly attending medical supervision for chronic diseases (i.e., cardiovascular) was dramatically reduced. The potential risks of this behavior contributing to the increase in the pandemic's secondary impact were worrisome, to the extent that medical doctors warn their patients, and the general population was warned about it in the TV news.

The data segmentation for misophonia diagnosis indicated that the arguments provided by M- contrasted with the low number and reasons for cancellations of those diagnosed with misophonia. In advance, misophonic patients feared that there would be a greater amount of misophonic stimuli in the confined situation. Therefore, they estimated that therapeutic help would be needed. The M+ participants were part of a specific program about misophonia, that probably allowed them to contextualize their problem and take the appropriate preventive measures. The results also confirm the relevance of knowledge of the problem and the diagnosis as the first steps to avoid misophonia being an ignored and, therefore, untreated problem.

Reasons of Consultations in People Attending the Center

The reasons for the requests for help and consultations were analyzed. These kinds of therapeutic requests are those that patients refer to the professional, independently of their clinical visits. Every time the patient contacts the center's professionals to request their support, the consultation or request for help is included in the record of "Requests and Reasons for Consultation" (2RC). Each consultation or request for help can include more than one item or reason for consultation. The results described show that, during the pandemic quarter, requests for extra visits increased 18-fold, in addition to the visits already assigned. This finding reflects the discomfort that patients experienced during the period of confinement and self-confinement. Another data that quantified the increase in psychological interventions was the number of requests and consultation items. During the reference quarter, the medical center received 278 requests for assistance that resulted in a total of 1,828 consultation items. During the confinement, the number of requests increased ten times (2,784 requests) and resulted in 7,561 (314%) consultation items. These increases are in agreement with the predictions and later confirmation of an overload of psychological burden and support demands recorded in the first wave of the pandemic (28, 29), referred to as being also increased (not yet quantified) in the second and current third wave of this pandemic. From a gender perspective, the ratio of requests between women and men was similar in both quarters. However, as quantified in the second part of the study, women had greater increase in severity of misophonia during the pandemic based on the LSB-50 psychiatric symptoms items.

A physical-psycho-social classification was used to identify the main reasons for consultation, resulting in different physical health and psychology variables, including social and professional aspects. This reflected the multiple impacts of COVID-19 in the individual's physical and psychological health and emergent worries due to socio-economical losses that reinforced the sense of loss and multiple grief/loss referred to as the secondary impact pandemic. Generically, during the

quarter of confinement and self-confinement, new symptoms and unknown discomforts increased but still represented a minor number of consultations. Thus, the individuals receiving psychological support increased the existent symptoms, both in frequency and intensity, and those added by worries worsened in the current COVID-19 scenarios. Reports in Spain and several other countries also refer that the clinical history of patients worsened after the outbreak of the pandemic (5–7, 30). However, critical analysis by experts pointed out the resistance and resilience capacity of the general population being underestimated. They recommended careful administration of the limited resources to be able to respond to the needs of individuals already receiving psychological/psychiatric support and those identified as vulnerable or at risk "(28). In the present work, statistical analysis confirmed M+ diagnosis as a critical factor, with increases in most of the domains and items observed in M+ patients being significantly higher than those recorded in M- patients. This fact supported the design of the second part of the study, where M+ patients were explicitly assessed for their psychological/psychiatric burden with a clinical tool for this purpose.

In agreement with the nature of the sample and the medical psychology center, psychological aspects were the main topic of the consultations, with generalized fear been the most predominantly reported. The hypervigilance and hypersensitivity to stimuli, together with the need to carry out physical activities and live with "normality" in an atypical situation, was referred to by people with M+ as a real Molotov cocktail. A series of neighborhood conflicts occurred that would have been inconceivable for the participants. The third most consulted item referred to conflicts with neighbors. While scarcely reported before the pandemic, those neighbors' conflicts involving law enforcement and justice intervention strongly contributed to increased consultations. Neighbor relations were also the topic of analysis of social violence associated with COVID-19 in other countries (31).

While most literature on misophonia has focused on the clinical correlates and phenomenology of misophonia, some research works have also investigated its impact in work, school, social, and family domains (15, 32). In the present work, "family" was the second source of worries during the pandemic quarter since participants were highly concerned about relatives becoming infected and at risk of dying. Before the pandemic, participants were more concerned about the issues for which they were attending therapy, and the family was in a third position in the ranking of worries.

Physical health was the fourth reason for requests, followed by losing the job that already pointed at the economic crisis as a secondary pandemic resulting from COVID-19. Study-related consultations were not limited exclusively to patients who were part of regulated academic training. They also included consultations from participants who voluntarily attended training workshops related to misophonia organized by the medical center. These consultations referred to difficulties in performance, memory, attention, concentration, among other problems. Previous research in Chinese and American college student samples showed that regardless of the cultural contexts, the impairment may be significant for those with more frequent or severe misophonia levels than individuals with subclinical sound sensitivities (15, 32).

Psychological and Psychosomatic Symptoms [PPS, LSB-50 Brief Symptom List)] in People With Misophonia

Regarding the prevalence of misophonia, research reports suggest that the number of people suffering misophonia is significant (15, 32). In the present work, the prevalence was 35%, being similar for women (37%) and men (31%). This is interesting to note since misophonia is quite unknown, leading to underdiagnosis and undertreatment. In a study that included a non-clinical sample of 483 undergraduate students, nearly 20% experienced clinically significant symptoms of misophonia (15). As indicated in different works, this syndrome can generate severe daily dysfunction (for example, occupational, interpersonal, academic), resulting in isolation, social, family, and couple conflicts. It can also contribute to the development of behavioral health problems (18), influence social life to extreme cases in which the individual may experience a decrease in mood or even have suicidal thoughts (10, 14, 18, 33)]. New preliminary studies also refer to the need to study misophonia and screen for comorbid psychiatric symptoms (34). In their work, PTSD (15.8%), OCD (11.5%), and MDD (9.6%) were found, in this order, the most common comorbidities. Similarly, the reports mentioned above on American and Chinese college students also provided evidence on misophonia symptoms being associated with substantial impairment and general sensory sensitivities, obsessive-compulsive, anxiety, and depressive symptoms (15, 32). Anxiety was found to significantly mediate the relationship between misophonia symptoms and anger attacks (32).

The symptom that had the highest percentage increase in women was "sleep disorder," while in men it was "hostility" and "sleep disorder" was the second one ranked to increase severity. In both cases, women and men reported global insomnia (conciliation, maintenance, and early awakening), associated with the consequences of daytime activity such as irritability, fears, uncertainty, anxiety, depression/sorrow, worries about job loss, and family and neighbor tensions as a result of noise. At the same time, night-time reasons were recorded: excessive activity and noise from neighbors and noise from pets. These facts meant that people diagnosed with misophonia were in a hypervigilance state that led them to suffer from insomnia.

"Amplified sleep disorder" was the second most increased symptom, also with gender bias. This item is related to the manifestations of the anxiety and depression scales, symptoms which were found also increased. Similarly, patients reported a worsening in these areas. Even though sleep disturbances in the wake of traumatic events are well-known (35), the first clinical reports of COVID-19 revealing the immediate impact of the COVID-19 outbreak unveiled worrisome clinically significant insomnia, acute stress, anxiety, and depression, mostly in front-line workers but also on subjective sleep status of the general population (36–39). Public health emergency collections and task forces, such as the European CBTI Academy, provided

practical recommendations to deal with sleep problems during confinement (40, 41). Thus, experts in the field recognize that the pandemic is causing a 'second pandemic of insomnia', and a new term Coronasomnia has been proposed.

The results of the present work on sleep and the fear to be infected, ill, or fear of dying are also relevant in the context of a recent review work that warns about the impact of the triad sleep insufficiency, anxiety, and psychosocial stress hampering immunity against viral infections and increasing the individual susceptibility to COVID-19 (42). According to these authors, the state-of-art of sleep, anxiety, and COVID-19 is still based on former research. Due to the emerging, and rapidly evolving situation of the COVID-19 pandemic, there is a strong need for further investigations as the virus seems meant to stay. Stress management measures, including addressing sleep-related disorders and sleep hygiene, are proposed to harness immune response and reduce viral infections' susceptibility (42).

After sleep disorders, hostility was the third variable to show a noticeable increase. It responds to the loss of emotional control with sudden or continuous aggression, anger, rage, or resentment. According to the results, an increase in these symptoms was observed in women and men. In both cases, patients justified these responses to the stress situation by confinement, excessive environmental and family noises, and, with particular relevance, children. The state of hypervigilance of day and night neighborhood behavior, changes in routines, fear, and uncertainty contributed to them. In this sense, it is important to note that while anger has been identified as the most prominent emotion in misophonia, irritation, stress and anxiety, aggravation, feeling trapped, and impatience have recently been reported as dominant emotions in some individuals (43).

Somatization was the fourth symptom that increased during the pandemic, twice as much in women than in men. Further evaluation showed that patients increased their physical and psychological distress during the pandemic, resulting in increased psychological and physical requests for therapist assistance.

The fifth variable was psychoactivity, with women increasing this symptom more than men. During the evaluation, patients recognized increased hypersensitivity to themselves and others. Especially and first of all, there is an increase in hypersensitivity to noise, followed by an increased sensitivity to lack of understanding in the couple and the extended family, to fears, worry, and uncertainty. This would be in agreement with recent reports about intolerance to uncertainty, which seems to be underlying the symptoms of anxiety and depression disorders (44), and to loneliness found during this pandemic, mostly in older adults (45, 46).

The following symptom that increased most during the pandemic was anxiety, more in women than in men. According to subsequent analysis, 12 patients reported having a panic attack during the pandemic: 6 with emergency room care, 1 with hospital admission. They also referred to increased fears in general, especially the contagious situation, both in themselves and their families. Half of the patients reported symptoms of anxiety-related to noise from family, pets, and neighbors.

Depression was the seventh variable with increased symptoms, more in women than in men. According to the clinical interview, they accounted for the increase during the pandemic quarter due, first, to the situation of uncertainty, lack of rest, loneliness, difficulty in adapting to the sudden change brought about by the pandemic, feelings of guilt and helplessness, emotional state, and irritability of both them and their family members.

The eighth item was obsession-compulsion. Patients scoring for this variable reported an increase in self-conversation. They referred to the behaviors they would have with neighbors and family members if they would make certain noises, in the same way as they do with those derived from work problems and conflicts. They also reported negative thoughts about their health and that of their family members. They acknowledged in the same way, having increased normal and some superstitious rituals. Several reports on the impact of COVID-19 on mental health point out the increase of anxiety-related symptoms and the current scenarios as a trigger on obsessive-compulsive disorder (47–51).

Finally, both women and men generically recognize that they feel particularly vulnerable to events arising from the pandemic situation, as reflected by hypersensitivity.

CONCLUSIONS AND FUTURE PERSPECTIVES

The present study provides evidence that the period of confinement and self-confinement enhanced the impact of misophonia in daily life activities and the well-being of people with severe aversive responses to certain sounds and movements. The data confirmed the strong capacity of misophonia to disrupt the participants' mental health in this unprecedented confinement context. Although the present work did not assess the quality of life (QoL) with a tool, a considerable decrease was predicted from the worsening of PPS, as also referred by participants, deserving future endeavors. The present work also shows that stressors were associated with the pandemic situation in general and, in particular, with the containment and self-confinement situation. Health, fears, conflicts with neighbors, study-related difficulties were outstanding reasons for consultations. Psychological and Psychosomatic Symptoms in participants diagnosed with misophonia revealed an increase of all items. Sleep disorders (coronasomnia), hostility, depression, and somatization were the most severe than previous assessments. From a gender perspective, in most of the variables, women presented the worst psychological and psychosomatic states that demanded more substantial therapeutical efforts.

There was a change in behaviors concerning the therapeutic intervention: most patients who felt more emotionally secure postponed their therapeutic schedules to later. Patients with misophonia kept their schedules for two reasons, (1) fear of not being able to address the problem, especially that arising from the excessive noise they anticipated during confinement,

and (2) because they were aware of the lack of therapeutic and professional support regarding the problem of misophonia outside the therapeutic setting they were carrying out.

This study reveals that besides the pandemic's effects on the general population, patients diagnosed with misophonia suffered an increase in symptoms due to the trigger sounds associated with neighborhood and family members. Lack of family, neighborhood, and professional understanding, due to lack of knowledge of misophonia, exacerbated psychological and psychosomatic problems during the pandemic.

Another aspect of great importance was the increase in interpersonal conflicts; within families and neighbors' communities. Since post-traumatic stress disorder has been related to the severity of the misophonic symptoms (34), the post-COVID scenario's perspectives are complex in this respect. Our results can help develop coping strategies addressing modifiable risk and protective factors for each mental status for early implementation in future outbreaks.

In summary, the study unveiled the complex physical-psychological-social burden, the need for dissemination, and a gender perspective to understand and approach the vast array of secondary impacts due to the COVID-19 pandemic on the population with misophonia. The unfeasibility to implement one-model-fits-all also highlights the relevance of further research investigation related to misophonia in the current and post-COVID-19 scenarios.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by L'Alfatier. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AF-T: interviews, data recordings and analysis, and manuscript draft. AF-T and LG-L: equally contributed to the concept, design, and scientific discussion, and the writing and approval of the manuscript. All authors have equally contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

To the participants, for their confidence and will to contribute to fighting COVID-19 through scientific research.

REFERENCES

1. World Health Organization, and Statement on the second meeting of the International Health, Regulations (2005). *Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV)*. (2020). Available online at: https://web.archive.org/web/20200131005904/https:/www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov) (accessed September 22, 2020).
2. World Health Organization. *WHO Director-General's Opening Remarks at the Media Briefing on COVID-19-—11 March 2020*. World Health Organization (2020).
3. Mira JJ. Pandemia COVID-19: y ahora¿'qué? COVID-19 pandemic: Now what? *J Healthc Qual Res.* (2020) 35:133–135. doi: 10.1016/j.jhqr.2020.04.001
4. *World Health Organization Timeline of WHO's Response to COVID-19*. (2020). Available online at: https://www.who.int/news-room/detail/29-06-2020-covidtimeline (accessed September 22, 2020).
5. Bartoszek A, Walkowiak D, Bartoszek A, Kardas G. Mental well-being (depression, loneliness, insomnia, daily life fatigue) during covid-19 related home-confinement - a study from poland. *Int J Environ Res Public Health*. (2020) 17:7417. doi: 10.3390/ijerph17207417
6. Planchuelo-Gómez Á, Odriozola-González P, Irurtia MJ, de Luis-García R. Longitudinal evaluation of the psychological impact of the COVID-19 crisis in Spain. *J Affect Disord*. (2020) 277:842–9. doi: 10.1016/j.jad.2020.09.018
7. Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun*. (2020) 87:40–8. doi: 10.1016/j.bbi.2020.04.028
8. Giménez-Llort L. The key role of chronosystem in the socio-ecological analysis of COVID. In: *Actas del VII Congreso Internacional de Investigación en Salud. Volumen I*. Madrid (2020).
9. Khan S, Huremovic D. Psychology of the Pandemic. In: Huremovic D, editors, *Psychiatry of Pandemics: A Mental Health Response to Infection Outbreak*. Urdorf: Springer Nature (2019).
10. Jastreboff PJ and Jastreboff MM. Treatments for decreased sound tolerance (Hyperacusis and Misophonia). *Semin Hear*. (2014) 35:105–20. doi: 10.1055/s-0034-1372527
11. Erfanian M, Mitchell AJ, Kang J, Aletta F. The psychophysiological implications of soundscape: a systematic review of empirical literature and a research agenda. *Int J Environ Res Public Health*. (2019) 16:3533. doi: 10.3390/ijerph16193533
12. Jastreboff MM, Jastreboff PJ. Components of decreased sound tolerance: hyperacusis, misophonia, phonobia. *ITHS News Lett*. (2001) 2:5–7.
13. Schröder A, Vulink N, Denys D. Misophonia: diagnostic criteria for a new psychiatric disorder. *PLoS ONE*. (2013) 8:e54706. doi: 10.1371/journal.pone.0054706
14. Edelstein M, Brang D, Rouw R, Ramachandran VS. Misophonia: physiological investigations and case descriptions. *Front Hum Neurosci*. (2013) 7:296. doi: 10.3389/fnhum.2013.00296
15. Wu MS, Lewin AB, Murphy TK, Storch EA. Misophonia: incidence, phenomenology, and clinical correlates in an undergraduate student sample. *J Clin Psychol*. (2014) 70:994–1007. doi: 10.1002/jclp.22098
16. Dozier TH, Lopez M, Pearson C. Proposed diagnostic criteria for misophonia: a multisensory conditioned aversive reflex disorder. *Front Psychol*. (2017) 8:1975. doi: 10.3389/fpsyg.2017.01975
17. Taylor S. Misophonia: a new mental disorder? *Med Hypotheses*. (2017) 103:109–17. doi: 10.1016/j.mehy,.2017.05.003
18. Brout JJ, Edelstein M, Erfanian M, Mannino M, Miller LJ, Rouw R, et al. Investigating misophonia: a review of the empirical literature, clinical implications, and a research agenda. *Front Neurosci*. (2018) 12:36. doi: 10.3389/fnins.2018.00036
19. Quek TC, Ho CS, Choo CC, Nguyen LH, Tran BX, Ho RC. Misophonia in singaporean psychiatric individuals: a cross-sectional study. *Int J Environm Res Pub Health*. (2018) 15:1410. doi: 10.3390/ijerph15071410

20. Jager I, de Koning P, Bost T, Denys D, Vulink N. Misophonia: phenomenology, comorbidity and demographics in a large sample. *PLoS ONE*. (2020) 15:e0231390. doi: 10.1371/journal.pone.0231390
21. EFE. *El Ruido Dispara Los Conflictos Entre Vecinos. In: El Periódico Digital, El Día, La Opinión De Tenerife*. (2020). Available online at: https://www.eldia.es/sociedad/2020/04/26/ruido-dispara-conflictos-vecinos/1073563.html (accessed September 22, 2020).
22. EFE. *El Ruido Dispara Los Conflictos Entre Vecinos*. (2020). Available online at: https://www.levante-emv.com/sociedad/2020/04/26/ruido-dispara-conflictos-vecinos/2005246.html (accessed September 22, 2020).
23. EFE. *El Ruido Dispara Los Conflictos Entre Vecinos*. (2020). Available online at: https://www.20minutos.es/noticia/4238317/0/ruido-dispara-conflictos-entre-vecinos-confinamiento/ (accessed September 22, 2020).
24. Federación Regional De Asociaciones Vecinales De Madrid. *Conflictos Vecinales Durante El Confinamiento: Prevención y Resolución*. Available online at: https://apuntesdeclase.lamarea.com/analisis/conflictos-vecinales-durante-el-confinamiento-prevencion-y-resolucion/ (accessed September 22, 2020).
25. Oller S. *Pautas Para Resolver Con Éxito Conflictos Con Los Vecinos*. (2020). Available online at: https://www.lavanguardia.com/vivo/lifestyle/20200424/48281212871/resolver-conflictos-vecinos-confinamiento-covid-19.html (accessed September 22, 2020).
26. de Rivera JLG, de Rivera L. *LSB-50: Listado de Síntomas Breve*. Manual. TEA Ediciones (2012).
27. Kastritis E, Tsitsimpis K, Anninos E, Stamatelopoulos K, Kanakakis I, Lampropoulos C, et al. Significant reduction in the visits to the emergency room department during the COVID-19 pandemic in a tertiary hospital in greece: indirect victims of the pandemic? *Medicine*. (2020) 99:e23845. doi: 10.1097/MD.0000000000023845
28. Durodié B. Handling uncertainty and ambiguity in the COVID-19 pandemic. *Psychol Trauma*. (2020) 12(Supple. 1):S61–2. doi: 10.1037/tra0000713
29. Farhan R, Llopis P. Psychiatric and neuropsychiatric syndromes and COVID-19. *Lancet Psychiatry*. (2020) 7:736. doi: 10.1016/S2215-0366(20)30317-5
30. García-Álvarez L, de la Fuente-Tomás L, García-Portilla MP, Sáiz PA, Lacasa CM, Dal Santo F, et al. Early psychological impact of the 2019 coronavirus disease (COVID-19) pandemic and lockdown in a large Spanish sample. *J Global Health*. (2020) 10:020505. doi: 10.7189/jogh.10.020505
31. Pizarro MR, Matta JP. *Las Relaciones Vecinales Como Clave Analítica De Ciertas Violencias Asociadas Al Covid-19 En La*. Argentina: Universidad Federal do Rio de Janeiro; Dilemas (2020). p. 1–10.
32. Zhou X, Wu MS, Storch EA. Misophonia symptoms among chinese university students: incidence, associated impairment, and clinical correlates. *J Obsessive Compuls Relat Disord*. (2017) 14:7–12. doi: 10.1016/j.jocrd.2017.05.001
33. Siepsiak M, Dragan W. *Psiquiatra Pol*. (2019) 53:447–58. doi: 10.12740/PP/92023
34. Erfanian M, Kartsonaki C, Keshavarz A. Misophonia and comorbid psychiatric symptoms: a preliminary study of clinical findings. *Nord J Psych*. (2019) 73:219–28. doi: 10.1080/08039488.2019.1609086
35. Lavie P. Sleep disturbances in the wake of traumatic events. *NEJM*. (2001) 345:1825–32. doi: 10.1056/NEJMra012893
36. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease *JAMA Netw Open*. (2020) 3:e203976. doi: 10.1001/jamanetworkopen.2020.3976
37. Zhang C, Yang L, Liu S, Ma S, Wang Y, Cai Z, et al. Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. *Front Psychiatry*. (2020) 11:306. doi: 10.3389/fpsyt.2020.00306
38. Lin LY, Wang J, Ou-Yang XY, Miao Q, Chen R, Liang FX, et al. The immediate impact of the 2019 novel coronavirus (COVID-19) outbreak on subjective sleep status. *Sleep Med*. (2021) 77:348–54. doi: 10.1016/j.sleep.2020.05.018
39. Morin CM, Carrier J. The acute effects of the COVID-19 pandemic on insomnia and psychological symptoms. *Sleep Med*. (2020) 77:346–7. doi: 10.1016/j.sleep.2020.06.005
40. Altena E, Baglioni C, Espie CA. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: practical recommendations from a task force of the European CBT-I academy. *J Sleep Res*. (2020) 29:e13052. doi: 10.1111/jsr.13052
41. UC Davis Health. *Psychiatry and Behavioral Sciences. COVID-19 Is Wreaking Our Sleep With Coronasomnia- Tips to Fight Back*. (2020). Available online at: https://health.ucdavis.edu/health-news/psychiatry/covid-19-is-wrecking-our-sleep-with-coronasomnia--tips-to-fight-back-/2020/09 (accessed September 22, 2020).
42. Nami M, Mehrabi S, Kamali A-M, Kazemiha M, Carvalho J, Derman S, et al. A new hypothesis on anxiety, sleep insufficiency, and viral infections; reciprocal links to consider in today's "world vs. COVID-19" endeavors. *Front Psychiatry*. (2020) 11:585893. doi: 10.3389/fpsyt.2020.585893
43. Rouw R, Erfanian M. A large-scale study of misophonia. *J Clin Psychol*. (2018) 74:453–79. doi: 10.1002/jclp.22500
44. McEvoy PM, Mahoney AE. To be sure, to be sure: intolerance of uncertainty mediates symptoms of various anxiety disorders and depression. *Behav Therapy*. (2012) 43:533–45. doi: 10.1016/j.beth.2011.02.007
45. Parlapani E, Holeva V, Nikopoulou VA, Sereslis K, Athanasiadou M, Godosidis A, et al. Intolerance of uncertainty and loneliness in older adults during the COVID-19 pandemic. *Front Psychiatry*. (2020) 11:842. doi: 10.3389/fpsyt.2020.00842
46. Angehrn A, Krakauer RL, Carleton RN. The impact of intolerance of uncertainty and anxiety sensitivity on mental health among public safety personnel: when the uncertain is unavoidable. *Cognit Ther Res*. (2020) 44:919–30. doi: 10.1007/s10608-020-10107-2
47. Shafran R, Coughtrey A, Whittal M. Recognising and addressing the impact of COVID-19 on obsessive-compulsive disorder. *Lancet Psych*. (2020) 7:570–2. doi: 10.1016/S2215-0366(20)30222-4
48. Rivera RM, Carballea D. Coronavirus: a trigger of OCD and illness anxiety disorder? *Psychol Trauma*. (2020) 12:S66. doi: 10.1037/tra0000725
49. Banerjee DD. The other side of COVID-19. Impact on obsessive compulsive disorder (OCD) and hoarding. *Psychiatry Res*. (2020) 288:112966. doi: 10.1016/j.psychres.2020.112966
50. Kumar A, Somani A. Dealing with corona virus anxiety and OCD. *Asian J Psychiatr*. (2020) 51:102053. doi: 10.1016/j.ajp.2020.102053
51. Sulaimani MF, Bagadood NH. Implication of coronavirus pandemic on obsessive-compulsive-disorder symptoms. *Rev Envir Health*. (2020). doi: 10.1515/reveh-2020-0054

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychology

OPINION
published: 03 June 2021
doi: 10.3389/fpsyg.2021.598096

Sister Death, Cousin Grief: Modes of Presence Before Life and Death

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Keywords: life, death, birth, grief, COVID-19

Ars longa, vita brevis, occasio praecepts, experimentum periculosum, iudicium difficile

Art is long, life short, opportunity fleeting, experimentation perilous, and judgment difficult.
– Hippocrates, *Aphorisms*

Like all humans in times of plague or catastrophe, contemporary humanity finds itself before a flood that overflows the dam, demanding answers happy modernity cannot give (Lossky, 1944; Barth, 1946; Glatzer, 1961; Ariès, 1977; Schuon, 2003; Ratzinger, 2020). Individuals are forsaken, to endure death and mourning alone. This much, the Covid-19 Pandemic has exposed.

Happy modernity stands for the contemporary expectations of limitless prosperity and progress, in the shade of unrealized, arguably unrealizable libertarian or socialist promises as well as the recurrent discovery of the unintended and harmful consequences of pursuing boundless progress and prosperity. Every so often, this dream of happy modernity turns into a nightmare, with the irruption of something that exposes its certainty. When a nightmare comes, happy modernity can only offer the promise of ever-more prosperous and progressive answers – and, as these fail, fall silent.

Within it lies also, more prominent if less pronounced, an illusion: that happy modernity's prosperity and progress will lead to a humanized nature, to a world where medicalization would tame death and expel it from life, building an invincible dam against suffering. The presumed immortality of institutions could lend this permanence to the contingency of individual life, for the price of accepting anonymous interchangeability and blurring of boundaries between private and public. Individual existence would be abstracted as part of a given, momentary and transient totality, a pseudo-transcendental whole that would contain all meaning, possess all value, express all sense – and endure "forever" or until the next correct narrative, whichever comes first. Once again, reality shows that the pretension of expelling death from life is vain; worse, it is misleading. There is an irredeemable individual cost in accepting the illusion, in believing this offer.

Franz Rosenzweig (1886–1929; a *morenu*, "one of our teachers," a traditional Jewish rabbinic distinction) wrote *Der Stern der Erlösung*, the *Star of Redemption* (Rosenzweig, 1921). It is one of the oddest of war books. *Unteroffizier* Rosenzweig wrote it while serving the Austro-Hungarian Army on the Balkan Front in World War One. It was written while he was a participant in this *small Jihad* (in the breaks of the marches, of battles, of holding positions, of the hospital, of the retreat). His *magnum opus, Der Stern* is essentially his testimony and commitment to the *great Jihad*, the struggle against the annihilation of the person by philosophical systems that aim to dissolve individual existences.

The circumstantial, momentary, foremost threat at his time was German Idealism, crowned by Hegel's philosophy and its attempt to unveil the "essence" of the world, to arrive and grasp at certainty. An attempt rooted in a fear of living, a vain effort to elude death. It would offer a refuge in abstraction, in the peaceful dissolution of all selves in a whole, mobilizing a cognition that has an end in itself, being afraid of life and all the disturbances and uncertainties life brings. *Der Stern* is a strong rebuttal of any such attempt. Life is, as sung in *La Traviata* (Verdi, 1853): *croce e delizia al cor* (a cross *and* a delight for the heart), personal for each individual.

Der Stern ends with these words: "into life"! a farewell to books and academic concepts and theories. Into life, free from being taken as disturbance on a system,

OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Theoretical and Philosophical Psychology, a section of the journal Frontiers in Psychology

Received: *17 September 2020*
Accepted: *05 May 2021*
Published: *03 June 2021*

Citation:
Bartholo R and Proença Jr D (2021) Sister Death, Cousin Grief: Modes of Presence Before Life and Death. Front. Psychol. 12:598096. doi: 10.3389/fpsyg.2021.598096

forsaking all systems, because any system hinders the plenitude of life as an inexhaustible fountain of renewal. *Erkennen* (cognition) is no longer an end in itself, it has turned into a service, it has become an ancilla for life, that only gains purpose when called upon. Such a cognition is a friend of living life and attends to it in all its needs, foibles and consequences.

Gesunder Menshenverstand in Handeln (sound common sense in action) is how Rosenzweig (1935) calls his method, as presented in *Das Büchlein vom Gesunden und Kranken Menschenverstand* (Rosenzweig, 1925). The *Little Book on Healthy and Sick Human Understanding*, published posthumously (translated as *Understanding the Sick and the Healthy, a view of World, Man, and God*). Rosenzweig offers the foundation for a *Neues Denken* (new thinking) critical of philosophy conceptualized. It is built on the bare acknowledgment that cognition is not independent of time, on the contrary, it is bound at each moment to that moment, cannot undo its past, cannot avoid its future.

Strictly speaking, this "new thinking" is grammatical, not merely logical. It is living, "speaking thinking" that needs someone else to take place, that can call upon cognition for this one living, dialogical, relational purpose. Its root is a radical gamble upon the value of living experience, in thinking of life living – lived, not conceptualized, so that it encloses the widest variety of relational exchanges – with other humans, with the world, with the divine. Rosenzweig's "new thinking" amounts to a veritable *philo-zoe* (zoe, life), signaling the counterpoint with philo-sophy. Philo-zoe includes philo-sophy as one among other dimensions of relational experience.

Wonder is at the heart of it all: the awe before marvels and estrangements. Estrangement, marveling, wonder have long been recognized as a door to philosophy. The problem begins if this access is presented as exclusive, even proprietary, as if the sole virtuous purpose of wonder was to lead to the path of abstract philosophizing. Most damning of all: to lead to a philosophical removal of wonder from life.

Rosenzweig's call, "into life"! frees wonder from the chains of conceptual abstractions. It acknowledges a wide variety of possible doors, leading to various paths of marvelings and estrangements, not denying that one among such doors would lead to philosophical paths.

Freeing wonder from philosophical claims of eternity and exclusivity, philo-zoe acknowledges birth and death as the paramount marvels of life. It is love, human love, living love that spans from the marvel of birth to the marvel of death, accepting the newborn from the moment it is to come – in expectation – and retaining the bond with the dear departed – in grief.

To be born is to arrive; it engenders a world anew, posing to the living needs of receiving and of being received. Birth is welcome and commitment to an otherness, since no human newborn survives alone. Newborns entail relational imperatives: of the world with them, of each newborn with the world. The joys of expectation and birth are modes of love, homage to the surprises, demands and potentials of a new presence.

Conversely, to die is to leave. For each dead, one world stops. Only the living remains. And their worlds endure with them. Grief is homage to a memory. To grieve is to make that memory living. The longing of grief is a mode of love, nostalgia for the departed, wishful for a presence made impossible by death – left only in the memory of those still living.

The acknowledgment of the marvels of birth and death are thus lovingly intertwined as *croce e delizia al cor* with the longings of expectation and grief. This is what sound commonsense in action may offer: access to the fruition of each mortal life – exciting, boring, painful, joyful, tearful, hopeful, despairful; particular, individual, unique; and, uppermost, finite. This means: bound in time through experience, from birth to death, the final alterity. But these are the paths the abstractions of "pure" philo-sophy fail to acknowledge, as Rosenzweig tells us.

We shared in this brief essay a mode of thinking that argues for philo-zoe rather than philo-sophy. This would be a mode of thinking for the lover of wisdom *lived*, loving living, rather than of wisdom *abstracted and conceptualized*. Philo-zoe offers, stands for, spouses an acknowledgment of the facticity of human experiences as possible meetings in time. Each meeting has its due time, occasion, span, density, intensity, purpose – duration during the time each of us lives and we can meet. Meetings mean encounters and dialogs with others, with the world, with the divine. Hence, also with "brother birth" and "sister death," that ensure life's temporality with the seal of mortality; and in anticipation of potential joy of an incoming alterity, with "cousin expectation," or in apologetical rite for alterities passed away, with "cousin grief" too.

As poets have told us –

> Everytime we say goodbye, I die a little
> Everytime we say goodbye, I wonder why a little
> Why the Gods above me, who must be in the know
> Think so little of me, they allow you to go
> *Every time we say goodbye I die a little*, Cole Porter

> *Warum ist Wahrheit fern und weit?* | Why is Truth so far and away?
> *Birgt sich hinab in tiefste Gründe?* | Hiding in the deepest abyss?
> *Niemand versteht zur rechten Zeit!* | No one understands at the right time!
> Hikmet Nameh. Buch der Sprüche, in *West-östlicher Diwan*, Goethe

AUTHOR CONTRIBUTIONS

Both conceived, drafted, and revised the manuscript together.

FUNDING

RB and DPJ received the Research Scholarship from the Brazilian Council for Scientific and Technological Development (CNPq).

ACKNOWLEDGMENTS

Roberto Bartholo and Domício Proença Júnior appreciate the support from the Brazilian Council for Scientific and Technological Development, CNPq.

REFERENCES

Ariès, P. (1977). *L'homme devant la mort*. Paris: Seuil.

Barth, K. (1946). *Christengemeinde und Bürgergemeinde*. Zurich: Kaiser Verlag.

Glatzer, N. (1961). *Franz Rosenzweig, His Life and Thought*. New York, NY: Schocken Books.

Lossky, V. (1944). *Essai sur la théologie mystique de l'Église d'Orient*. Paris: Cerf Foi Vivant.

Ratzinger, J. (2020). *Der Gott Des Glaubens Und Der Gott Der Philosophen (Gesammelte Schriften 3.)*. Freiburg im Breisgau: Verlag Herder.

Rosenzweig, F. (1921). *Der Stern der Erlösung. Frankfurt am Main: Kaufmann Verlag. English translation by William W. Hallo, The Star of Redemption*. New York, NY: Holt, Reinhart and Winston.

Rosenzweig, F. (1925). *unpublished. Das Büchlein vom Gesunden und Kranken Menschenverstand. English translation by Nahum Glatzer, Understanding the sick and the healthy: a view of world, man and God*. Cambridge, MA: Harvard University Press.

Rosenzweig, F. (1935). *Briefe. Edited by Edith Rosenzweig with the cooperation of Ernst Simon*. Berlin: Schocken Verlag.

Schuon, F. (2003). *Understanding Islam (with a preface by Annemarie Schimmel)*. Bloomington: World Wisdom.

Verdi, G. (1853). La Traviata. Opera in fours scenes on the libretto of Francesco Maria Piave from La dame aux camélias by Alexandre Dumas (the son)*. Venice: Teatro la Fenice.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

PERSPECTIVE
published: 04 June 2021
doi: 10.3389/fpsyt.2021.637237

Managing Grief of Bereaved Families During the COVID-19 Pandemic in Japan

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This commentary discussed the psychological issues related to bereavement in the wake of the COVID-19 pandemic. Specifically, we addressed two aspects in the context of Japanese culture. The first relates to the psychological distress of members of the bereaved family who could not visit their loved ones who had COVID-19 before or after their death. The second relates to the bereavement experience of those who were unable to be with their loved ones when the end came, even though they did not have COVID-19, because of restrictions on visiting hospitals. We seek to focus on the need for a support system for bereaved families to help them through the grieving process, and discuss end-of-life care in such circumstances, and in the post-COVID-19 era, as in current day Japan.

Keywords: COVID-19, prolonged grief, ambiguous loss, mourning process, bereavement

OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *03 December 2020*
Accepted: *12 May 2021*
Published: *04 June 2021*

Citation:
Matsuda Y, Takebayashi Y, Nakajima S and Ito M (2021) Managing Grief of Bereaved Families During the COVID-19 Pandemic in Japan. Front. Psychiatry 12:637237. doi: 10.3389/fpsyt.2021.637237

INTRODUCTION

The number of deaths worldwide due to the COVID-19 pandemic has exceeded 3 million as of April 20, 2021 (1). In this pandemic, the grief response may become more complex and prolonged, leading to psychological problems among people. During the same period, the pandemic caused 9,629 deaths in Japan, a 2% mortality rate (1). Thus, the number of COVID-19-related deaths has been relatively lower in Japan than in the Western countries, where the infection has exploded (2). As the number of deaths due to the pandemic increases, there is growing focus on the suffering of the bereaved families and their support systems in the wake of the COVID-19 pandemic. Pre and post-face-to-face family contact with loved ones is limited in in order to prevent infection (3). The suddenness and unpredictability of bereavement due to COVID-19 makes it challenging to establish advance care planning, a key component of effective terminal care (4). Bereavement due to COVID-19 infection may also interfere with the adaptive mourning process in terms of disruption of social norms, rituals, and mourning practices for death, as seen during past epidemics of infectious diseases (5). Because of these peculiarities, there is concern that bereavement due to coronavirus infections may increase psychological risks, such as complicated grief and depression (5, 6). For this reason, safer funeral practices have been explored in infectious disease pandemic disasters through the modification of funeral rites and the introduction of traditional ritual techniques specific to each culture (6, 7).

In the early stages of the pandemic, public awareness regarding COVID-19 deaths was low because there was no rapid increase in the number of deaths in Japan. However, public awareness increased considerably following the mass media broadcasts of the deaths of two celebrities from COVID-19–a popular comedian and a famous actress–in March and April 2020, respectively.

Around the same time, there were infections among funeral workers, which raised public concern about conducting funerals in these difficult times. It became apparent that bereavement during the COVID-19 pandemic was different from that caused by other types of death in Japan. We addressed two issues related to bereavement. First, family members of persons succumbing to COVID-19 were not allowed to bid goodbye to the deceased before death or see them face-to-face even after death. Second, the impact on end-of-life care and bereavement due to restrictions on visits to hospitalized patients, which had significant ramifications given the fact that a majority of people die in hospitals in Japan (8). We shall discuss efforts to address these issues in Japan.

POTENTIAL PSYCHOLOGICAL CONCERN REGARDING BEREAVEMENT DUE TO COVID-19

In early April 2020, during the initial stages of the pandemic, a statement regarding its psychological impact was released by the Chairman of the Disaster Preparedness and Disaster Response Committee of the Japanese Society for Traumatic Stress Studies. The statement pointed out that bereavement due to COVID-19 could lead to psychological problems such as prolonged grief and ambiguous loss, one which is without closure or clear understanding of why it occurred (9). In order to prevent the spread of COVID-19 in Japan, it was recommended, in principle, that visiting a person at the end of life with COVID-19 infection should be prohibited (10). Not being present at the death of patients with COVID-19 infection impedes the usual farewell rituals conducted for the deceased by the bereaved. For example, touching the deceased's body helps those bereaved to realize that their loved one has actually died. Not being present at the end of a person's life and not being allowed to touch the body potentially interferes with the mourning process and increases the risk of prolonged grief (9). In the Netherlands it was noted that grief levels were higher among people bereaved due to COVID-19 than those who had lost loved ones due to natural causes (11). Traumatic bereavement is more likely to occur when the death of a loved one is sudden or unnatural, such as when a loved one's body is damaged (12). It is accompanied by regret, anger, and guilt over death (For example, could the end have been prevented? Is the loved one suffering? Was death or dying unjust?) (12). Traumatic bereavement is a risk factor for PTSD and depression, as well as prolonged and complicated grief (13). These symptoms after bereavement often co-occur and share common features, but many epidemiological studies support their distinctiveness (14, 15). Since bereavement due to COVID-19 shares the common feature of traumatic bereavement (6), systematic psychosocial support is needed. Psychological therapies, such as cognitive-behavioral therapy, optimized for each symptom, have been shown to improve PTSD, grief, and depression after bereavement (16, 17).

Although Japan has yet to report any empirical studies on grief after bereavement due to COVID-19, considering its cultural practices regarding funerals, it is reasonable to expect increased rates of prolonged grief. In Japan, it is customary to hold a funeral that is widely attended by family members, locals, or business partners. Such bereavement ceremonies are essential to facilitate the grieving process of the bereaved by allowing them to share their feelings and memories of the deceased. Traditional Japanese funeral ceremonies include sharing meals and alcohol with all the people who attend. However, most funerals have now been restricted in Japan, following instances of people becoming infected with COVID-19 after attending funerals. Being in close physical proximity with friends or others may produce feel-good hormones such as oxytocin, dopamine, and serotonin (18). When they are not physically present to say goodbye and grieve with a loved one, they may be more likely to experience a sense of ambiguous loss (18). An ambiguous loss is an indefinite loss that persists without resolution or closure, such as when a loved one is missing (e.g., kidnapped or swept away by a tsunami and never found) or physically present but psychologically absent (e.g., the former personality is still intact due to dementia) (19). Ambiguous loss differs from ordinary bereavement in that there is no definitive information or finality (19).

In Japan, guidelines regarding COVID-19 patients have been in place right from the beginning of the pandemic. For example, the number of visits to critically ill patients should be limited. Existing restrictions relate to both end-of-life care and contact with the body after death. However, there is the need to take care of family feelings at each stage, which highlights the usefulness of communication through social networking services and online tools in the COVID-19 Nursing Practice Guide for Critically Ill Patients, Version 1 (published in April 2020) (20). In response to such recommendations, efforts at the grassroots level are underway to encourage communication between patients and their families through online communication tools such as videophones. For example, a physician has launched a crowdfunding campaign to purchase tablets in hospitals to facilitate online communication between critically infected patients and their families. He reached his goal in just half a day (21), and by the end of the campaign, he had raised more than five times his goal of more than 16 million yen, enabling distribution of the tablets to approximately 80 facilities (22). Similar efforts–making videoconferencing possible in end-of-life care settings, when patients cannot see their families face-to-face because of the pandemic (23)–are expected to alleviate patients' suffering in a way that medical personnel by themselves cannot. There is also a growing focus on comforting patients in their dying days, with families asking medical personnel to show the patients their favorite pictures and play their favorite music (24).

From the perspective of preventing infection during transportation and cremating the bodies of those who have succumbed to COVID-19, the Japan Medical Association's Implementation Manual (6th edition) (25) requires that crematorium workers and mourners do not touch the body. Under these circumstances, to arrange the farewell ceremony close to the conventional one, flowers and photographs are placed on top of the coffin (which usually mourners set inside the coffin). In case there are restrictions on the number of people who can be present at the funeral, the cremation service provider

can take pictures of the deceased before the funeral and show them to the family later. The family could also ask the service provider to place photographs, flowers, and other items related to the deceased on the coffin. Such acts at the funeral ceremony perhaps reflect the bereaved family members' sentiments that they are not leaving their loved ones alone at the time of their death. In addition, there is a custom of wiping and cleansing the body and applying makeup on the face after death (so-called angel care), which nurses generally perform when patients die in Japan (26). However, Version 2 of the COVID-19 Nursing Practice Guide for Critically Ill Patients published in July 2020 points out the importance of family members' participation in angel care in terms of grief care (26). The guideline recommends explaining the risk of infection to family members. If they still wish to participate in angel care, one recommendation is that they take the same preventive measures as do the medical personnel like wearing protective clothing, and touching a safe body area where they are not exposed to bodily fluids. Continuous efforts are needed to make mourning rituals safer with technology, and changes in funeral practices acceptable in each local culture (19).

THE IMPACT OF RESTRICTED END-OF-LIFE CARE VISITS FOR NON-COVID-19 INPATIENTS

Japan has been a super-aged society since 2007. In 2019, 28.4% of the population were 65 years and above and 4.7% were 85 years or older (27). In the 1950s, more than 80% of people died at home in Japan (28). In 2017, more than 80% of patients died in hospitals or institutions (8), despite nearly 70% of them wanting to die at home (29). Fewer people die at home because of the increasing trend toward nuclear families, which has led to a decline in family relationships (28). Many older relatives are moved into homes for the elderly because it may be a burden on family members and others who care for them (29). It is necessary to improve home medical care in present-day Japan to achieve end-of-life care at home, but only 5% of all medical institutions could support it in 2014 (8). For these reasons, many patients choose to receive end-of-life care for diseases other than COVID-19 in a medical facility or palliative care. However, many hospitals now restrict visits to non-COVID-19 inpatients—a necessary and natural measure—to prevent nosocomial infections (infections caused by pathogens in the hospital). There is a concern that these measures will result in a situation where terminally ill, non-COVID-19 patients, will not be provided with adequate end-of-life care. One of the risk factors for prolonged grief and PTSD after the death of a COVID-19 patient is the bereaved family's inability to say goodbye to the deceased. Since family members of non-COVID-19 inpatients have restricted visitation, the same psychopathological risk can be assumed for them (3). In light of the philosophy of palliative care, it is desirable for the psychological health of patients and their families to spend time with each other so that the patients are taken care of at the end of their lives, by their own. Therefore, there has been a move to provide a flexible response so that patients can be involved in end-of-life care while taking measures to prevent infection.

In response to this situation, the Japanese Society for Palliative Medicine has suggested in a pamphlet that families should consider caring for patients at home (30). In one such case, based on a nurse's suggestion, a leukemia patient who was prepared to die in the hospital could go home and spend the next 10 days with his family (31). In some areas, the number of individuals switching to end-of-life care at home has nearly doubled compared to previous years (32). Cases of end-of-life care at home have also been reported in the UK and Portugal (33, 34). In Portugal, most families encourage terminally ill patients to stay at home for an extended period (34).

Although, in some cases, family members were unable to visit their hospitalized relatives freely during the COVID-19 pandemic, they asked individuals, called end-of-life caregivers, from some organizations such as hospices, to provide end-of-life care for terminally ill patients living alone in Japan (35). Conversely, some physicians involved in palliative care have expressed concern about suggesting end-of-life care at home. It is necessary to consider the situation of families who have difficulties or anxieties about administering end-of-life care at home and seek gentle and heartwarming end-of-life care at hospitals for their loved ones, knowing that they will have to observe all the required measures against infectious diseases during their restricted visits (36). The UK has increased opportunities for bereaved institutional support, including the issuance of guidelines by the NHS to allow only one family member to visit patients who are unlikely to recover or who are days or weeks away from their death (37).

Although end-of-life care has been discussed as an issue for medical care in super-aging Japanese society, COVID-19 could be considered an opportunity to think about dying at home. As a country with one of the highest life expectancy levels, Japan has focused on care for the elderly. It is precisely for this reason that it is expected to lead the world in establishing a system of advanced end-of-life care.

RESPONSE TO BEREAVEMENT DUE TO COVID-19 IN JAPAN: LESSONS LEARNED FROM PAST MAJOR DISASTERS

Japan experienced an extremely high level of loss in the Great East Japan Earthquake of 2011 (38), which led to the development of academic and public health efforts to deal with grief; these were also deployed during the COVID-19 pandemic. For example, *the Japan Disaster Grief Support* project established after this earthquake and implemented in May 2020, provided grief-related psychoeducational materials for the bereaved (39). Musashino University, the National Center of Neurology and Psychiatry, and others developed several treatment/prevention programs for prolonged grief, which have been shown to be effective in other countries too, based on empirical evidence. These include complicated grief treatment (40) and its Japanese version, along

with group cognitive behavioral therapy for the bereaved with the distress of grief less severe than complicated grief (41). Since face-to-face therapy is limited during the COVID-19 pandemic, to provide such services, it would be necessary to devise programs including web-based grief treatment and videoconferencing psychotherapy (42, 43). We provide a modified treatment program for patients in whom face-to-face treatment at an institution had to be interrupted as a preventive measure against COVID-19. Even before the COVID-19 pandemic, the U.K. and U.S. had established guidelines and training methods for telepsychological interventions and developed laws; this area has not yet been developed in Japan. In the early stages of the pandemic, some academic volunteers translated these guidelines into Japanese. The infrastructure for telepsychological interventions has been developed; however, its growth is not sufficient to meet the demand. Professionals must work together to ensure that grief support continues without interruption. To ensure that those who need help do not suffer, we must provide more flexible support, including online programs that can be implemented for bereaved families in remote areas, in preparation of the post-Corona era.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

YM and YT conceived the ideas. YM developed the draft paper. MI and SN verified the draft paper as experts in grief-related research and treatment in Japan and supervised this work. YT encouraged YM to investigate the research or guidelines related to bereavement due to COVID-19 in Japan. All authors have discussed the contents and contributed to the final manuscript.

FUNDING

This work was supported by JSPS KAKENHI (Grant Number 20H01774).

REFERENCES

1. Dong E, Du H, Gardner, L. *COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)*. ArcGIS. Johns Hopkins University (2021). Available online at: https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6 (accessed April 20, 2021).
2. Alwan NA, Burgess RA, Ashworth S, Beale R, Bhadelia N, Bogaert, D et al. Scientific consensus on the COVID-19 pandemic: we need to act now. *Lancet*. (2020) 396:71–2. doi: 10.1016/S0140-6736(20)32153-X
3. Morris SE, Moment A, Thomas JD. Caring for bereaved family members during the COVID-19 pandemic: before and after the death of a patient. *J Pain Symptom Manage*. (2020) 60:e70–4. doi: 10.1016/j.jpainsymman.2020.05.002
4. Moore KJ, Sampson EL, Kupeli N, Davies N. Supporting families in end-of-life care and bereavement in the COVID-19 era. *Int Psychogeriatr*. (2020) 32:1245–8. doi: 10.1017/S1041610220000745
5. Mayland CR, Harding AJE, Preston N, Payne S. Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement. *J Pain Symptom Manage*. (2020) 60:e33–9. doi: 10.1016/j.jpainsymman.2020.05.012
6. Carr D, Boerner K, Moorman S. Bereavement in the time of coronavirus: unprecedented challenges demand novel interventions. *J Aging Soc Policy*. (2020) 32:425–31. doi: 10.1080/08959420.2020.1764320
7. Cardoso ÉAO, Silva BCAD, Santos JHD, Lotério LDS, Accoroni AG, Santos MAD. The effect of suppressing funeral rituals during the COVID-19 pandemic on bereaved families. *Rev Lat Am Enfermagem*. (2020) 28:e3361. doi: 10.1590/1518-8345.4519.3361
8. Ministry of Health, Labour and Welfare. *Survey of attitudes toward medical care in the final stages of life report*. Ministry of Health, Labour and Welfare (2018). Available online at: https://www.mhlw.go.jp/toukei/list/saisyuiryo_a.html (accessed November 6, 2020).
9. Kato, H. *The Psychological Impact of the COVID-19 Pandemic. Japanese Society of Traumatic Stress Studies*. (2020). Available online at: https://www.jstss.org/ptsd/covid-19/page01.html (accessed November 6, 2020).
10. Japanese Society for Infection Prevention and Control. *A guide to dealing with COVID-19 infections in medical institutions ver.3*. Japanese Society for Infection Prevention and Control (2020). Available online at: http://www.kankyokansen.org/uploads/uploads/files/jsipc/COVID-19_taioguide3.pdf (accessed November 6, 2020).
11. Eismaa MC, Tammingab A, Smid GE, Boelen PA. Acute grief after deaths due to COVID-19, natural causes and unnatural causes: an empirical comparison. *J Affect Disord*. (2020) 278:54–6. doi: 10.1016/j.jad.2020.09.049
12. Barlé N, Wortman CB, Latack JA. Traumatic bereavement: basic research and clinical implications. *J Psychother Integr*. (2020) 27:127. doi: 10.1037/int0000013
13. Kokou-Kpolou CK, Moukouta CS, Masson J, Bernoussi A, Cénat JM, Bacqué MF. Correlates of grief-related disorders and mental health outcomes among adult refugees exposed to trauma and bereavement: a systematic review and future research directions. *J Affect Disord*. (2020) 267:171–84. doi: 10.1016/j.jad.2020.02.026
14. Malgaroli M, Maccallum F, Bonanno GA. Symptoms of persistent complex bereavement disorder, depression, and PTSD in a conjugally bereaved sample: a network analysis. *Psychol Med*. (2018) 48:2439–48. doi: 10.1017/S0033291718001769
15. Lenferink LI, Nickerson A, de Keijser J, Smid GE, Boelen PA. Reciprocal associations among symptom levels of disturbed grief, posttraumatic stress, and depression following traumatic loss: a four-wave cross-lagged study. *Clin Psychol Sci*. (2019) 7:1330–9. doi: 10.1177/2167702619858288
16. Johannsen M, Damholdt MF, Zachariae R, Lundorff M, Farver-Vestergaard I, O'Connor M. Psychological interventions for grief in adults: a systematic review and meta-analysis of randomized controlled trials. *J Affect Disord*. (2019) 253:69–86. doi: 10.1016/j.jad.2019.04.065
17. Eddinger JR, Hardt MM, Williams JL. Concurrent treatment for PTSD and prolonged grief disorder: review of outcomes for exposure- and nonexposure-based treatments. *OMEGA-J Death Dying*. (2019). doi: 10.1177/0030222819854907
18. Weir Grief K. *COVID-19: saying goodbye in the age of physical distancing*. American Psychological Association (2020). Available online at: https://www.apa.org/topics/covid-19/grief-distance (accessed November 6, 2020). doi: 10.1037/e502882020-001
19. Pauline E, Boss JY. Ambiguous loss: a complicated type of grief when loved ones disappear. *Bereavement Care*. (2014) 33:63–9. doi: 10.1080/02682621.2014.933573
20. Japan Society of Critical Care Nursing. *COVID-19 Practical Guide to Critical Care Nursing Ver.1.0*. Japan Society of Critical Care Nursing (2020). Available online at: https://www.jaccn.jp/guide/pdf/COVID-19_guide1.Ver1.0.pdf (accessed November 6, 2020).

21. Japanese Institute of Medicine. Promoting online visitation in the age of living with COVID-19. *Weekly Med J*. (2020) 2020:3377. Available online at: https://www.igaku191shoin.co.jp/paperDetail.do?id=PA03377_04 (accessed November 6, 2020).
22. Hirohashi T. *Making videoconferencing possible in end-of-life care settings where they cannot see their families during COVID-19 pandemic*. (2020). Available online at: https://readyfor.jp/projects/palliative-care (accessed November 6, 2020).
23. Utsuki N. *Videoconferencing is a new option for end-of-life care*. Nikkei Medical (2020). Available online at: https://medical.nikkeibp.co.jp/leaf/all/report/t344/202005/565572.html (accessed November 6, 2020).
24. The Japanese Society of Intensive Care Medicine. *Care for Loss, Grief and Bereavement during COVID-19 pandemic*. The Japanese Society of Intensive Care Medicine (2020). Available online at: http://elnecjcc.hs.med.kyoto-u.ac.jp/data/COVID-19/COVID-19_PART2-3.pdf (accessed November 6, 2020).
25. Japan Medical Association. *COVID-19 Infection: Manual for the Transportation, Funeral and Cremation of Bodies Ver.5.0*. (2020). Available online at: https://www.jmari.med.or.jp/download/sousaimanual5.pdf (accessed November 6, 2020).
26. Japan Academy of Critical Care Nursing. *The Japanese Society of Intensive Care Medicine COVID-19 Critical Care Nursing Practice Guide Ver.2.0*. Japan Medical Association. Available online at: https://www.jsicm.org/news/upload/COVID-19_nursing_guide_v2.pdf (accessed November 6, 2020).
27. Health, Labour and Welfare. *White Paper*. (2020). Available online at: https://www.mhlw.go.jp/toukei_hakusho/hakusho/index.html (accessed November 6, 2020).
28. Shimada I. 80% of people in Japan die in hospital: the reason why "I want to spend my last days at home" doesn't get real. Gento-sha Gold Online (2020). Available online at: https://gentosha-go.com/articles/-/22078 (accessed November 6, 2019).
29. Ministry of Health, Labour and Welfare. *End-of-life -reference materials*. Available online at: https://www.mhlw.go.jp/file/05-Shingikai-12404000-Hokenkyoku-Iryouka/0000156003.pdf (accessed November 6, 2017).
30. *Japanese Society for Palliative Medicine brochure about COVID-19:finished version 2*. Available online at: https://www.pref.hiroshima.lg.jp/uploaded/attachment/396604.pdf (accessed November 6, 2020).
31. Asahi Digital. *Some people don't get to see their families at the end of life - Ten days for the 222 patient who complained*. (2020). Available online at: https://digital.asahi.com/articles/ASN5967C9N57UTIL03V.html?pn=9 (accessed November 6, 2020).
32. Asahi Digital. *Want to see him/her at the end of life: COVID-19, which prevents wishes. 226 Getting double the end-of-life care at home*. (2020). Available online at: https://digital.asahi.com/articles/ASN596H4ZN58UTIL03C.html (accessed November 6, 2020).
33. Katz NT, McInerney M, Ravindran G, Gold M. Silent suffering of the dying and their families: impact of COVID-19. *Intern Med J*. (2021) 51:433–5. doi: 10.1111/imj.15101
34. Carvalheiro AM, Faria C, Semeão I, Martinho SM. Caring for end-of-life patients and their families, during life, and mourning, in the COVID-19 era—the experience of a palliative care team in Portugal. *Front Psychiatry*. (2021) 12:624665. doi: 10.3389/fpsyt.2021.624665
35. NIKKEI. *The scene of their final days which COVID-19 changed: end-of-life care is at home*. (2020). Available online at: https://r.nikkei.com/article/DGKKZO62603760T10C20A8KNTP00?lightid_token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJraWppX2lkIjoiREdLS1pPNjI2MDM3NjBUMTBDMjBBOEtOVFAwMCIsImF0bGFzX2lkIjoiZDlzLWxqYjRtaC0yYWxsYjVoLWpvYzN6M2ZkZ2t0MzVhb2tuMXN0cXhjaC1za2Q3Z296cF92czE5eXQ5cDBoaSIsImlhdCI6MTU5OTYzNTMzMCwiZXhwIjoxNTk5NjQyNTMwfQ.F5cPC0jfwc2lr0jN0uqEpofMCd5FmHxpLmGJF90D0uQs=6 (accessed Nobember 6, 2020).
36. Shinjo, T. *Hasn't palliative care killed itself by COVID-19? The medical profession has violated 237 the rights of the dead*. BUZZFEED Japan (2020). Available online at: https://www.buzzfeed.com/jp/takuyashinjo/covid238 19-palliative-care (accessed November 6, 2020).
37. NHS. *Guidance for Visitors during the COVID-19 Pandemic Visiting Restrictions: an information guide*. (2020). Available online at: https://www.pat.nhs.uk/downloads/New%20NCA%20Leaflets/COVID-19/910%20-%20Guidance%20for%20Visitors%20during%20the%20COVID-19%20Pandemic%20Visiting%20Restrictions.pdf (accessed April 18, 2021).
38. Ranghieri F, Ishiwatari M, editors. *Learning From Megadisasters: Lessons from the Great East Japan Earthquake*. The World Bank (2014). doi: 10.1596/978-1-4648-0153-2
39. Japan Disaster Grief Support. *Support for the bereaved during COVID-19 pandemic*. (2020). Available online at: https://jdgs.jp/wp-content/uploads/2020/06/70681bce9d0f5eb3afd733f2af78e47a.pdf (accessed November 6, 2020).
40. Okazaki J, Nakajima S. Practice of complicated grief treatment. *Japan J Trauma Stress*. (2018) 16:5–10.
41. Kurosawa M, Sasaki S, Ueda M, Nakajima S, Kim Y. Practice of group cognitive behavioral therapy for distress of grief. *Japan J Trauma Stress*. (2018) 16:17–23.
42. Shirai A, Nakajima S, Wagner B. Cognitive-behavioral therapy for complicated grief using email. *Japan J Trauma Stress*. (2018) 16:11–6.
43. Boelen PA, Maarten C, Eisma MC, Smid GE, Keijser J, Lenferin L. Remotely delivered cognitive behavior therapy for disturbed grief during the COVID-19 Crisis: challenges and opportunities. *J Loss Trauma*. (2020) 16:211–9. doi: 10.1080/15325024.2020.1793547

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Sociology

PERSPECTIVE
published: 08 June 2021
doi: 10.3389/fsoc.2021.648395

Increased Risk of Death Triggered by Domestic Violence, Hunger, Suicide, Exhausted Health System during COVID-19 Pandemic: Why, How and Solutions

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Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Liubov V. Borisova, Uppsala University, Sweden
James Overholser, Case Western Reserve University, United States

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Specialty section:
This article was submitted to Medical Sociology, a section of the journal Frontiers in Sociology

Received: *31 December 2020*
Accepted: *17 May 2021*
Published: *08 June 2021*

Citation:
David KB, Aborode AT, Olaoye DQ, Enang NV, Oriyomi AK and Yunusa I (2021) Increased Risk of Death Triggered by Domestic Violence, Hunger, Suicide, Exhausted Health System during COVID-19 Pandemic: Why, How and Solutions. Front. Sociol. 6:648395. doi: 10.3389/fsoc.2021.648395

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections, just like many other public health emergencies, is a well-established global health burden that has resulted in several changes in routines and lifestyles of people globally. The coronavirus disease (COVID-19) pandemic, caused by SARS-CoV-2, has directly or indirectly involved in the loss of lives of more than 3.24 million as of 6th May, 2021. The increasing threats posed by this pandemic were subsided by the swift and drastic measures put in place by different countries. As other causes of death before the emergence of COVID-19 still exist, the pandemic has further worsened their impact. The increased risks of COVID-19 deaths are not only due to the health burden it possesses, but also due to some other factors. These factors include domestic violence that becomes rampant, especially during lockdowns; hunger due to low economic development, unemployment, and loss of jobs; suicide due to depression; exhausted health system due to high level of COVID-19 cases and inability to contain it. As we move from the response phase into recovery, the pandemic's direct and broader impacts on individuals, households, and communities will influence the capacity to recover. An understanding of these impacts is therefore required to develop priorities to support recovery. This paper identifies other causes of death amidst the pandemic, such as domestic violence, hunger, suicide, and exhausted health system, and how to minimize their effects.

Keywords: suicide, pandemic, hunger, death, COVID-19, SARS-CoV-2, domestic-violence

INTRODUCTION

The current COVID-19 pandemic is one of the largest respiratory disease outbreaks affecting several countries simultaneously and has affected over 200 countries as of April 2021 (David and Ozuluoha, 2020). As we move from the response phase into recovery, the pandemic's direct and broader impacts on individuals, households, and communities will influence the capacity to recover. An understanding of these impacts is therefore required to develop priorities to support recovery (Bernard et al., 2020).

COVID-19 pandemic has affected many homes and families. It has caused numerous deaths in the world with greater collateral damages in some low and middle-income countries where people do not have access to proper healthcare, food, and jobs (Lim et al., 2020; Wang et al., 2020). These factors have, in turn, influenced other triggers of deaths during the COVID-19 pandemic. The numerous deaths triggered by COVID-19 and other factors that made the pandemic out of control, such as domestic violence, hunger, suicide, and exhausted health system, are discussed extensively in this paper, and suitable solutions that could reduce these risks are proposed in detail.

Impacts of COVID-19 Pandemic on Human Lives

While different countries' policies vary, a lockdown declaration seemed like a common occurrence across many countries (De Ver Dye et al., 2020). The declared lockdown, though having many advantages, came in with other notable disadvantages. Some of the considerable impacts are seen on the health of people with chronic diseases (Umaru et al., 2020; Aborode et al., 2020a), treatment of malaria (Aborode et al., 2021a), education (Lawal et al., 2020; Aborode et al., 2020b), drugs supply (Dada et al., 2020), healthcare services (David and Adebisi, 2020; Ahmad et al., 2021). The magnitude of these impacts has created an atmosphere where people are more susceptible to deaths not only directly linked to COVID-19 pandemic, but indirectly to other factors.

Domestic Violence

COVID-19 has radically changed the lives of many individuals. During the quarantine mandated by governments to curb the spread of COVID-19, domestic violence made some people's homes a more dangerous place to live and survive. This could be because they must stay the whole day with partners and away from people who can witness their experiences and give help. Many abusive situations were on an increase due to economic crises linked to COVID-19 emergence (many victims have difficulty leaving abusive partners for financial reasons). In addition, lockdown triggered the increased risk of domestic violence where parents fight with one another, children unable to handle the mental stress of such acts, thus increasing the prevalence of suicide, mental instability, and physical deformation (Elbert et al., 2018; Cluver et al., 2020). A recent study has proven a rise in domestic violence and social decadences during pandemics (Brooks et al., 2020). The rise in domestic violence during pandemics increases the level of violence and social menace that cannot be control easily due to low engagement of people and lockdown. Domestic violence during pandemics is linked to the adoption of negative stress coping mechanisms that occur between spouses, parents, and individuals during pandemic lockdowns. Lockdown also brings abusers closer to their victims for an extended period, consequently increasing the probabilities of repeated occurrences (Brenner, 1987; Reynolds et al., 2008; Palermo and Peterman, 2011).

Several media reports indicate a surge in domestic violence cases in various countries (Lima et al., 2020; van Gelder et al., 2020; Gearin and Knight, 2020). According to Kagi (2020), the overall crime rates in Australia have declined, however, the rate of domestic abuse increased by 5%. Some charities in Australia also raised concerns about COVID-19 misinformation used by the offenders to further control and abuse domestic violence victims (Kagi, 2020). Allen-Ebrahimian (2020) reported that China witnessed a threefold increase in domestic violence cases after imposing lockdown. Different states in the United States also reported about 21–35% increase in the number of domestic violence recorded (Wagers, 2020). According to Bradbury-Jones and Isham (2020), the lockdown imposed to deal with COVID-19 pandemic has granted greater freedom to abusers. It has become easier for the abusers to enforce control tactics by limiting the victims' access to phones, the internet, and other people, while van Gelder et al. (2020) also emphasized that the lockdown limits familiar support options.

The proposed solutions to the occurrences of domestic violence are strengthening online support and aids systems (Haneef and Kalyanpur, 2020). There should be advocacy platforms aimed at curtailing the several factors catalyzing the spikes in violence against persons (WHO, 2020). Also, there should be proposed plans that will reduce the risk triggers of domestic violence, which results to death during COVID-19 pandemic. It is required that prioritizing violence prevention within the global public health agenda be encouraged. This can be done by defining the problem through the systematic collection of information, using research evidence to determine the causes and risk factors of violence, and implement effective interventions to prevent violence. Achieving these goals becomes particularly important during the pandemic because violence against women has dramatically increased (WHO, 2020). The effectiveness of online safety and health interventions for different needs of women who have experienced intimate partner violence have already been outlined previously (El-Serag and Thurston, 2020; Ford-Gilboe et al., 2020).

Moreover, to reduce the mortality rates due to domestic violence during COVID-19 pandemic, there is a need for funding sources to enhance telephone or remote counseling services with high-speed internet, hotlines, and emergence shelters. It is also mandatory to identify high-risk individuals and admonish them to avoid extreme events such as impulsive acts, homicide, or suicide.

Hunger

Agriculture has remained the primary source of food globally, and hence agriculture plays a vital role in the nation's economic development. The lockdowns imposed by countries have resulted in an obstruction to the free flow of all the stages involved in agriculture i.e. from farm to fork (including production, processing, distribution, and consumption). This has consequently resulted in a hike in the prices of food commodities (Torero, 2020). As a result of this increase in food prices and a further anticipated hike, food shortages, malnutrition, and even deaths have been recorded (Torero, 2020). The United Nations World Food Program has estimated that by the end of the year 2020, over 265 million

people could suffer from food shortages and hunger (Food Security Information Network, 2020).

In a national survey conducted in the United States of America, it was shown that the COVID-19 pandemic has directly increased the rate of food insecurity in households having children (Bauer, 2020). This survey showed that 34.5% of households with a child ≤18 years old and 34.4% of families with children ≤12 years old were experiencing food shortages by the end of April 2020, compared with 14.7 and 15.1% in 2018, respectively (Bauer, 2020). It was also shown that 17.4% of mothers with children ≤12 years old reported that "the children in my household were not eating enough because we just couldn't afford enough food," compared to 3.1% in 2018 (Bauer, 2020).

COVID-19 pandemic aggravated the hunger crisis in the world's hunger hotspots and created new epicenters of hunger worldwide. By the end of the year, 12,000 people per day died from COVID-19 pandemic, which is linked to hunger, potentially more than the disease (Siguerva et al., 2020). The pandemic is the final straw for millions of people already struggling with the impacts of conflict, climate change, inequality, and a broken food system that has impoverished millions of food producers and workers. During the COVID-19 pandemic, despite the socioeconomic disparities across borders and communities, there has been expansive togetherness, love, and care. The lockdown, however, introduced several economic hardships Siguerva et al. (2020); Aborode et al. (2021b), such as coronavirus famine, food insecurity and adverse hunger, which triggered risk of human death. Neglecting to combat hunger may have caused severe malnutrition and starvation, as evident in war-torn or ravaged ambient. These correlated to salient risk factors or determinants Chukwuma (2020) for compromised immune systems and facilitated susceptibility to infection rates, life-threatening disorders associated with the novel coronavirus. These disorders include severe respiratory distress, pneumonia, diarrhea, cholera, other gastrointestinal diseases Chaolin et al. (2020), and emerging and re-emerging diseases Chukwuma (2018) to poor sanitation and inadequate water supply.

To mitigate the impact of hunger during COVID-19 pandemic on human lives, there is a need for COVID-19 economic recovery palliative. This will provide families with prompt and adequate access to food and other resources during and after the pandemic crisis. There is also a need for an improvement in the nutritional intake of people who are vulnerable- mostly people with low standard of living and other factors that trigger their vulnerability such as health issues (El Zowalaty et al., 2020). Sustainable development policies, actions, and good governance will reduce and eventually eradicate the burden of poverty triggered by hunger (Chukwuma, 2020; Abdullahi et al., 2021). Sustainable steps need to be taken to prevent deaths secondary to hunger amidst the pandemic, as they can affect other sectors if not duly attended to because human survival depends on quality foods. In addition, there should be an assurance that food will be readily available to people who need them. This is to mitigate the consequences posed by hunger, which can result in death if there is no action implemented.

Suicide

The potential of COVID-19 pandemic to cause long-lasting morbidity implies that it may serve as a risk factor for mental illness and suicide in the end. It was found that psychosis (a risk factor for suicide) was high in people during the H1N1, MERS, and SARS pandemics (Rogers et al., 2020). Wasserman (1992) stated that the Spanish flu epidemic (1918–1920) resulted in a slight increase in the number of suicide cases in the United States of America. In Hong Kong, the 2003 SARS epidemic also increased the rates of suicide cases (Cheung et al., 2008). Generally, few studies have investigated the impact of prior pandemics on suicide rates (Wasserman, 1992; Cheung et al., 2008).

The factors that result in suicide during COVID-19 are also due to the economic hardship faced by people, with loss of jobs occupying the premium position. Other factors that trigger suicides during the COVID-19 pandemic are entrapment, social isolation, alcohol consumption, and loneliness (O'Connor and Kirtley, 2018; David et al., 2020b).

To reduce the rate of suicide triggered by the COVID-19 pandemic, there should be programs and awareness campaigns organized by NGOs and government bodies that will ensure proper mental health education for people. These programs would inform them on how to take care of their mental health and why they need to take care of their loved ones. The lockdowns imposed in several parts of the world have resulted in economic hardship and loss of jobs for many people, thus creating financial stressors (Cheung et al., 2008). These are among the risk factors for suicide. The government should provide financial security to ease the hardship posed by these circumstances. These can be in the form of housing, food, employment support, and consideration for their future and not just their current situations. There should be a responsible reporting of suicide cases so that people can maintain their emotional and mental stability; irresponsible reporting of spikes of suicide recorded instilled fear in people's minds (Niederkrotenthaler et al., 2020). Finally, support in form of easy-accessible and well-distributed telephone help-lines should be available to help people with their mental health.

Deaths Triggered by Exhausted Health System

The disruption of healthcare services to other medical conditions due to the drifted attention given to COVID-19 pandemic has resulted in many deaths (Santoli et al., 2020). The deaths triggered by healthcare inability to provide services to all patients was because of the priorities given to COVID-19 patients and suspected patients at the expense of others (Lange et al., 2020). During the pandemic, regular healthcare services inevitably reduced because of concerns about SARS-CoV-2 exposure, restructuring regular hospital facilities to facilitate the COVID-19 patients, shifting of health professionals from their professional department to COVID-19 departments, shortage of beds, shortage of operation theaters, and shortage of doctors and nurses (Babatunde et al., 2020; Aborode et al., 2021c). This has also decreased in-person services, and supported

the use telehealth in order to address some healthcare needs of patients (Lange et al., 2020).

To solve the problem of increased deaths from other causes due to healthcare system's inability to provide services to all patients, balancing the direct response to COVID-19 with the need for other health services' continuous delivery is a universal dilemma for policymakers (Aborode et al., 2021d). It is particularly challenging for decision-makers in low- and middle-income countries (LMICs), where health systems already face enormous demands to address infectious and non-communicable diseases coupled with significant resource constraints (Oseran et al., 2020; Abdullahi et al., 2020). The leaders should evaluate different policy options that will effectively respond to COVID-19 by exacerbating all the causes of morbidity and mortality among the population from neglecting or diverting care for other conditions (Stuckler et al., 2009).

Furthermore, exploring underlying reasons for medical care avoidance should be act on, which include people with disabilities, people with underlying health conditions, unpaid caregivers for adults, and those who face structural inequities. If care for population survival rate and standard of living were neglected because of concerns about SARS-CoV-2 exposure or if there were closures or limited options for in-person services, providing accessible telehealth or in-home health care could address some of these issues (Oseran et al., 2020).

Communities, health care systems, and public health agencies should foster equity by working together to ensure access to information, testing, and care to all. The higher prevalence of medical care delay or avoidance among patients with high medical service bills or payments on people with no money might reflect differences in medical care-seeking behaviors (Chan et al., 2020).

CONCLUSION

The spread of the COVID-19 pandemic has resulted in many unprecedented events and an increase in the number of non-COVID-19 deaths. To deal with the direct effects of the pandemic and prior to universally available vaccination, many governments have imposed lockdowns to reduce the viral spread. This, however, has resulted, in social distancing, economic instability, mental health problems, isolation, depression, domestic violence, suicide, hunger, and a strained healthcare system that was not able to provide services as usual (David et al., 2020a). Although there have been studies exploring the impact of the COVID-19 pandemic, analyzing the causes of death triggered by other factors such as domestic violence, suicide, hunger, and exhausted healthcare system is of great importance. There is a need for NGOs, governments, and individuals to play a role in mitigating these challenges.

DATA AVAILABILITY STATEMENT

There is no data available for this study as this is a perspective research study..

AUTHOR CONTRIBUTIONS

KD, IY, and AA conceptualized the topic. KD, AA, DO, and NE wrote the first draft. All the authors proofread the draft for both grammatical and intellectual accuracy. All the authors have read and approved the final draft before submission.

REFERENCES

Abdullahi, A. T., Emmanuel, F., Oluwasola, A., and Quadri, A. (2021). The Impact of COVID-19 on Child Malnutrition in Nigeria: Special Focus on Strategic Solutions. *Sci. Open Preprints* 72 (3), 226–235. doi:10.14293/S2199-1006.1.SOR-.PPG5I7K.v1

Abdullahi, T. A., Marvelene, B. E., and Samuel, O. O. (2020). The Change in Attitude of Nigerians towards COVID-19". *AIJR Preprints* 133 (1), 1–3. doi:10.21467/preprints.133 https://preprints.aijr.org/index.php/ap/preprint/view/133

Aborode, A., Aiyenuro, A., Ogunsola, S., Adesewa, V., and Zakariyah, M. (2020a). *Risk of COVID-19 on Diabetes Mellitus and Hypertension*. Basel, Switzerland: MDPI, 2020090029. doi:10.20944/preprints202009.0029.v1

Aborode, A., Anifowoshe, O., Ifeoluwapo Ayodele, T., Rebecca Iretiayo, A., and Oluwafemi David, O. (2020b). *Impact of COVID-19 on Education in Sub-saharan Africa*. Basel, Switzerland: MDPI, 2020070027. doi:10.20944/preprints202007.0027.v1

Aborode, A. T., Babatunde, A. O., and Agboola, P. (2021c). Training and Practices of Quack Nurses in Nigeria: A Public Health Concern. *Int. J. Health Plann. Mgmt*. Epub ahead of print. PMID: 33544427. doi:10.1002/hpm.3120

Aborode, A. T., David, K. B., Uwishema, O., Nathaniel, A. L., Imisioluwa, J. O., Onigbinde, S. B., et al. (2021a). Fighting COVID-19 at the Expense of Malaria in Africa: The Consequences and Policy Options. *Am. J. Trop. Med. Hyg.* 104 (0), 26–29. doi:10.4269/ajtmh.20-1181

Aborode, A. T., Ogunsola, S. O., and Adeyemo, A. O. (2021b). A Crisis within a Crisis: COVID-19 and Hunger in African Children. *Am. J. Trop. Med. Hyg.* 104 (1), 30–31. PMID: 33236705; PMCID: PMC7790064. doi:10.4269/ajtmh.20-1213

Aborode, A. T., Tsagkaris, C., Jain, S., Ahmad, S., Essar, M. Y., Fajemisin, E. A., et al. (2021d). Ebola Outbreak amid COVID-19 in the Republic of Guinea: Priorities for Achieving Control. *Am. J. Trop. Med. Hyg.* 14, tpmd210228, 2021d . Epub ahead of print. PMID: 33852428. doi:10.4269/ajtmh.21-0228

Ahmad, S., Tsagkaris, C., Aborode, A. T., Ul Haque, M. T., Khan, S. I., Khawaja, U. A., et al. (2021). A Skeleton in the Closet: The Implications of COVID-19 on XDR Strain of Typhoid in Pakistan. *Public Health Pract.* 2, 100084, 2021 . Epub 2021 PMID: 33521736; PMCID: PMC7826057. doi:10.1016/j.puhip.2021.100084

Allen-Ebrahimian, B. (2020). *China's Domestic Violence Epidemic, Axios*. doi:10.3386/w26823Retrieved from: https://www.axios.com/china-domesticviolencecoronavirusquarantine-7b00c3ba-35bc-4d16-afdd-b76ecfb28882.html (Accessed April 7, 2020).

Babatunde, A. O., Aborode, A. T., and Agboola, P. (2020). Implications of COVID-19 on the Healthcare Infrastructural Development in Nigeria. *Jundishapur J. Health Sci.* 12 (4), e112934. doi:10.17795/jjhs-112934

Bauer, L. (2020). *The COVID-19 Crisis Has Already Left Too many Children Hungry in America*. https://www.brookings.edu/blog/up-front/2020/05/06/the-covid-19-crisis-has-already-left-too-many-children-hungry-in-america/(Accessed December 30, 2020).

Bernard, F. O., Akaito, J. A., Joseph, I., and David, K. B. (2020). COVID-19: the Trends of Conspiracy Theories vs Facts. *Pan Afr. Med. J.* 35 (2), 147. doi:10.11604/pamj.supp.2020.35.2.25536

Bradbury-Jones, C., and Isham, L. (2020). The Pandemic Paradox: The Consequences of COVID-19 on Domestic Violence. *J. Clin. Nurs.* 29, 2047–2049. doi:10.1111/jocn.15296

Brenner, M. H. (1987). Economic Instability, Unemployment Rates, Behavioral Risks, and Mortality Rates in Scotland, 1952-1983. *Int. J. Health Serv.* 17, 475–487. doi:10.2190/5GVU-86Y6-NH1U-PQB0

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020). The Psychological Impact of Quarantine and How to Reduce it: Rapid Review of the Evidence. *Lancet* 395, 912–920. doi:10.1016/S0140-6736(20)30460-8

Chan, K. W., Wong, V. T., and Tang, S. C. W. (2020). COVID-19: An Update on the Epidemiological, Clinical, Preventive and Therapeutic Evidence and Guidelines of Integrative Chinese-Western Medicine for the Management of 2019 Novel Coronavirus Disease. *Am. J. Chin. Med.* 48(3), 737–762. doi:10.1142/S0192415X20500378

Chaolin, H., Yeming, W., Xingwang, L., Lili, R., Jianping, Z., Yi, H., et al. (2020). Clinical Features of Patients Infected with 2019 Novel Coronavirus in Wuhan, China. *Lancet* 395(10223), 497–506. doi:10.1016/S0140-6736(20)30183-5

Cheung, Y. T., Chau, P. H., and Yip, P. S. F. (2008). A Revisit on Older Adults Suicides and Severe Acute Respiratory Syndrome (SARS) Epidemic in Hong Kong. *Int. J. Geriat. Psychiatry* 23, 1231–1238. doi:10.1002/gps.2056

Chukwuma, Sr. C. (2018). Bioinformatics-base and Determinants of the Spatiotemporal Variations of Emerging and Re-emerging Infectious Diseases. *J. Ancient Dis. Prev. Remedies* 06 (02). doi:10.4172/2329-8731.1000182

Chukwuma, Sr. C. (2020). Ecological Features of the Association between Mortality and Determinants or Salient Risk Factors of Cardiovascular Disease. *Int. J. Clin. Biomed. Res.* 6 (3), 18–23. doi:10.31878/ijcbr.2020.63.05

Cluver, L., Lachman, J. M., Sherr, L., Wessels, I., Krug, E., Rakotomalala, S., et al. (2020). Parenting in a Time of COVID-19. *Lancet* 395 (10231), e64. doi:10.1016/s0140-6736(20)30736-4

Dada, D. A., Aku, E., and David, K. B. (2020). COVID-19 Pandemic and Antiretrovirals (ARV) Availabilty in Nigeria: Recommendations to Prevent Shortages. *Pan Afr. Med. J.* 35, 149. doi:10.11604/pamj.supp.2020.35.2.25639

David, K. B., and Adebisi, Y. A. (2020). Proposed Model for Hospital and Community Pharmacy Services during COVID-19 Pandemic in Nigeria. *Int. J. Pharm. Pract.* 28, 544–545. doi:10.1111/ijpp.12652

David, K. B., and Ozuluoha, C. C. (2020). Past and Present Viral Pandemics: Lessons Learnt and Future Recommendations. *Int. J. Health Life Sci.* In Press, e108965, 2020 . Online ahead of Print; In Press(In Press). doi:10.5812/ijhls.108965

David, K. B., Solomon, J. K., Yunusa, I., Lawal, B. K., Marshal, C. S., Okereke, M., et al. (2020a). Telemedicine: an Imperative Concept during Covid-19 Pandemic in Africa. *Pan Afr. Med. J.* 35 (2), 129. doi:10.11604/pamj.supp.2020.35.2.25281

David, K. B., Thomas, N., and Solomon, J. K. (2020b). Epidemiology of COVID-19 in Africa - Daily Cumulative index and Mortality Rate. *Int. J. Infect. Control* 16, i2. doi:10.3396/ijic.v16i2.008.20

De Ver Dye, T., Muir, E., Farovitch, L., Siddiqi, S., and Sharma, S. (2020). Critical Medical Ecology and SARS-COV-2 in the Urban Environment: a Pragmatic Dynamic Approach to Explaining and Planning for Research and Practice. *Infect. Dis. Poverty* 9, 71. doi:10.1186/s40249-020-00694-3

El Zowalaty, M. E., Young, S. E., and Jarhult, J. D. (2020). Environmental Impact of the COVID-19 Pandemic - a Lesson for the Future. *Infect. Ecol. Epidemiol.* 10 (1), 3. doi:10.1080/20008686.2020.1768023

El-Serag, R., and Thurston, R. C. (2020). Matters of the Heart and Mind: Interpersonal Violence and Cardiovascular Disease in Women. *J. Am. Heart Assoc.* 9, e015479. doi:10.1161/JAHA.120.015479

Elbert, T., Schauer, M., and Moran, J. K. (2018). Two Pedals Drive the Bi-cycle of Violence: Reactive and Appetitive Aggression. *Curr. Opin. Psychol.* 19, 135–138. doi:10.1016/j.copsyc.2017.03.016

Food Security Information Network (2020). *Global Report on Food Crises*. http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/1187704/ (Accessed December 30, 2020).

Ford-Gilboe, M., Varcoe, C., Scott-Storey, K., Perrin, N., Wuest, J., Wathen, C. N., et al. (2020). Longitudinal Impacts of an Online Safety and Health Intervention for Women Experiencing Intimate Partner Violence: Randomized Controlled Trial. *BMC Public Health* 20. doi:10.1186/s12889-020-8152-8

Gearin, M., and Knight, B. (2020). *Family Violence Perpetrators Using COVID-19 as a Form of Abuse We Have Not Experienced before*. Sydney: ABC News Australia. Retrieved from: https://www.abc.net.au/news/2020-03-29/coronavirus-family-violence-surge-in-victoria/12098546.

Haneef, C., and Kalyanpur, A. (2020). *Global Rapid Gender Analysis for COVID 19*. New York, NY: CARE and International Rescue Committee, 12–23.

Kagi, J. (2020). *Crime Rate in WA Plunges amid Coronavirus Social Distancing Lockdown Measures*. Sydney: ABC News Australia. Available online at: https://www.abc.net.au/news/2020-04-08/coronavirus-shutdown-sees-crimeratedrop-in-wa/12132410 (Accessed April 10, 2020).

Lange, S. J., Ritchey, M. D., Goodman, A. B., Dias, T., Twentyman, E., Fuld, J., et al. (2020). Potential Indirect Effects of the COVID-19 Pandemic on Use of Emergency Departments for Acute Life-Threatening Conditions - United States, January-May 2020. *MMWR Morb. Mortal. Wkly. Rep.* 69, 795–800. doi:10.15585/mmwr.mm6925e2

Lawal, B. K., Haruna, A., Kurfi, F. S., and David, K. B. (2020). COVID-19 Pandemic and Pharmacy Education in a Developing Country: A Case Study from Nigeria. *Pe* 20 (2), 15–16. doi:10.46542/pe.2020.202.1516

Lim, J., Jeon, S., Shin, H. Y., Kim, M. J., Seong, Y. M., Lee, W. J., et al. (2020). Case of the index Patient Who Caused Tertiary Transmission of COVID-19 Infection in Korea: The Application of Lopinavir/ritonavir for the Treatment of COVID-19 Infected Pneumonia Monitored by Quantitative RT-PCR. *J. Korean Med. Sci.* 35 (6), e79. doi:10.3346/jkms.2020.35.e79

Lima, C. K. T., Carvalho, P. M. d. M., Lima, I. d. A. A. S., Nunes, J. V. A. d. O., Saraiva, J. S., de Souza, R. I., et al. (2020). The Emotional Impact of Coronavirus 2019-nCoV (New Coronavirus Disease). *Psychiatry Res.* 287, 112915. doi:10.1016/j.psychres.2020.112915

Niederkrotenthaler, T., Braun, M., Pirkis, J., Till, B., Stack, S., Sinyor, M., et al. (2020). Association between Suicide Reporting in the media and Suicide: Systematic Review and Meta-Analysis. *BMJ* 368, m575. doi:10.1136/bmj.m575

O'Connor, R. C., and Kirtley, O. J. (2018). The Integrated Motivational-Volitional Model of Suicidal Behaviour. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 373 (1754), 20170268. doi:10.1098/rstb.2017.0268

Oseran, S. A., Nash, D., Kim, C., Moisuk, S., Lai, P. Y., Pyhtila, J., et al. (2020). Changes in Hospital Admissions for Urgent Conditions during COVID-19 Pandemic. *Am. J. Manag. Care* 26 (8), 327–328. doi:10.37765/ajmc.2020.43837 https://www.ajmc.com/view/changes-inhospital-admissions-for-urgent-conditions-during-covid19-pandemic (Accessed July 8, 2020).

Palermo, T., and Peterman, A. (2011). Undercounting, Overcounting and the Longevity of Flawed Estimates: Statistics on Sexual Violence in Conflict. *Bull. World Health Organ.* 89, 924–925. doi:10.2471/BLT.11.089888

Reynolds, D. L., Garay, J. R., Deamond, S. L., Moran, M. K., Gold, W., and Styra, R. (2008). Understanding, Compliance and Psychological Impact of the SARS Quarantine Experience. *Epidemiol. Infect.* 136, 997–1007. doi:10.1017/S0950268807009156

Rogers, J. P., Chesney, E., Oliver, D., Pollak, T. A., McGuire, P., Fusar-Poli, P., et al. (2020). Psychiatric and Neuropsychiatric Presentations Associated with Severe Coronavirus Infections: A Systematic Review and Meta-Analysis with Comparison to the COVID-19 Pandemic. *The Lancet Psychiatry* 7 (7), 611–627. doi:10.1016/S2215-0366(20)30203-0

Santoli, J. M., Lindley, M. C., DeSilva, M. B., Kharbanda, E. O., Daley, M. F., Galloway, L., et al. (2020). Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration - United States, 2020. *MMWR Morb. Mortal. Wkly. Rep.* 69, 591–593. doi:10.15585/mmwr.mm6919e2

Siqueira, C. A. D. S., Freitas, Y. N. L., Cancela, M. C., Carvalho, M., Oliveras-Fabregas, A., and de Souza, D. L. B. (2020). The Effect of Lockdown on the Outcomes of COVID-19 in Spain: An Ecological Study. *PLoS ONE* 15 (7), e0236779. doi:10.1371/journal.pone.0236779

Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., and McKee, M. (2009). The Public Health Effect of Economic Crises and Alternative Policy Responses in Europe: an Empirical Analysis. *The Lancet* 374, 315–323. doi:10.1016/s0140-6736(09)61124-7

Torero, M. (2020). Without Food, There Can Be No Exit from the Pandemic. *Nature* 580, 588–589. doi:10.1038/d41586-020-01181-3

Umaru, E. S., Enang, N. V., and David, K. B. (2020). Effect of COVID-19 on People with Chronic Diseases. *J. Med. Public Health* 1 (1), 1005. https://www.researchgate.net/publication/346835487_Effect_of_Covid-19_on_People_with_Chronic_Diseases

van Gelder, N., Peterman, A., Potts, A., O'Donnell, M., Thompson, K., Shah, N., et al. (2020). COVID-19: Reducing the Risk of Infection Might Increase the Risk

of Intimate Partner Violence. *EClinicalMedicine* 21, 100348–100352. doi:10.1016/j.eclinm.2020.100348

Wasserman, I. M. (1992). The Impact of Epidemic, War, Prohibition and media on Suicide: United States, 1910–1920. *Suicide Life Threat Behav.* 22, 240–254. doi:10.1111/j.1943-278X.1992.tb00231.x

Wagers, S. (2020). *Domestic Violence Growing in Wake of Coronavirus Outbreak. The Conversation*. Available online at: https://theconversation. com/domestic-viole nce-growing-in-wake-of-coronavirus-outbreak-135598 (Accessed April 10, 2020).

Wang, H., Wang, S., and Yu, K. (2020). COVID-19 Infection Epidemic: The Medical Management Strategies in Heilongjiang Province, China. *Crit. Care* 24, 107. doi:10.1186/s13054-020-2832-8

WHO (2020). *Strengthening Health Systems to Respond to Women Subjected to Intimate Partner Violence or Sexual Violence: A Manual for Health Managers*. Available online at: https://www.who.int/reproductivehealth/publications/violence/vaw-health-systems-manual/en/.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 16 June 2021
doi: 10.3389/fpsyt.2021.622174

Catharsis Through Cinema: An Italian Qualitative Study on Watching Tragedies to Mitigate the Fear of COVID-19

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Background: Among different ways of coping with the unsettling situation of the COVID-19 pandemic, a very peculiar one has been identified: a more frequent request, by the general population, of movies or TV series related to the very theme of viruses, contagions, and epidemics.

Objectives: The aim of the present study was to explore this peculiar phenomenon, in order to identify people's emotions and cognitions during and after the process, and to better understand the possible psychological function cinema can have during moments of intense and generalized crisis like the present COVID-19 pandemic.

Participants: Fifteen Italian adults took part in the study – eight women and seven men (average age = 30 years, SD = 10.54). Participants were recruited through social media via a specific announcement, and subsequently, through a "snowball sampling."

Method: For the present study a qualitative approach was adopted, and more specifically, the principles of Interpretative Phenomenological Analysis (IPA) have been followed. Semi-structured interviews were conducted by telephone or through online meeting platforms (Zoom or Skype). The written texts obtained from the transcription of each interview were analyzed using thematic analysis with the support of the software *Atlas.ti*, in order to highlight their fundamental contents.

Results: From the data analysis, four main areas of thematic prevalence emerged, which reflected the participants' condition during the pandemic that actually led them to watch epidemic-themed movies or TV series: the need to document themselves concerning the theme of epidemics, the need to exorcize contagion anxiety, the desire to find a character with which they could identify, and the casual condition of finding a peculiar movie related to the theme of pandemics and being interested in it because of the striking resemblance with real life.

Conclusions: The findings suggest that cinema could indeed represent a powerful tool to help people face the intense uncertainty of the new COVID-19 epidemic, since it allows spectators to both obtain more insight into the current situation, and to project their fears and uncertainties into the movie or TV series, thus reaching a sort of cathartic liberation that offers them hope toward the future.

Keywords: COVID-19, cinema, qualitative research, epidemic, death, catharsis

OPEN ACCESS

Edited by:
Virginia Torres-Lista, Catholic University Santa Maria La Antigua, Panama

Reviewed by:
Luis Carlos Herrera, Catholic University Santa Maria La Antigua, Panama
Chong Chen, Yamaguchi University Graduate School of Medicine, Japan

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *27 October 2020*
Accepted: *12 May 2021*
Published: *16 June 2021*

Citation:
Testoni I, Rossi E, Pompele S, Malaguti I and Orkibi H (2021) Catharsis Through Cinema: An Italian Qualitative Study on Watching Tragedies to Mitigate the Fear of COVID-19. Front. Psychiatry 12:622174. doi: 10.3389/fpsyt.2021.622174

INTRODUCTION

In 2020 humanity had to face the new threat of a pandemic. A new type of Coronavirus, the COVID-19, spreading rapidly from China has affected the entire world population, with a devastating impact on both the public health and the global economy (1, 2). For these reasons, the World Health Organization (WHO) on the 31st of January 2020 declared the state of public emergency of international interest, and on the 3rd of March confirmed the presence of a global pandemic (3).

Italy has been the first Western Country that had to face firsthand the consequences of the epidemic. The first cases of COVID-19 were registered on the 21st of February (4), with a total amount of recorded cases until the present day of more than 434,449 (5). Since the first cases in February, the spread of the contagion had grown rapidly to few hundreds of ill people in a few days, so that the Italian government decided to create the first so called "red-zones," that is, special secluded areas corresponding to the towns and cities most affected by the number of contagions. Inside red-zones, people were forbidden from leaving their homes except for essential needs (groceries shopping, sanitary reasons, urgent work reasons or other serious emergencies) (6). However, as neither this measure proved to be enough to stop the spread of the virus, the Italian government decided in March 2020 to enact a total lockdown on the whole national territory that would endure for two months (from the 8th March to the 3rd May 2020).

Many studies that have been conducted in the immediate period following the lockdown, both in Italy and in the other countries equally affected by the pandemic, have highlighted how the situation of health emergency and the social isolation imposed during the lockdown seriously impacted on the general population, also in terms of mental health and general well-being (7). A recent systematic review conducted by Hossain et al. (8) has pointed out how the imposed quarantine and the isolation measures negatively affected mental health. This trend has also been confirmed by other studies (9–11) describing a serious increase in the rates of anxiety, panic attacks, obsessive–compulsive disorder, stress, and trauma-related disorders in the population during and right after the lockdown (12, 13), even when compared to the already serious effects of the 2020 SARS epidemic per se (14).

The COVID-19 epidemic has in fact spread much more than any previous one, leading to a global condition of fear and uncertainty that is still highly present. People from all over the world have been therefore forced for many months to confront themselves with their worst and best-hidden fear: death (15). This highly distressful situation has grown so significantly that researchers have coined the term "pandemic stress" as a typical stress syndrome of 2020 (16).

Especially for Western society the theme of death and dying is still too frequently hidden and concealed and the thought of human finitude is suffocated, and this because of a substantial inability to manage the extreme anguish that death generates (17). This mechanism of repression has been explored in depth by Terror Management Theory (TMT) (18). TMT suggests that this common worldwide fear of death actually guides the majority of people's choices in everyday life, from the pursuit of social self-esteem to the religious affiliations and even in political preferences. According to the TMT, the thought of death is usually counteracted by the so called "anxiety buffers" that either suppress and/or project it in a far and undetermined future, allowing people to feel invulnerable again (18).

COVID-19 has now challenged this typical balance, leading to a striking and constant mortality salience (15). Since very little was known about this new threat and both governments and media seemed hesitant and contradictory in giving information, a paralyzing uncertainty and fear took citizens (19).

Particularly during the lockdown, the anguish of not knowing anything about the new danger had become extremely intense, leading people to adopt certain kinds of behaviors that could result very peculiar and difficult to explain. One of those was deciding to watch movies or TV series directly related to the themes of contagion, epidemic, pandemic etc., exactly during the period of the highest peak of COVID-19 contagions (20, 21). Such a behavior seems to disprove TMT itself, according to which, as it has been mentioned before, people would generally feel the need to suppress any thought that could be linked with death and/or human vulnerability (22–24).

However, this phenomenon had happened before. Some researchers reflected on the fact that there are similarities between the themes represented in a movie that pertains to this peculiar thematic category and how viewers perceive what can actually happen during a real pandemic (25), sometimes even with some counterproductive outcomes, especially when the representations in such movies are not adequately realistic and cannot therefore offer proper guidance concerning what to do and how to behave (26). Nevertheless, it has been suggested that a movie, as well as a TV series, can potentially become a dimension that leads people to stop and reflect upon this matter, sometimes even to a strategy to interpret reality (27). Giving images of either realistic or completely fictitious worlds that constitute a mirror of the spectators' present reality can help them focus on certain essential traits and aspects of life itself, being this particularly true for movies concerning epidemics (28).

This process was explored in depth by French philosopher and sociologist Edgar Morin (29). He would describe cinema as an "anthropologic mirror" of human nature, capable to generate in the spectator a perception that moves in a sort of double-conscience: an illusory one (of identification with the story narrated in the movie) and a real one (the part of the spectator that remains anchored to his/her actual everyday life) (29). In this way, cinema can offer people the possibility to enter a new world, without however feeling too disoriented, in a kind of aesthetic transfiguration that also allows people to discover the real world itself. According to the author, the emotional intensity with which the spectator watches a movie triggers a sort of cognitive metamorphosis (29).

It is precisely inside this thematic frame that the present study is inserted. We sought to further explore the peculiar phenomenon of people who, precisely during a devastating pandemic and a period of strict lockdown, felt the desire to watch movies or TV series linked with the theme of viruses, contagions and epidemics, in order to identify their emotions

and cognitions during and after the process. It was also our aim to better understand the possible psychological function cinema can have during moments of intense and generalized crisis like the present COVID-19 pandemic.

MATERIALS AND METHODS

Fifteen Italian people took part in the study—eight women and seven men (average age = 30 years, SD = 10.54)—five of them were high school graduate, nine had a bachelor's degree and one had a master's degree. All of them were employed in public or private companies. Three participants declared to be religious, while 11 were atheist and one agnostic. Moreover, seven of them saw death as annihilation, five of them as a passage toward another dimension, two were not sure and one expressed a more complex vision that integrated more than one aspect.

The recruitment criteria were being at least 18 years old and having watched during the lockdown period in Italy (from the 8th March to the 4th of May 2020) at least a movie or a TV series that addressed the theme of viruses, contagions, epidemics and their consequences. These could be either direct (movies in which the presence of un-dead people was explicitly referred to the effect of a virus – for example the movie "28 days later" by Danny Boyle) or symbolical (horror movies concerning zombies, that can be considered as a metaphor of contagion fears).

The movies or TV series participants actually watched were the following: *Contagion* by Steven Soderbergh (six viewers), *The Last Man on Earth* by Sidney Salkow (one viewer), *I am Legend* by Francis Lawrence (one viewer), *Resident Evil* by Paul W. S. Anderson (one viewer), *Outbreak* by Wolfgang Petersen (one viewer), *BirdBox* by Susanne Bier (one viewer), *Flu* by Kim Sung-su (one viewer), *Medici* (TV series) by Frank Spotnitz and Nicholas Meyer (one viewer), *The Walking Dead* (TV series) by Frank Darabont (one viewer), *The Hot Zone* (TV series), by James V. Hart (one viewer).

For more information concerning the movies watched by each participant and the exact period in which they did it, please see **Table 1**.

Participants were recruited through social network (Facebook) via an announcement, which invited anyone who felt the need to watch films featuring epidemics to engage in the study. Subsequently, the first participants were asked to think whether they knew other people who had watched the same kinds of movies/TV series during that period, and, if that was the case, to invite them to take part in the study too, by contacting the researchers. In this way, an adequate number of participants could be reached thought what is typically called "snowball effect."

The research followed the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct and the principles of the Declaration of Helsinki, and it obtained the approval of the Ethics Committee for the research in Psychology of the University of Padua (Italy) (n. B2A86963B9F0C9D30F4B5A435F3C9570). Signed informed consent was obtained by each participant.

TABLE 1 | Movie/TV series watched by participants.

Title and typology	Pandemic period of viewing	Rewatched
Contagion (realistic)	First month	Yes
Contagion (realistic)	Second month	No
Bird Box (fiction)	First Month	No
The Hot Zone (realistic)	First month	No
The Walking Dead (fiction)	Extended over time	Yes
Contagion (realistic)	First month	Yes
Medici (realistic)	Extended over time	No
Contagion (realistic)	First month	No
Contagion (realistic)	Second month	No
Flu (realistic)	First Month	No
The Last Man on Earth (fiction)	First month	Yes
Resident Evil (fiction)	First month	Yes
I am Legend (fiction)	First month	Yes
Outbreak (realistic)	First Month	Yes
Contagion (realistic)	Second month	No

For the present study a qualitative approach was adopted (30), and more specifically, the principles of Interpretative Phenomenological Analysis (IPA) have been followed (31). In order to get as close as possible to the participants' perspective, IPA follows two processes: People are asked to give a meaning to their experiences through a detailed narration guided by the researcher; the researcher then tries to give a meaning to the sense itself that emerges from the participants' narrations (31, 32). Through this method, the researchers get as close as they can to the point of view of the person who experiences a certain phenomenon (33).

Participants took part in a semi-structured interview, aimed to explore the specific reasons that have led them to watch during the lockdown some movies or TV series that refer to the theme of epidemics, contagions, serious health risks caused by infectious diseases. The interview was structured in order to enable the researchers to investigate participants' precise cognitions and emotions during that peculiar period, as well as during the vision of the movie/TV series, and right after that. Moreover, the interview also explored the participants' perception and attitude toward COVID-19 and the related lockdown measures (their fears, anxieties, negative thoughts etc.), in order to evaluate whether they seemed to change after the vision of the movie/TV series.

In order to better understand the deeper meaning of the phenomenon, the researchers also investigated the participants' spiritual dimension, independently from the religiousness, and their personal representation of the idea of death (as total annihilation or as a passage toward another dimension) (34). The semi-structured format of the interview was used in order to allow a certain degree of flexibility for the researchers, who had therefore a track of the fundamental themes to explore but could at the same time allow participants to feel as free as possible to focus on the themes that were the most meaningful to them, without interfering too much with the spontaneous flow of the conversation (31).

Each interview lasted about 90 min and was conducted in Italian (participants' native language), through a phone call or by Skype or Zoom, in order to comply with the current lockdown and social distancing measures and to safeguard the participants' and the researchers' health.

The interviews were audio-recorded (with participants' permission), and subsequently transcribed verbatim, still in Italian, for the analysis. The written texts obtained in this way were then analyzed using thematic analysis, in order to examine them in terms of their fundamental contents (35). The texts were translated in English after this process, during the elaboration of the first draft of the present article by the authors, who were very careful to maintain the linguistic style and precise terms the participants had used in the original language (Italian).

The analysis proceeded through six main phases: engaging in preparatory organization; reading the texts deeply; coding data; interpreting themes; searching for alternative explanations; and producing the final report (36). The process was performed by highlighting some recurrent words or concepts that appeared to be particularly meaningful for a participant (since during the interview participants had repeated them often or had given emphasis to them), and by subsequently confronting these elements with the ones that could be found in the other participants' narrations, and subsequently grouping together into broader thematic categories the elements that appeared to be shared the most among the participants (37). The analysis was performed with the software Atlas.ti (38), which allows researchers to directly work on written texts, highlighting portions of them (which become "quotations," that is, parts of the direct speech of each participant that are particularly meaningful) creating labels to insert in each text that can adequately represent its fundamental themes, and elaborating broader clusters of meaning comparing the data gained from each text. This analysis method allowed the researchers to also explore the possible relation between participants' age, gender or reported spirituality and attitude toward the idea of death and their psychological response to epidemic-related movies or tv series. In order to achieve this, the authors evaluated each main thematic category that emerged from the obtained analyzed data in terms of how many male vs. female, religious/spiritual vs. atheist participants had expressed thoughts and ideas that could be inserted into that peculiar category, comparing it with the characteristics of those who had highlighted different aspects of their experience and therefore could be considered linked to other thematic categories more.

The participants' age difference was also considered in the process. The Atlas.ti software allowed to compare fundamental elements of each thematic category and highlight shared or instead different aspects among them, such as, for each quotation related to a specific thematic category, the age, gender, and religious orientation of the participant who expressed it.

RESULTS

From the data analysis, four main issues emerged to describe the reason why participants watched epidemic-themed movies/TV series during the lockdown period: "Reducing the uncertainty," "The not always successful attempt to exorcize the contagion," "Identification and catharsis," and "From fortuity to interest." The numbers indicated in each quote in the following description of the results specify the interview number that corresponds to each participant (from 1 to 15) and the order number that refers to the quote on the working text in *Atlas.ti*. The reported names are fictitious to respect participants' anonymity. Quotations are partially camouflaged to impede any possible recognition of the participants' identity.

First Main Reason: Reducing the Uncertainty

A first fundamental and deeply felt desire all participants reported was to reduce the extreme uncertainty that they felt during the epidemic spread and in particular during the lockdown period. Such a need could be somehow fulfilled by watching movies or TV series that represented, either directly or even only symbolically, the theme of viruses and scaring contagions.

This is precisely what happened to Leonardo, a man very passionate about cinema who lived the lockdown period in total isolation in order to protect as much as possible the people he loved. Living completely isolated for 2 months, he reported his desire to understand what was happening, and the fact that he could find a sort of explanation thanks to the movie: "I was really driven by the desire to understand. I mean, the movie followed a scientific approach, and when the films are able to explain scientifically a problem, they really allow you to understand what happens. In this case, I understood that COVID-19 is a tough fight and that there are some methods to respect if we want to win… Obviously it is not simple since we were not ready for this, however there are some people who are actually working in order to protect us from these problems, just like the movie perfectly describes. I feel better when I think of it" [1.36–1.54]. Paola expressed a similar need for information, as she narrated how her desire to watch a movie concerning epidemics was driven by the hope that the work of fiction could offer her the explanation she was looking for and not finding in real life: "I wanted to see this movie because I wanted to understand what might happen, so that I could understand something I did not know. You know, I was informed, and I had already read a lot about the coronavirus, but I thought that perhaps that movie could add something important" [15:25].

Paola had been informed of the virus spread since December 2019, due to her work. However, information had not been exhaustive, and she lived the subsequent lockdown with huge apprehension. Another meaningful experience has been reported by Daniele, a man who lived the lockdown with his origin family. He suffered from a huge anxiety because COVID-19 reminded him the health problem of his childhood: "Well, I have always considered ignorance to be the worst possible thing. I mean, you can die, but you can die either knowing what you are dying for or not, and I prefer to die knowing what got me and how I could have acted in order to avoid it" [6.37]. He also added: "We will probably worry more and feel more anxious, or more scared

watching movies like *Contagion*. However, perhaps a person or two will also realize that what is represented in this movie is the exact copy of what is happening right now, maybe they will become more aware of the situation, perhaps having more faith in a future cure, in a solution, this is what I think" [6.38].

However, the possibility to receive useful information concerning the pandemic situation through the movies could also feed some negative emotions, especially because of the possibility to inevitably recognize some problematic aspects depicted in the work of fiction and also present in the reality, as Daniele reported: "Well, let's say it gave me a lot of anxiety. I mean, I'm astonished by the effect of a microscopical at a global level. You can catch a train, or a bus, or eat something strange, maybe you simply touch a pole in a bus to maintain your balance and just with that you could already have spread the virus to all the people on the bus. You can eat something and spread a mortal virus. All this is really similar to what films describes" [6.53]. Agreeing with the others, Rudy, a sick person who had to prepare himself for the self-isolation even before it was actually required by the government, said: "Watching these movies helps me to represent what can be useful to do in critical moments. They describe the difficulties but also the remedies to the problems" [14:28].

Second Main Reason: The Not Always Successful Attempt to Exorcize the Contagion

A second kind of motivation reported by participants was that to diminish or somehow exorcize the growing anxiety they were experiencing during the lockdown, due to the constant news of high peaks of contagion and of countless deceased persons. Watching movies was a strategy to avoid panic. For example, Laura, who had recently returned from China, affirmed: "My boyfriend and I were getting ready to face the lockdown. I think that it is quite difficult to understand the dimension of the problem, so we watched the movies together in an ironic way. We tried to cope with this situation as if it was a film, that is, not too tragically" [10:19]. Similarly, Rosanna, a woman who was particularly scared of the obligation to go to her workplace, admitted that she chose that kind of movies "because they transform everything as a fantasy, and this reduces my anxiety. Really, during the day, I'm constantly scared because of my constant exposure to the risk of contagion in the workplace. In the evening I can imagine that everything is an improbable plot of a film" [4:24]. She also reported that the repeated vision of such films more and more times reassured her because doing so she could predict all the events and passages, till the end. Knowing first how everything would turn out gave her back in the evening all the sense of security she had lost during the day: "It is relaxing to know before everything, when a situation is particularly scaring. There is always a peaceful start, a moment of extreme crisis in which many people die, and everyone is in distress and worried for his/her loved ones. However, in the end the protagonists always survive, and this is very relaxing. So, it is like telling yourself a fairytale. It is possible to face this pandemic thinking that it is only a fairytale. And this soothes you anyway. I felt understood by the TV series, I felt someone was in my same situation, and they all survived" [4:46]. Rudy described the same exigence: "These movies reassure you, because there is the evil that scares you, however you already know that the goodness will win. And it is interesting to learn the strategies of goodness" [14:30].

However, not all the participants obtained such a calming and some of them actually reported an increase in the level of distress. Leonardo, for example, said: "Well it creeps you out too obviously, because it makes you think of what could possibly go wrong and become even worse in real life. It is distressing because you understand that the problem could be more difficult compared to that you imagine and so that it is possible you aren't able to solve it" [1:45]. Similarly, Daniele described his rage after the watching: "Well, the movies leave you with a bitter kind of feeling, because they make you aware of the fact that the government gives priority to the families, or to the scientists, or anyway those who are in charge and have enough power. These categories of people are evidently more lack of others. They describe only how life is easier for people who have some particular advantages" [6.25].

Third Main Reason: Identification and Catharsis

The identification with the protagonists was the third main reason for watching scaring films, to see a part of their life and situation represented. Indeed, all the movies these participants chose to watch narrated episodes very similar to their experiences. For example, Veronica lived the first moments of the epidemic with great anxiety: "I totally recognized myself in the protagonist. In a very similar way, when something bad happens, I feel very distressed like the narration of this story. However, I try to be as rational as possible. Of course, it is very difficult and the fight between reason and emotions is excellently narrated by this movie. When I see scenes that describe this conflict and see that everything finishes well, I'm happy to be as I am" [3:28]. Similarly, Giorgio, who spent the lockdown in total isolation in his country house, explained that he chose to watch pandemic-related movies where protagonists had to face the crisis completely alone: "Well, one film in particular excellently described this condition, that is to be alone in facing the danger. There is this part where you can see how the protagonist relates to his dog, in a kind of egoistical way. He is completely alone so he needs the affection his dog can give him, but this makes his dog eventually run away. And I was feeling exactly like that, I kept looking for other people's support even though I could not visit them, and that was even a little unhealthy. I really felt the same sufferance the protagonist experiences, when something is happening outside your home, but you are blocked away from everything" [11:9]. Also Gianluca lived the lockdown in total isolation and wanted to re-watch a movie that represented the last man remained on Earth, since that perfectly mirrored how lonely he was feeling: "I thought I wanted to watch it again to see how it had aged and also to pretend to be inside the movie itself, I knew I could identify with it since the protagonist is alone, and I was there all lonely watching it in my living room. Somehow, seeing that someone was absolutely lonelier than me

made me feel less lonely" [13:30]. Many participants explained that identification helped them have a catharsis, with the effect of an intense liberation. Veronica, for example, reported that this psychological dynamic allowed her to finally have the strength to accept the present condition and feel at peace with the situation of health emergency and uncertainty: "I had a fever and also hypertension during the lockdown, so I was terrified of being infected even though I never left my home. I was there trying to control my fears but on an emotional and psychosomatic level I was suffering a lot, until at a certain moment I freed myself saying 'Ok, I feel really bad, denying this is pointless, let's embrace this situation of pain and stop'. Just like the protagonist did, that's why I really saw myself in her. Watching the movie has taught me that I am not the only one who has to live this situation and that in any case I do not miss anything to be able to handle it even if it is something absolutely unpredictable and unusual" [3:38]. Veronica also reported a peculiar feeling of hope she felt at the end of the movie, as if re-living all her suffering in the protagonist's shoes made her able to somehow detach from the situation and feel hopeful again: "The last scene, in which the protagonist tells her son that she is his mother and she says she is sorry for refusing to acknowledge that before, and you can see she is changed and wants to commit herself completely to her new, better life, that helped me too. After all the suffering, in the movie and in real life, that moment helped me see the situation in a slightly different way, in a more positive light. The suffering and the traumas permitted the protagonist to become a better person" [3:29].

However, in some cases the identification with the protagonist did not produce positive effects. Giorgio, for example, reported that he decided to watch a pandemic-themed movie because "that was the only way to feel some emotions since I could not speak to anyone. I needed to be able to feel something for situation like this. Indeed, I could identify myself with the protagonist and feel a stronger emotion" [11:10]. Instead, this experience increased the level of worry because he identified some behaviors depicted in the movie very similar to those in the real world and this threatened him: "I am rather convinced that…I mean, I was very scared. I felt a sort of hunt for those who were infected in the film and in parallel for those who suffer for the COVID infection around us. Now, when I read the news I cannot think that someone would exaggerate, and I am very scared that we have to live an experience very similar to that of the film. I think that we risk a sort of witch hunt so to speak" [11:24].

Fourth Main Reason: From Fortuity to Interest

The last condition reported by some participants was perhaps the most peculiar one, since some of the people interviewed explained that they were not particularly interested in pandemic-related movies or TV series, which differentiates them from the majority of the other participants who actively looked for those movies. Simply they found a contagion-themed movie or TV series casually on television or on the Internet that caught their attention because of the pandemic period, so they decided to watch it. In some cases, the effects were really similar to those of participants who actively searched such a kind of films. In fact, one of the reasons was to be better informed and to understand what was happening, even without believing that they could have learnt something useful to manage the difficulties caused by COVID-19. Francesca said: "I do not deny that after watching the very first scenes I was intrigued. There were some moments that seemed exactly what we were living, so I got up widening my eyes and said 'this is not the typical science fiction movie', and it was obviously the whole context in real life that made me perceive it as a realistic kind of work" [15:25]. The same idea was expressed by Alessia, who was visiting her parents when the lockdown was announced so she was unexpectedly blocked at their home. She enjoyed the time with her family, but the impossibility to go outside and exercise made her accumulate a lot of tension and eventually gave her insomnia. She said: "I was simply dining, and I saw that this movie was beginning, and it starts with a damn cough, so that already caught my interest, and I watched it till the end. I found it unsettling, but also accurate, similar to our reality. Even though I am not really into that genre, I liked it because it made me think" [9:31–9:38]. Similarly, Annarita lived the lockdown period in a very distressful way with her origin family: "Those kinds of movies make me anxious, I would not usually watch them, however I saw that it was identical to what we were living, so I thought 'Oh God, this is the same! That person seemed healthy and now is already dead, I need to see this'. It was very stressful, but I thought that I had to see it because it was a sign of what was happening and so I had to realize something" [2:32].

For these participants, feelings subsequent to the vision were mostly negative, as Annarita described:

"When you see it explicitly in a movie, see those common graves, you think 'Oh God, I really could end like one of them during the first phase of the epidemics, the most acute one, or perhaps my father, thrown like an animal inside a common grave'. How can I change this situation? I do not know how to manage this tragedy" [2:51]. She also reported feelings of anger, because what she saw represented in the movie mirrored all the difficulties she found in real life during the pandemic: "Rage, so much rage, because people in the movie could not have access to face masks to protect themselves and that happened to me too. People who do not want to see those they know, just like happened to me. Being isolated by others. The human aspect of the movie made me suffer a lot, I suffered a lot because of the pandemic, and I see that people have become animals, or even, objects…I do not know, automatons. And I lived this firsthand. And I saw it also in the movie" [2:48]. However, at the end she admitted that: "Since the movie ends with the contagions decreasing, this gave me a little hope. I mean, if they could make it in the movie why can't we make it too? Perhaps not returning to our previous life, but at least being able to still have all the people I love alive and well six months into the future" [2:50]. Similarly, Alessia narrated: "The film reassured me because the effects of the virus were stronger in the movie than in real life. I mean, the effects on society, people who start to shoot each other to be able to eat. I felt reassured because I thought that it could have been worse in real life too, the virus could have been even more lethal, and we could have reached that terrible point showed in the movie" [9:16].

DISCUSSION

This study was aimed to explore the peculiar phenomenon of those people who, during the early phase of the COVID-19 pandemic in Italy, decided to watch a movie or TV series that represented situations of contagions, epidemics and health risks. This phenomenon, in fact, may seem to be incoherent to the general Western culture which removes any reflection on death, dying or human vulnerability (18, 32). However, as some researchers have highlighted, the typical balance people had reached between the vague awareness of the possibility of their death and the need to protect themselves from the anxiety this generated, was completely subverted by the unpredictability and devastating impact of COVID-19 pandemic. Instead, it constantly made death present and salient, forcing people to find new ways to cope with it (15, 22). Indeed, our results highlighted a peculiar way of dealing with the epidemic and its heavy consequences, since it was not possible anymore for the participants to simply ignore the thought of their mortality. In this way, cinema became (sometimes thanks to a personal passion as happened for Leonardo, sometimes even by pure coincidence, as happened for example to Annarita) a powerful tool that helped them face the lockdown period.

All participants shared the need to be more informed and to better understand what was happening. And while the medias and the governments seemed not to be able to offer proper explanations, pandemic-related movies assured some kind of insight, as reported by Leonardo, Paola and Daniele. As literature already discussed, films and movies permit to find a mirror that help people understand and interpret their current reality (25, 27). Another important motivation was for example reported by Laura, Rosanna and Rudy, who said they wanted to exorcize and therefore diminish their high levels of anxiety related to the current Italian lockdown situation. The possibility to detach from real life problems by seeing the situation in a different light, together with the identification with the protagonist, help to distance fear and anxiety, reaching a more peaceful psychological state (29). An unsettling reality becomes this way somehow easier to accept, thanks to this peculiar filter which cinema can put between spectators and their life, giving shape to those inner processes of thought that could result problematic before (39).

This element emerges also among those participants, like Veronica, Giorgio and Gianluca, who explicitly reported to have actively chosen a movie or a TV series in which there was a protagonist they knew they could identify with. This process, namely the need to identify with a fictional character and the consequent feeling of hope and faith in the future that came with it, caused a cathartic liberation, very similar to the one already described by ancient Greek philosophers and tragedians Plato, Aristotle, Aristophanes (40), and which has been already documented in scientific literature as a possible beneficial effect of cinema, especially in this current time of global pandemics (41, 42). Finally, there were also participants who, despite not having any initial intention to watch virus-related movie or TV series, found them by chance and eventually could not but being absorbed in because of the inevitable resemblance with their reality. These participants also reported, like the rest of the respondents, that watching those movies somehow fulfilled their need of being better informed and of gathering as much information as they could on the COVID-19 pandemic.

Watching movies or TV series epidemic-related during this peculiar historical period led also to experience some negative emotions, as reported by some participants. Daniele, Leonardo, Giorgio, Alessia and Annarita, for instance, described feelings of increasing anxiety and sometimes even rage, especially when they could identify some problematic aspects that were present in their real life too. This risk has already been highlighted by other studies (26). However, even those who experienced at first feelings of distress could eventually and most of the times report feelings of hope and relief by the end of the movies, since the already mentioned process of cathartic identification and the possibility to exorcize their anxiety could counterbalance their initial increase in fear and negative emotions (for a more precise summary of most participants' feelings after the movies/tv series, please refer to **Table 2** at the end of the present section).

Lastly, no noteworthy difference was detected among participants based on their age, gender or reported spirituality and attitude toward the idea of death, in relation to their response to epidemic-related movies or tv series and the psychological effects they had on them. Even though the number of participants is small, which does not permit a generalization of the results, this element could however suggest that the cathartic power of cinema, especially in moments of peculiar crisis as the present COVID-19 pandemic represents, can be equally beneficial for different populations, regardless of other personal characteristics.

CONCLUSIONS

The current COVID-19 pandemic has had a devastating impact on people's physical and psychological well-being, with an increasing mortality salience that challenges Western Societies' tendency to occult death and dying. In this situation cinemas become powerful tools capable to manage the anxiety and the anguish caused by the epidemic and the consequent restrictive measures. The identification and projective processes enacted by movies allow people to partially detach from their own sorrows and enter a fictitious dimension that may at the same time offer them useful insights into the pandemic and free them from their negative emotions. Cinema appears then to be a useful instrument to help people cope with pandemics.

However, it has to be underlined that our study has some limitations, in particular the small number of participants, typical of a qualitative study, does not allow to explore completely the possible different influence of variables such as participants' age, gender or spirituality in relation to the psychological effects of cinema.

In the near future, therefore, it would be interesting to conduct similar interviews again, thus expanding the number of participants, in order to possibly include more peculiar points of view and explore more in depth these aspects.

TABLE 2 | Feelings and emotions after the vision.

Participant	Gender	Age	Movie/Tv series watched (typology)	Consequent emotions/ feelings	Quotations
Rosanna	Female	54	The Hot Zone (Realistic)	Comforted, feeling understood	"It is relaxing to know before everything, when a situation is particularly scaring. […] in the end the protagonists always survive, and this is very relaxing. So, it is like telling yourself a fairytale. It is possible to face this pandemic thinking that it is only a fairytale. And this soothes you anyway. I felt understood by the TV series, I felt someone was in my same situation, and they all survived"
Rudy	Male	49	Outbreak (Realistic)	Reassured	"These movies reassure you, because there is the evil that scares you, however you already know that the goodness will win. And it is interesting to learn the strategies of goodness"
Leonardo	Male	45	Contagion (realistic)	Distressed	"Well it creeps you out too obviously, because it makes you think of what could possibly go wrong and become even worse in real life. It is distressing because you understand that the problem could be more difficult compared to that you imagine and so that it is possible you aren't able to solve it"
Daniele	Male	23	Contagion (realistic)	Upset, anxiety	"Well, the movies leave you with a bitter kind of feeling […] it gave me a lot of anxiety. […] You can catch a train, or a bus, or eat something strange, maybe you simply touch a pole in a bus to maintain your balance and just with that you could already have spread the virus to all the people on the bus. You can eat something and spread a mortal virus"
Gianluca	Male	22	I am Legend (fiction)	Feeling less lonely	"I thought I wanted to watch it again to see how it had aged and also to pretend to be inside the movie itself, I knew I could identify with it since the protagonist is alone, and I was there all lonely watching it in my living room. Somehow, seeing that someone was absolutely lonelier than me made me feel less lonely"
Veronica	Female	25	Bird Box (fiction)	Hope, seeing the situation in a more positive light	"The last scene, in which the protagonist tells her son that she is his mother and she says she is sorry for refusing to acknowledge that before, and you can see she is changed and wants to commit herself completely to her new, better life, that helped me too. After all the suffering, in the movie and in real life, that moment helped me see the situation in a slightly different way, in a more positive light. The suffering and the traumas permitted the protagonist to become a better person"
Giorgio	Male	24	The Last Man on Earth (fiction)	Apprehension, fear	"[…] I was very scared. I felt a sort of hunt for those who were infected in the film and in parallel for those who suffer for the COVID infection around us […] I think that we risk a sort of witch hunt so to speak"
Annarita	Female	26	Contagion (realistic)	Evolution, from anxiety and rage, to final hope at the end of the movie	"When you see it explicitly in a movie, see those common graves, you think 'Oh God, I really could end like one of them during the first phase of the epidemics, the most acute one, or perhaps my father, thrown like an animal inside a common grave' […]." "Rage, so much rage, because people in the movie could not have access to face masks to protect themselves and that happened to me too. People who do not want to see those they know, just like happened to me." "Since the movie ends with the contagions decreasing, this gave me a little hope. I mean, if they could make it in the movie why can't we make it too? Perhaps not returning to our previous life, but at least being able to still have all the people I love alive and well six months into the future"
Alessia	Female	24	Contagion (realistic)	Reassured	"The film reassured me because the effects of the virus were stronger in the movie than in real life. […] I felt reassured because I thought that it could have been worse in real life too, the virus could have been even more lethal, and we could have reached that terrible point showed in the movie"
Laura	Female	25	Flu (realistic)	Possibility to perceive the situation in an ironic way	"My boyfriend and I were getting ready to face the lockdown. I think that it is quite difficult to understand the dimension of the problem, so we watched the movies together in an ironic way. We tried to cope with this situation as if it was a film, that is, not too tragically"

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The Ethical Committee for Psychological Research of the University of Padua. The patients/participants provided

their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

IT: project ideation, research design, supervision, analysis, article writing, and coordination. ER: project ideation, interviews, analysis, and article writing. SP: analysis, supervision, and article writing. IM: supervision and consultation during the second revision of the manuscript. HO: supervision and article writing. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

We thank Davide Viezzoli, Erika Iacona, Marco Antonellini, Alice Culcasi, and Gianmarco Biancalani for the help in some critical phases of the work.

REFERENCES

1. Douglas M, Katikireddi SV, Taulbut M, McKee M, McCartney G. Mitigating the wider health effects of COVID-19 pandemic response. *BMJ.* (2020) 369:1557. doi: 10.1136/bmj.m1557
2. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int J Surg.* (2020) 78:185. doi: 10.1016/j.ijsu.2020.04.018
3. World Health Organization. *Coronavirus Disease (COVID-19) Pandemic.* (2020). Available online at: https://www.who.int/health-topics/coronavirus#tab=tab_1 (accessed May 22, 2020).
4. Ravizza S. Il rompicapo del ≪paziente zero≫. Un algoritmo per individuarlo [The riddle of patient zero. Am algorithm to identify him/her]. *Corriere della Sera.* (2020). p. 12–13.
5. Ministry of Health. *Nuovo coronavirus e COVID-19.* [*New Coronavirus and COVID-19*]. Available online at: http://www.salute.gov.it/portale/nuovocoronavirus (accessed March 17, 2020).
6. Nicastro A. Viaggio nella Wuhan d'Italia ≪Noi come sul set di un film≫ [Journey in the Wuhan of Italy ≪Us as in a movie set≫]. *Corriere della Sera.* (2020). p. 9.
7. Pfefferbaum B, North CS. Mental health and the COVID-19 pandemic. *N Engl J Med.* (2020) 383:510–2. doi: 10.1056/NEJMp2008017
8. Hossain MM, Sultana A, Purohit N. Mental health outcomes of quarantine and isolation for infection prevention: a systematic umbrella review of the global evidence. *Epidemiol Health.* (2020) 42:e2020038. doi: 10.4178/epih.e2020038
9. Kim J. Impact of the perceived threat of COVID-19 on variety-seeking. *Aust Mark J.* (2020) 28:108–16. doi: 10.1016/j.ausmj.2020.07.001
10. Pan X. Exercise under death anxiety: investigating individual exercise psychology and behavior from perspective of terror management and behavioral immune system introduction. *J Appl Sports Sci.* (2020) 1:3–21. doi: 10.37393/JASS.2020.01.1
11. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatry.* (2020) 52:102066. doi: 10.1016/j.ajp.2020.102066
12. Cerami C, Santi, GC, Galandra C, Dodich A, Cappa, et al. COVID-19 outbreak in italy: are we ready for the psychosocial and the economic crisis? Baseline findings from the PsyCOVID study. *Front Psychiatry.* (2020) 11:1–9. doi: 10.3389/fpsyt.2020.00556
13. Fiorillo A, Gorwood P. The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. *Eur Psychiatry.* (2020) 63:e32. doi: 10.1192/j.eurpsy.2020.35
14. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *SSRN Electron J.* (2020) 395:912–20. doi: 10.1016/S0140-6736(20)30460-8
15. Courtney EP, Goldenberg JL, Boyd P. The contagion of mortality: a terror management health model for pandemics. *Br J Soc Psychol.* (2020) 59:607–17. doi: 10.1111/bjso.12392
16. Biondi M, Iannitelli A. COVID-19 e stress da pandemia: "l'integrità mentale non ha alcun rapporto con la statistica." [COVID-19 and pandemic stress: "Mental integrity has no relationship with statistics"]. *Riv Psichiatr.* (2020) 55:131–6. doi: 10.1708/3382.33567
17. Testoni I, Sansonetto G, Ronconi L, Rodelli M, Baracco G, Grassi L. Meaning of life, representation of death, and their association with psychological distress. *Palliat Support Care.* (2018) 16:511–9. doi: 10.1017/S1478951517000669
18. Greenberg J, Solomon S, Pyszczynski T. Terror management theory of self-esteem and cultural worldviews: empirical assessments and conceptual refinements. *Adv Exp Soc Psychol.* (1997) 29:61–139. doi: 10.1016/S0065-2601(08)60016-7
19. Dong M, Zheng J. Letter to the editor: headline stress disorder caused by Netnews during the outbreak of COVID-19. *Health Expect.* (2020) 23:259–60. doi: 10.1111/hex.13055
20. Clarke T. The movie 'Outbreak,' about a deadly virus, is now one of Netflix's most popular titles in the US. *Business Insider.* (2020). Available online at: https://www.businessinsider.com/coronavirus-outbreak-one-of-netflixs-most-popular-movies-2020-3?IR=T (accessed March 12, 2020).
21. Lindhal C. Beyond 'contagion': interest in outbreak movies, podcasts, and more surges across the internet. *IndieWire.* (2020). Available online at: https://www.indiewire.com/2020/03/contagion-pandemic-outbreak-movies-coronavirus-1202218477/ (accessed March 12, 2020).
22. Pyszczynski T, Lockett M, Greenberg J, Solomon S. Terror management theory and the COVID-19 pandemic. *J Human Psychol.* (2020) 61:1–17. doi: 10.1177/0022167820959488
23. Menzies RE, Menzies RG. Death anxiety in the time of COVID-19: theoretical explanations and clinical implications. *Cogn Behav Ther.* (2020) 13:e19. doi: 10.1017/S1754470X20000215
24. Steele H. COVID 19, fear and the future: an attachment perspective. *Clin Neuropsychiatry.* (2020) 17:97–9. doi: 10.36131/CN20200213
25. Davis M. "Is it going to be real?" Narrative and media on a pandemic. *Qual Soc Res.* (2017) 18:1–19. doi: 10.17169/fqs-18.1.2768
26. Pappas G, Seitaridis S, Akritidis N, Tsianos E. Infectious diseases in cinema: virus hunters and killer microbes. *Clin Infect Dis.* (2003) 37:939–42. doi: 10.1086/377740
27. O'Brien C, Bordwell D, Branigan E. *Narration in the Fiction Film. SubStance.* London: Routledge (1986).
28. Han Q, Curtis DR. Social responses to epidemics depicted by cinema. *Emerg Infect Dis.* (2020) 26:389–94. doi: 10.3201/eid2602.181022
29. Morin E. *Il cinema o l'uomo immaginario* [*Cinema of the imaginary man*]. Milan: Rafaello Cortina Editore (2016).
30. Denzin NK, Lincoln YS. *The Sage Handbook of Qualitative Research.* Thousand Oaks, CA: Sage (2005).
31. Smith JA, Osborn M. Interpretative phenomenological analysis. *Doing Soc Psychol Res.* (2008) 229–54. doi: 10.1002/9780470776278.ch10
32. Testoni I, Iacona, E, Fusina S, Floriani M, Crippa M, Maccarini A, et al. "Before I Die I want to" :an experience of death education among university students of social service and psychology. *Health Psychol Open.* (2018) 5:2055102918809759. doi: 10.1177/2055102918809759
33. Testoni I, Zielo A, Schiavo C, Iacona E. The last glance: how aesthetic observation of corpses facilitates detachment in grief work. *Illness Crisis Loss.* (2020) 1–17. doi: 10.1177/1054137320933592
34. Testoni I. Tomasella E, Pompele S, Mascarin M, Wieser MA. Can desire and wellbeing be promoted in adolescents and young adults affected by cancer? Photo therapy as a mirror that increases resilience. *Front Psychol.* (2020) 11:966. doi: 10.3389/fpsyg.2020.00966
35. Testoni I, Pesci S, De Vincenzo C, Dal Corso L, Zamperini A. Work and spirituality among people with asperger syndrome: an exploratory study. *J Disabil Relig.* (2019) 23:178–96. doi: 10.1080/23312521.2019.1580174

36. Zamperini A, Testoni I, Primo D, Prandelli M, Monti C. Because moms say so: narratives of lesbian mothers in Italy. *J GLBT Fam Stud.* (2016) 12:91–110. doi: 10.1080/1550428X.2015.1102669
37. Testoni I, Franco C, Palazzo L, Iacona E, Zamperini A, Wieser MA. The Endless Grief in Waiting: A Qualitative Study of the Relationship between Ambiguous Loss and Anticipatory Mourning amongst the Relatives of Missing Persons in Italy. *Behav Sci.* (2020) 10:110. doi: 10.3390/bs10070110
38. Muhr T. ATLAS/ti? A prototype for the support of text interpretation. *Qual Sociol.* (1991) 14:349–71. doi: 10.1007/BF00989645
39. Stagnitta S. *Come in uno specchio: Un viaggio tra cinema e psicologia*. Rome: Ultra (2020).
40. Ferro L. *Sociologia dell'ironia* [*Sociology of Irony*]. Padua: CLEUP (2009).
41. Geller JD. Introduction: psychoterapy through the lens of cinema. *J Clin Psychol.* (2020) 76:1423–37. doi: 10.1002/jclp.22995
42. Scrivner C, Johnson JA, Kjeldgaard-Christiansen J, Clasend M. Pandemic practice: horror fans and morbidly curious individuals are more psychologically resilient during the COVID-19 pandemic. *Personal Individ Diff.* (2020) 168:110397. doi: 10.1016/j.paid.2020.110397

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 30 June 2021
doi: 10.3389/fpsyt.2021.638949

Sounds of Silence in Times of COVID-19: Distress and Loss of Cardiac Coherence in People With Misophonia Caused by Real, Imagined or Evoked Triggering Sounds

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OPEN ACCESS

Edited by:
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Reviewed by:
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University of Sfax, Tunisia
Jennifer Jo Brout,
International Misophonia Research Network (IMRN), United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *07 December 2020*
Accepted: *25 May 2021*
Published: *30 June 2021*

Citation:
Ferrer-Torres A and Giménez-Llort L (2021) Sounds of Silence in Times of COVID-19: Distress and Loss of Cardiac Coherence in People With Misophonia Caused by Real, Imagined or Evoked Triggering Sounds. Front. Psychiatry 12:638949. doi: 10.3389/fpsyt.2021.638949

The extreme, unprecedented situations in the current COVID-19 pandemic are risk factors for psychosocial stress for the entire population. However, strict confinement had a particular impact on people suffering from misophonia and their families. Misophonia is a condition in which hearing certain sounds triggers intense anger, disgust and even severe autonomic nervous system responses. This prospective cohort study examined the impact of strict confinement (Spain, March 14–June 21, 2020) on a sample of 24 people (16 women and eight men) who had been diagnosed with moderate to extreme misophonia and were regularly attending a medical psychology center in Barcelona. The 3-month period of confinement caused general emotional maladjustment, distress, and a transitory crisis. Long-term biomonitoring of their heart variability rate (HRV) enabled to identify a significant increase in physiological arousal after the confinement period, which had already been recorded in a loss of cardiac coherence under basal rest/relaxation conditions. Certain auditory stimuli triggered adverse responses, lowered HRV scores, and an increased stress level and heart rate. Loss of cardiac coherence in their responses to these auditory stimuli (triggering mouth, nose and other sounds), as well as to non-triggering mouth, nose and other sounds was increased when compared to two assessments performed during the previous year. Despite the limited sample size, sex differences were observed in the incidence. Loss of cardiac coherence worsened with the severity of the misophonia. Most importantly, imagined or evoked triggering sounds, as well as real ones, were enough to cause the aversive responses, as displayed by the increased loss of cardiac coherence with respect to the at-rest basal level. A semi-structured interview revealed the exceptional nature of the situations, increased hyper-sensorial sensitivity, fear of being infected with or dying from COVID-19, the patients' coping strategies, and the difficulties and constraints they faced. Finally, the article gives recommendations for better management of misophonia. Improved

knowledge of this disorder would help address the current lack of health and social care, hopefully preventing this shortfall's impact on social and affective relationships, which are particulary important for well-being now and in the coming periods of physical distancing measures.

Keywords: misophonia, distress, loss, cardiac coherence, heart rate variability, COVID-19, confinement

INTRODUCTION

COVID-19, Confinement and Secondary Impact of COVID-19 Pandemic

Since the WHO declared the COVID-19 outbreak a pandemic on March 11, 2020 (1) an increasing number of scientific reports have documented the psychological affects upon the population. These have been attributed to confinement, as well as the direct and indirect effects of the illness itself (2, 3). Added to this are the loss of loved ones and associated grieving processes, as well as the impacts of a sudden health and socioeconomic crisis of unprecedented magnitude.

Even before the COVID-19 pandemic, studies warned that confinement responding to outbreaks of viral diseases such as SARS and H1N1 flu produced negative psychological effects (3). However, Spain had no choice but to implement strict confinement measures to put a halt to the dramatic spread of the disease through its population and to prevent its health system reaching saturation point. In Spain, a strict lockdown of 47 million people was put into place from March 14 to June 21, 2020, and limited the free movement of citizens to essential acts such as the acquisition of food and medicine or going to medical centers or the workplace, resulting in the confinement of the population in their places of residence. The emergence of anxiety, depression, insomnia, denial, anguish and fear was particularly common, as was the aggravation of existing conditions (4). The Spanish scientific-technical guidelines for managing COVID-19 included a section that detailed how the pandemic had contributed to the mental health crisis. The document paid particular attention to health professionals and hospitalized patients, people with pre-existing mental illness, and individuals in difficult situations caused by isolation and the economic crisis. The international scientific community has described this phenomenon as "the untold toll" – the effects of the pandemic on patients without COVID-19 (5) and can be also referred as secondary impact of COVID-19 pandemic.

Misophonia and Co-morbid Disorders

At present, misophonia is not included within the International Classification of Diseases (ICD-11) and does not appear in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). However, several studies have indicated that misophonia is a disorder associated with a wide variety of psychiatric symptoms (6–9), including anxiety that acts as a channel for anger (10, 11). Furthermore, according to studies by Schröder et al. (12), people with misophonia report suffering a significantly higher percentage of anxiety symptoms than control groups. Another recurrent disorder in the misophonic population is depression (13), which was diagnosed in 22% of a sample of 50 people suffering from misophonia (14) and in 9.61% of a sample of 52 (8). Both studies revealed a positive correlation between depression and the severity of misophonia symptoms. Rouw and Erfanian (15) also found that post-traumatic stress disorder (PSTD) was one of the most common diagnoses in people with misophonia.

Mapping Neuronal Basis of Misophonia

Neuroimaging research has revealed that there might be a neural basis to misophonia (16, 17). Individuals with misophonia have been shown to have greater activity in the anterior insular cortex in response to signals that trigger misophonia than in response to non-triggering or universally unpleasant signals, compared to the control group (18). The existence of greater functional connectivity in the misophonic group between the anterior insular cortex and the ventromedial prefrontal cortex, posteromedial cortex, hippocampus, and amygdala indicates that there are neuronal bases for the heightened, emotional response to triggering stimuli. Schröder et al. (12) demonstrated networks' prominent involvement in misophonia and that the right anterior cingulate cortex and the right insula are activated to a greater extent in people with the condition (12).

HRV and Cardiac Coherence as Objective Physiological Measures of Misophonia

At a physiological level, people with misophonia show higher skin conductance responses to auditory stimuli that are triggering for them, compared to healthy controls (19). This increase in conductance was thought to reflect an autonomous physical component in the misophonic reaction. Also, heart rate variability (HRV) describing the physiological phenomenon of variation in heartrate in the beat-to-beat time interval between consecutive heartbeats (20–25) is considered an effective instrument that is able to quantitatively assess the response of the autonomic nervous system (ANS) to certain situations (26). HRV analysis is therefore recognized in clinical settings as a powerful indicator of the relationship between psychological and physiological processes (27). As some scholars have pointed out, HRV is accepted to be a cost-effective method with a high level of validity and reliability, regardless of any cardiovascular disease the patient may have (28). It has been used in several studies to investigate the reactivity of the ANS to sounds (29, 30). Also, a number of interventions aimed to improve health and wellbeing though the adjustment of ANS balance train patients to achieve

"cardiac coherence," the coupling and synchronization of the rhythm of breathing to the rhythm of the heart [i.e., (21, 31–35)].

Misophonia Emotional, Behavioral, Physical, and Physiological Components

When exposed to auditory stimuli, which may also be termed "triggering sounds," people who suffer from misophonia experience intense and unpleasant emotional, behavioral, physical and physiological reactions. Thus, responses to triggering sounds or "misophonic responses" are usually: emotional (anxiety, anger, disgust, extreme irritation, the feeling of losing emotional control, the feeling of being overloaded by stimuli); behavioral (feeling the need to flee or escape from the place where the sounds are being produced); physical (pressure in the chest); or physiological (increased heart rate), in addition to many others (19, 36, 37). The most common somatic reactions in these patients are pressure in the chest, tension in the arms, head, or the whole body, and increased heart rate, increased body temperature, physical pain, or breathing difficulties (19). People with misophonia tend to avoid social situations or anticipate triggering stimuli, which leads to a deterioration of their social and functional life. Characterizing the complex neural underpinnings of misophonia and the interplay of neural systems (38) to develop the behavioral, cognitive and emotional responses to misophonic triggers is among the key aspects considered in the road map for advancing in the scientific research agenda in this new field (36).

Misophonia Common Triggers

Sounds such as chewing, lip-smacking or breathing are among those that most frequently provoke intense anger and physical arousal (19). According to Jager et al. (39), the most disturbing sounds are eating (96%), followed by nasal or respiratory sounds (85%), these being the two key groups used to diagnose misophonia. In addition to these two groups, other triggering stimuli, such as sounds made by other humans, animals, objects, and the environment can be added. Concurrently, visual or movement triggers are also noted.

Misophonia and Secondary Impact of COVID-19 Pandemic

Jastreboff first described this phenomenon in 2001 (40). Since then, scientific studies of misophonia, while still scarce, have increased in number [i.e., (14, 18, 19, 36, 39, 41–44)]. Misophonia has only been discovered recently, yet it is a fairly common condition. A study conducted with college psychology students reported that 19.9% had clinically significant misophonia symptoms (10). Further work research of this research team found 6% incidence among Chinese university students. Besides, their work provided further evidence on misophonia symptoms being associated with noteworthy impairment, as well as general sensory sensitivities, obsessive-compulsive, anxiety, and depressive symptoms (43). During confinement, interpersonal and social conflicts have also increased (2, 45–47). Factors such as the reorganization of domestic space, the intrusion of virtual spaces into family life and multitasking, have made the home into a space in which activities take place that were previously conducted outside of it. Additionally, the crisis situation has made it impossible for families and individuals to go through necessary adaptation processes, generating intra-family and social stress. Due to a lack of knowledge and information, misophonic patients have not been taken into account at the socio-sanitary or legal levels. This lack of assistance results from the fact that the disorder is unfamiliar to a significant number of psychological health professionals and a large proportion of the population: even those who suffer from it.

Current Study on the Secondary Impact of Strict Confinement During COVID-19 Pandemic on Patients With Misophonia

The objective of this prospective study was to determine the impact of strict confinement on the HRV of misophonic patients in Spain, using a longitudinal design. For that purpose, a pre-post analysis of the HRV assessment was conducted in people diagnosed with misophonia who were regularly attending a medical psychology center in Barcelona. The study hypothesized that, during confinement, the following HRV-related changes would be observed: [1] there would be a worsening in responsiveness to auditory triggers, with respect to two preceding basal periods; [2] a stressful period of confinement would increase heart rate variability in patients with misophonia, and [3] not only real but imagined or evoked triggers would result in a loss of cardiac coherence. Finally [4], it was hypothesized that the semi-structured interviews on their fears (the fear or being infected or dying), relationships and emotional states, in conjunction with their self-assessments, would confirm the increased impact or perception of stressful events, while also revealing their coping strategies.

MATERIALS AND METHODS

Participants

The prospective study started on June 29th, 2019 with a cohort of 24 individuals (16 women and eight men), who were regular patients at a medical psychology center in the city of Barcelona. None of them had initially requested a specific consultation for treatment for misophonia. These patients were later diagnosed with misophonia at the center using a recent scale: Amsterdam Misophonia Scale [A-MISO-S, Schröder et al. (41)].

Patients first came to the center in the belief that they had other conditions. In fact, 99% (one woman/24 patients) of them were completely unaware that they were suffering from misophonia. After initial diagnosis and subsequent check-ups, we tested these regular patients for misophonia. The cases identified as misophonic after June 2019 were selected for this study. The inclusion criteria were as follows: Over 18 years of age; Having agreed to participate in the study; Having spent the national strict confinement period at home, following it according to the rules; Being a regular patient of the center; Having been diagnosed with misophonia after June 2019; At least mouth and nasal sounds having been identified as triggering stimuli in the patient's diagnosis; Having a minimum of four triggering stimuli.

Exclusion Criteria were: History of phonophobia, hyperacusis, tinnitus, tympanic membrane perforation or temporomandibular disorders (TMDs); Having any degree of hearing impairment, from mild to severe, following the Bureau International d'Audio-Phonologie (BIAP) criteria, which indicates mild hearing loss starting at 20dB; Have received a treatment for misophonia.

EVALUATION TOOLS

Diagnosis of Misophonia

During the diagnostic phase, the Amsterdam Misophonia Scale (A-MISO-S) was used to assess whether patients were suffering from misophonia (41). For the only purpose of this study, in order to facilitate data collection and analysis, the five levels of this numerical scale (41) were labeled as follows: level 0, not misophonic (for a score of 0–4, subclinical); level 1 (5–9, mild); level 2 (10–14, moderate); level 3 (15–19, severe); level 4 (20–24, extreme).

Physiological Measurements

In order to measure the impact that confinement, the degree of balance-imbalance of the ANS was assessed. The patient's psychophysiological response was recorded by measuring HRV (ms) during exposure to certain auditory stimuli and in a state of rest or relaxation. The emWave® technology (emWave® Desktop and emWave® PSR; HeartMath Institute, California, USA), a software that allows heart behavior patterns to be observed and measured on a computer, tablet, or cell-phone screen in real time, was used. The software is a heart-rate coherence trainer, designed to assess, prevent, control and reverse the effects of stress. **Figure 1** provides an example of an HRV read-out upon exposure to a sound, the results remaining without the normal range (48). As indicated, each of the sounds was evaluated through time domain analysis, using a statistical

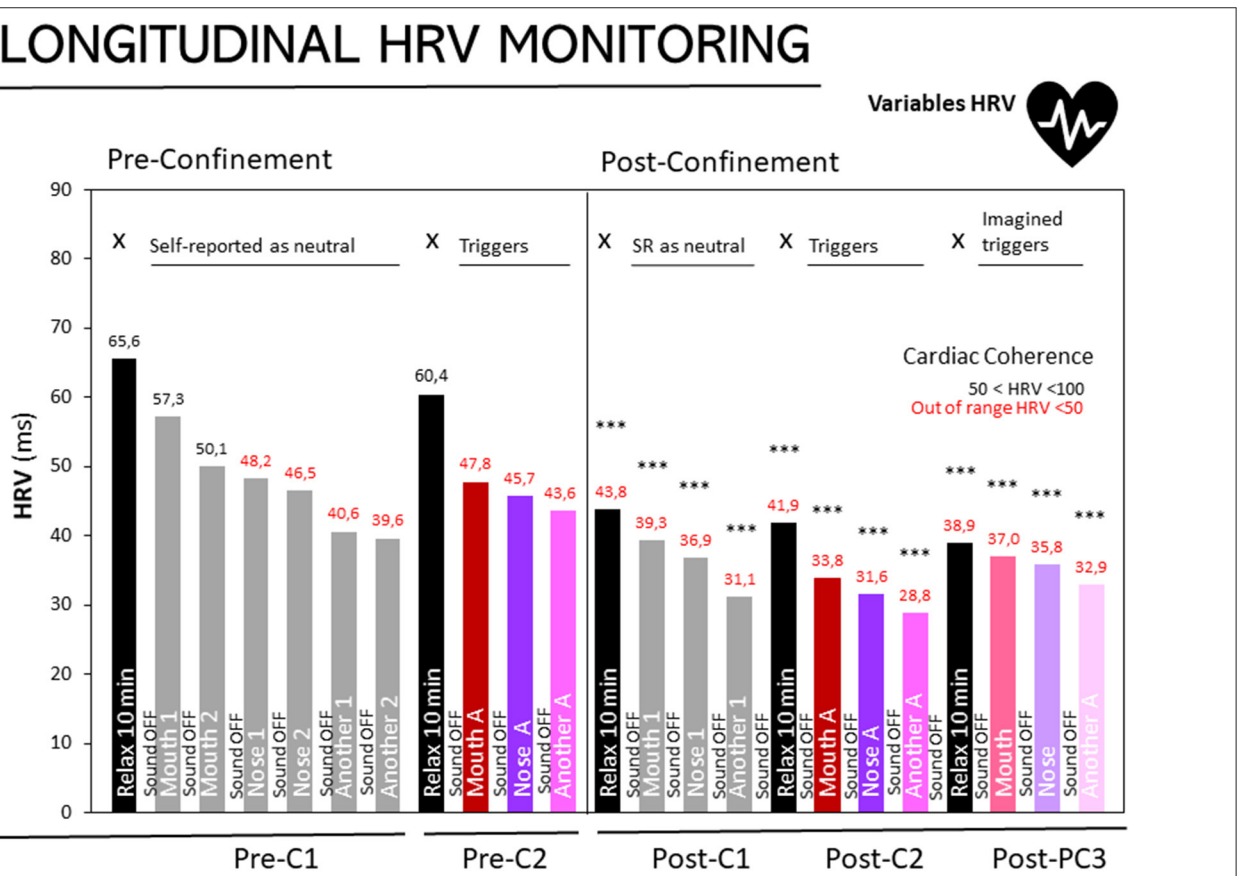

FIGURE 1 | Longitudinal monitoring of HRV in people with misophonia at three different stages. Results are expressed as medians of HRV (ms). The 25, 50, and 75th percentiles are detailed in the Supplementary Table in **Supplementary Material** Pre-confinement- First assessment (Pre-C1), Pre-confinement Second Assessment (Pre-C2), Post-confinement First (Post-C1), Second (Post-C2), and Third (Post-C3) Assessments. Sound on and sound off as depicted inside and between the bars, respectively. Black bars: HRV during the 10 min of relaxation, X: without sound stimuli. Gray bars: Sounds self-reported (SR) as neutral: Mouth sound 1, mouth sound 2, nose sound 1, nose sound 2, another sound 1, another sound 2. Trigger sounds: Magenta bars, mouth sound A; Purple: nose sound A, Pink: another sound A. Imagined sounds: Soft Magenta bars, imagined mouth sound A; Soft purple, imagined nose sound A; soft pink, imagined nose sound A. Normal cardiac coherence ($50 < HRV < 100$); in red, cardiac coherence out of range (<50). Statistics: $^{***}p < 0.0001$ Wilcoxon's rank-sum test, as compared to "Basal level, Relaxation 10 min" of the first assessment.

method sourced from the Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology (49). This is currently one of the most widely used methods.

Procedure

The protocol was designed to assess HRV in three different stages: [1] basal level – after obtaining the misophonia diagnosis (2019); [2] second assessment for a retest- after completing the first half of the program, and [3] post-confinement - at the end of June 2021 after having been through the period of confinement responding to the COVID-19 pandemic (March 14 to June 21, 2020).

On each day of assessment, the participants were asked to have had a light meal in the two hours before the test, but not to have ingested alcohol, coffee, tea, chocolate or any other stimulants. They were informed about the duration of the study, what it was about, and the number of sounds they would be exposed to, but at no stage did they know what auditory stimulus would be presented to them. The assessments were conducted in a soundproof room, with dim light. During assessment sessions, no interruptions were allowed and the patient was physically isolated from the rest of the center.

In the three assessments, prior to the exposure to the sounds, the patient was asked to perform a relaxation exercise for 10 min, followed by sound exposure for 5 min. Between each period of sound exposure, during the intertrial time of 5 min, a rest/relaxation was again performed.

The exposures were as follows:

Pre-confinement First assessment (Pre-C1) – The patient was exposed to non-triggering sounds (understood as those sounds the participant had not identified as triggering misophonia at the time of diagnosis), two sounds related to eating, two nasal sounds and two other sounds. All these sounds had been randomly selected by the psychologist administering the test.

Pre-confinement Second assessment (Pre-C2) – The patient was exposed to a total of three sounds they had identified as triggering misophonia: one chewing food, one nasal, and one miscellaneous. These sounds had been selected in advance by the psychologist administering the test. In this assessment, the sounds were taken from each participant's Personalized Sound Bank (PSB). The procedure for creating the PSB is explained at the end of this section. A total of 15 sound banks were used.

Post-confinement (PC) – Consisted in three assessments: (Post-C1) exposure to non-triggering sounds, in which the procedure completed in the first assessment was repeated, but using only three sounds identified as non-triggering – 1 chewing food, 1 nasal and 1 miscellaneous; (Post-C2) exposure to second assessment triggering sounds, the second assessment being repeated in the same way; and (Post-C3) imagined triggering sounds used in the second assessment, in which the patient was asked to imagine or recall the three triggering sounds used in the preceding assessment of this stage. There was no sound exposure during this assessment.

The Personalized Sound Bank (PSB)

The PSB consisted of a personalized sound file for each patient and it was set up by a sound technician using a sound meter, a computer, headphones, the list of triggering sounds mentioned by the patient, and the interview notes.

PSBs were created as follows: Patients had to record the situations and stimuli that triggered misophonia in their daily life for 1 month. This record had to be brief, and the patient had to rate the trigger of misophonia from 0 to 10, differentiating their physical reaction from the emotional one. At the end of the month of recording, an interview was conducted in which the patient handed over and explained the list of situations. From this list, the sounds corresponding to the patient's description in the interview were selected from the 15 sound banks.

Three alternative sounds were recorded that matched the patient's description. A pre-assessment of triggering sounds was carried out, where patients were asked to confirm whether the selected sounds resembled those they had described by them in their month-long record. After exposure to the sound, the patient had to choose one of the following options:

[1] It does not resemble the recorded sound at all; [2] It somewhat resembles the recorded sound; [3] Yes, this is the sound; [4] This is the exact sound situation experienced. The sound was only accepted when the patient validated it with answer 3 or 4. If the patient agreed, the sound was recorded as definitive. If the patient rejected the sound, it was canceled and a new one was presented for the same task. For each situation, three alternative sounds had been filed, using identical triggers described by the patient. All the sounds were normalized so that they did not exceed 70dB, as measured with a sound meter. PBS were stored in a computer, from where they were used as outputs for the second assessment of the post-confinement stage.

Self-Reporting

After the confinement period and having conducted the third and final HRV assessment (post-confinement stage), a semi-structured interview was carried out with each patient. Factors related to interpersonal relationships, emotions and other areas connected to misophonia were investigated by conducting a semi-structured interview, as detailed in **Table 2**. The descriptive analysis determined patients' sociodemographic characteristics and the reasons why they believed they had modified their behavior during confinement.

Data and Statistical Analysis

The statistical analysis derived from the HeartMath tool was performed using IBM SPSS-software (version 25), through which both descriptive and inferential procedures were carried out. Statistical analysis of HRV was carried out by means of Wilcoxon signed rank tests for non-parametric statistical analysis since the variables did not follow a normal distribution and there was no homogeneity of variances.

TABLE 1 | Demographics and misophonia diagnoses.

	Total ($n = 24$)	Women ($n = 16$)	Men ($n = 8$)
Age (years)	45.75 ± 11.12	47.63 ± 11.83	42.0 ± 9.07
Marital status			
Married	11	8	3
Single	7	4	3
Divorcee	4	3	1
Widow	1	1	0
Level of education			
Primary	0	0	0
High school	12	6	6
University	12	10	2
Misophonia (M+)			
Level 2, moderate (M+ 10–14)	10	6	4
Level 3, severe (M+ 15–19)	10	7	3
Level 4, extreme (M+ 20–24)	4	3	1

Assessed using the Amsterdam Misophonia Scale (A-MISO-S, 27). The levels were adapted by the authors for the only purpose to facilitate analysis in the present work.

RESULTS

Demographics

The demographics of the sample of 24 participants, with a sex ratio of 2:1 women to men, are depicted in **Table 1**.

Longitudinal Monitoring of HRV

Figure 1 shows the results of participants diagnosed with misophonia in the three stages: basal level, retest and post-confinement assessments. For the basal level and retest assessments, the HRV measurements in a state of relaxation (black bars) produced a score within the normal range (>50). In contrast, during the post-confinement assessment, the three scores for the relaxation period (black bar at PC1, PC2, and PC3) progressively decreased. Significantly, in all the post-confinement assessments, including those referring to the 10 min of relaxation, the scores were HRV < 50, outside the normality range (Wilcoxon rank test, $p < 0.001$ *vs.* basal level).

HRV According to the Different Levels of Misophonia

Second Assessment

Figure 3 depicts HRV responses to three non-triggering auditory stimuli at the second assessment, according to participants' level of misophonia (moderate, severe or extreme), as diagnosed using the A-MISO-S test. A negative relationship can be observed between the degree of misophonia and the results obtained by exposure to non-triggering sounds: the higher the degree of misophonia, the lower the HRV score (misophonia-2: 20.32; misophonia-3: 12.0; misophonia-4: 10.5). The same relationship also appears in the relaxation or resting stage assessments: in this state of rest or relaxation, the HRV value progressively decreases, the more severe the misophonia.

Post-confinement

Figure 2 illustrates HRV responses at the post-confinement stage and according to participants' level of misophonia, as diagnosed using the A-MISO-S test. The responses are shown for non-triggering auditory stimuli, the triggering auditory stimuli, and the imagined/evoked stimuli.

The same trend as in **Figure 3** can be observed – the higher the degree of misophonia, the lower the HRV score, as shown in the following figures. Assessment 1: M+ [2], 132.66; M+ [3], 85.94; M+ [4], 16.98. Assessment 2: M+ [2], 117.91; M+ [3], 79.44; M+ [4], 11.78. Assessment 3: M+ [2], 124.64; M+ [3], 87.06; M+ [4], 16.05.

Self-Reporting

Table 2 shows the self-reported results, constructed on the basis of a semi-structured interview carried out with the patients after confinement. It includes their own evaluation of their interpersonal relationships and their ideas about why their emotional and relational states worsened. This general deterioration was defined by 100% of the patients as a "crisis." They believed it to be a transitory crisis which would end once confinement and the pandemic ended. Despite distinct marital status, none of participants were living alone during the strict confinement, nor confronted it in their own room but in a house or apartment. It can be seen that 79.17% of the patients described a worsening in the relationship with their partner, and 87.50% mentioned a deterioration in their relationships with the community. All of the patients showed emotional deterioration. In 87.50% of the cases, patients believed the cause to be the situation of confinement; the same percentage alluded to overstimulation from sounds both within the family and in the neighborhood. Having to live with move movement and the resulting sounds, both in the morning and at night, was cited by 83.33% of the participants. All of the patients described having experienced increased hypersensitivity in general, including to sounds and movements. Feeling more hypersensitive and hyper-vigilant at bedtime was mentioned by 83.33%, due to noises produced in the neighborhood, or by family members and pets: both in their own and neighbors' homes. Fear of being infected by COVID-19 was cited by 62.50% and the same percentage said that their ailments and discomfort increased, due to the change in routine and lack of physical exercise, as other authors have also observed (50).

In the following paragraphs, we provide a detailed overview of the patients' open-ended comments about their strategies for coping with stress, and other reflections on their fears and the confinement period. The patients recognized that the frequency with which they experienced the variables related to hyper-vigilance and hyper-sensibility, described in **Table 2**, increased as the days of confinement passed. They claimed to have greater resilience to triggering stimuli (movements and sounds), thanks to having previously completed training in self-control techniques, including breathing, visualization, and relaxation exercises. Most of them agreed that being well-practiced in these techniques could improve their capacity for self-control and their ability to manage triggering stimuli and/or adverse situations.

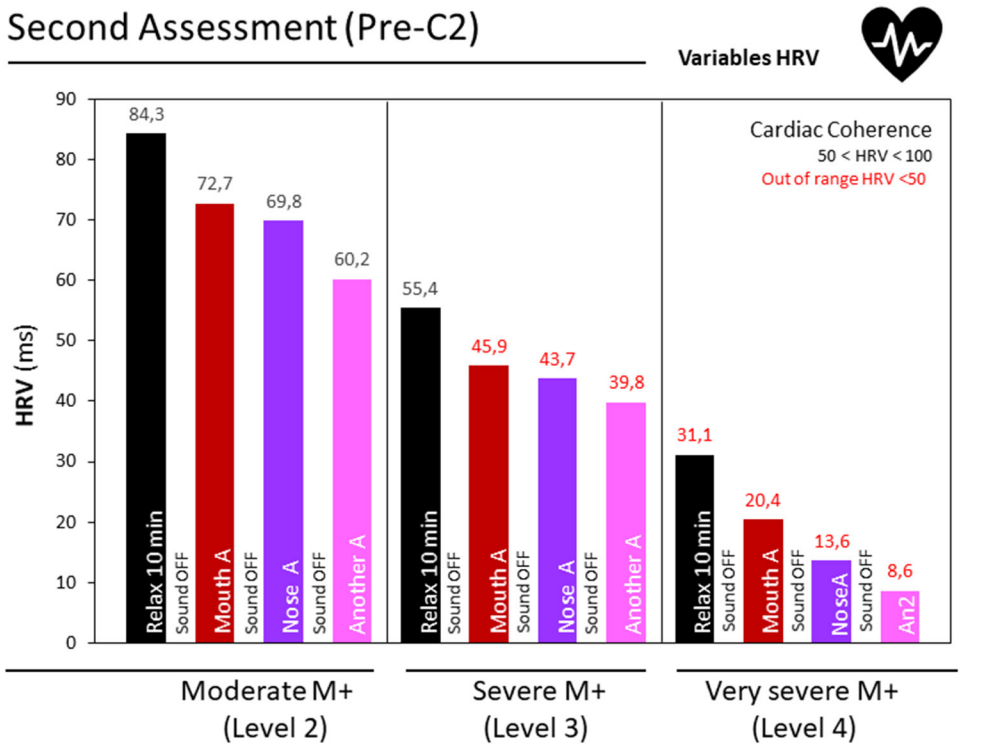

FIGURE 2 | Monitoring of HRV in people with misophonia during the second assessment, according to the severity of the disorder. Results are expressed as medians of HRV (ms). The 25, 50, and 75th percentiles are detailed in the Supplementary Table in **Supplementary Material**. Bar codes as in **Figure 1**. Moderate M+ (Level 2, $n = 10$), severe M+ (Level 3, $n = 10$), and extreme M+ (Level 4, $n = 4$) exposed to non-triggering auditory stimuli (mouth, nose, other). Misophonia was assessed using the Amsterdam Misophonia Scale [A-MISO-S, (41)] and the levels of misophonia were adapted by the authors for the only purpose to facilitate analysis in the present work.

They also placed great value on having scheduled activities that they had to carry out on a daily basis: the medical psychology center had asked them to perform the activities, and monitored this throughout the confinement period. These activities had been designed on a completely individual basis, according to how the patients' condition progressed.

To tackle information overload regarding COVID-19, deaths, and the risk of contagion, measures were taken such as limiting information and performing therapeutic writing exercises to control fears and anxiety. Other measures taken to address this and other issues, were performing daily physical exercise, adjusting chronobiological factors – sleep-wake cycles and meal times – and practicing various self-control exercises.

The patients told researchers how forced confinement was implemented in an excessively sudden manner, which made it difficult for them to prepare therapeutic strategies that would enable them to deal with the situation, and left them unprepared on a psychological, physical and organizational level. They considered these factors to have aggravated the effects of confinement and made their subsequent recovery less effective.

All the strategies employed by misophonic patients during this period could be useful for anyone experiencing a situation of confinement. However, this should not detract from the suitability or effectiveness of the intervention, since we must bear in mind that the threshold stress levels of a person with misophonia are those experienced by any other person in a confinement situation. Living with constant auditory stimuli or disturbing sounds, without being able to control, avoid, run away from or manage them is to live in a state of permanent stress. In addition, misophonic patients receive a lack of empathy usually due to ignorance – from his or her family, society, and even the health system.

Participants also described how, once they had entered a stressful situation or felt unstable, they were unable to return to a state of normality by performing self-control exercises, especially if triggering stimuli occurred during the day and night. They thought that practicing self-control exercises could be somewhat more effective after "venting." This was achieved through behavior such as getting angry, yelling, singing, running, hitting an object, playing music, or putting on any device at a very high volume. After this "shock," some patients found it helpful to: isolate themselves from others (if they were able); do self-control exercises; put herbal heat packs (or pads) on their ears, covering both ears entirely; listen to relaxing music; do gentle physical exercise, or have a very hot shower or bath. These observations, made during the semi-structured interview, tally

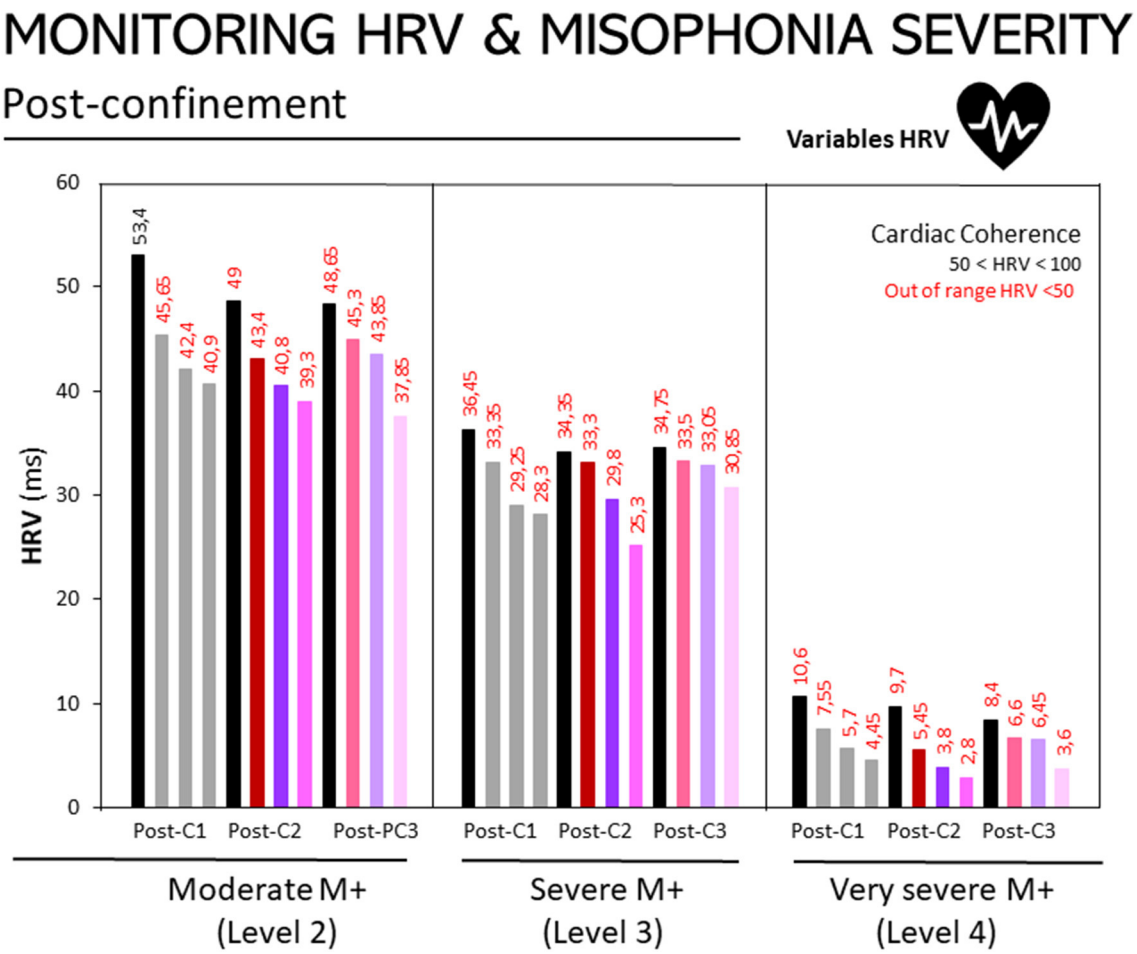

FIGURE 3 | Monitoring of HRV in people with misophonia during the three assessments conducted at the post-confinement stage, according to the disorder's severity. Results are expressed as medians of HRV (ms). The 25, 50, and 75th percentiles are detailed in the Supplementary Table in **Supplementary Material**. Bar codes as in **Figure 1**. Moderate M+ (Level 2, $n = 10$), severe M+ (Level 3, $n = 10$) and extreme M+ (Level 4, $n = 4$) exposed to non-triggering auditory stimuli (mouth, nose other), triggering auditory stimuli (mouth, nasal, other), and imagined/evoked triggers (mouth, nose, other). Misophonia was assessed using the Amsterdam Misophonia Scale [A-MISO-S, (41)] and the levels of misophonia were adapted by the authors for the only purpose to facilitate analysis in the present work.

with the notes and statements that the patients made during the post-confinement HRV assessment.

DISCUSSION

This study examined the secondary impact of situations related to COVID-19 and the strict confinement measures implemented in Spain upon the fears, relationships, and emotional states of a group of people with misophonia, who were regularly attending a medical psychology center in Barcelona. Most importantly, it explored whether HRV was useful as a physiological indicator of their distress, this also being compared to their basal levels, recorded during the preceding year. The difference between the number of male and female subjects in the sample, observed in our preceding work (51), was also confirmed. Our results show that the three-month confinement period caused these patients general emotional distress and a significant increase in physiological arousal. Triggering auditory stimuli caused aversive responses, lowering HRV scores and thus increasing the stress level and heart rate, with a sustained loss of cardiac coherence. More importantly, not only real but imagined or remembered stimuli were able to cause these effects, despite the fact that there was no audio reproduction.

Some interesting results were obtained for the relaxation or rest stage, in which patients spent 10 min performing a relaxation exercise that they practiced every day at home. In the first stage, which established the basal level, and in the second assessment, the HRV scores were within the normal range of > 50. These results show that the patients, at that moment, presented a normal level of HRV in the absence of stress. However, during the post-confinement assessments, there was a drop in HRV at the resting stage, which was maintained in all three assessments. In the first post-confinement assessment, where the patients performed 10 min of relaxation and had not yet been exposed to any sound, they did not manage to raise their HRV level to

TABLE 2 | Self-reporting on confinement: Transitory crises, deterioration of relationships and emotions, and causes.

	Total (%)	Women ($n = 16$)	Men ($n = 8$)
Transitory crisis	100.0	16	8
Relationships			
With the partner worsened	79.27	14	5
With a neighbor worsened	87.5	15	6
With the family worsened	25.0	4	2
Emotional state			
Worsened	100.0	16	8
Symptoms that I already had have worsened	41.7	8	2
New symptoms have appeared	12.5	2	1
Causes			
Increased general hypersensitivity	100.0	16	8
Increased hypersensitivity to sounds and movements	100.0	16	8
Overstimulation caused by sounds in the family and the neighborhood	87.5	14	7
The confinement situation	87.5	14	7
Movements and multisensory stimuli during the day and at night	83.3	14	6
Increased hypersensitivity due to sleep disorders, caused by neighborhood sounds	83.3	14	6
Increased hypersensitivity due to sleep disorders, caused by family and pet sounds	83.3	14	6
Increased hypersensitivity due to changes in routine and a lack of physical exercise	62.5	10	5
Fear of getting infected with COVID-19 and dying	62.5	10	5

a normal state. The same occurred in the next two relaxation stages, within the same post-confinement assessment period. These results suggest that the patients had been experiencing a stressful situation during confinement to which they were not exposed at the time of the previous assessments (basal level and second assessment), as they themselves confirmed in the interview carried out once the study was completed, after confinement had ended.

It can be seen that patients' evaluations of auditory stimuli in the basal-level assessment were somewhat higher than their evaluations of the same stimuli during the second assessment. In other words, the patients presented a higher level of stress in the second assessment than in the basal level. The same was true for the results of the first of the post-confinement assessments, in comparison to the previous assessments (second assessment and the basal level). It can be inferred from this that the results obtained in these post-confinement assessments are due to the alertness or hypervigilance that the patient was experiencing confinement. While the patients had not defined the auditory stimuli presented to them in the basal level assessment as triggering sounds, the participants were aware of the procedure they were about to go through, but not the type of sounds they would be exposed to. The patients lived in a state of hypervigilance resulting from the constant auditory stimuli that were present during confinement, which they experienced as a threat and therefore caused them stress (52, 53). LeDoux posed the hypothesis of increased activity in the amygdala (54, 55) and the superior temporal cortex being related to maintaining greater attention to sounds (56, 57).

Another factor that supports this interpretation is the progressive decrease in scores in all the assessments, recovery not having been possible, despite patients having taken 5 min of rest and carrying out a relaxation exercise that they knew and had practiced before. Added to this was the cumulative effect that occurred in all the assessments, especially at the post-confinement stage. According to Schröder et al. (58), repeated exposure to triggering stimuli may increase the severity of reactions. The data in this study demonstrate this cumulative effect, caused by the succession of sounds, and show that the time provided for recovery was not enough. The participants themselves made the case for another solution: most of them mentioned a need to get out of the room, run, move, yell, scream, talk or do any activity that involved physical movement and verbal expression. The relaxation exercise, after exposure to sound, was an impediment rather than a help. However, before any auditory exposure, relaxation exercises did reduce the effect of triggering sounds or prevent these effects from occurring as quickly.

A decrease in the HRV score for the second of the post-confinement assessments was to be expected, since this one exposed the patient to the triggering auditory stimuli that he or she had predetermined before confinement and during the second assessment in the program. However, it is worth noting how these scores compare to the following assessment, the third in the post-confinement stage. In this last assessment (post-confinement 3), the patients were asked to remember or imagine the triggering sounds they had heard in the previous assessment (post-confinement 2). Therefore, in this last assessment, the sounds were not audible. Comparing both groups, a recovery in HRV scores can be observed in the third post-confinement assessment. The patients therefore experienced less stress in this final assessment. The conclusion we may draw is that triggering sounds, even if they are not those heard by patients in their daily lives, having been extracted from a database, generate greater distress than the imagined sounds. Although more in-depth study is required, considering this observation is of special interest for misophonia treatment.

In both the second assessment and the post-confinement stage, there was a negative relationship between HRV scores and the severity of misophonia. The more severe the degree of misophonia, the lower the HRV score. Moreover, this occurred during periods of relaxation and when exposed to auditory stimuli, which confirms that when a patient has a higher level of misophonia, both hypervigilance and stress levels are more pronounced. Here it is important to clarify that misophonia was assessed using the Amsterdam Misophonia Scale [A-MISO-S, (41)] and the 'levels of misophonia' used in the present work were defined by the authors for the only purpose to facilitate analysis in categories.

As expected, in the semi-structured interview, all participants self-reported a deterioration in their emotional status and experiencing a transitory crisis. They all attributed these changes to a general sense of hypersensitivity, as well as hypersensitivity. Feeling particularly sensitive, due to the change in their routines and a lack of physical activity, were also cited as causes of their worsening psychological health. The fear of getting infected with COVID-19 and dying was also mentioned by 10 out of 16 women, and five out of eight men. According to a previous article published by the authors (51), once the lockdown was finished, most misophonia patients attending the medical center reported to practicing self-confinement, their main reason for doing so being the fear of being infected with or dying from COVID-19.

Conflicts with participants' partners, and especially with their neighbors, were caused by the noise they made throughout the day and part of the night. The long, strict confinement period made this a recurrent situation that was impossible to avoid. This caused a crisis on the personal and interpersonal levels, as it affected their relationships with their neighbors and partners. Patients described the crisis as transient because they directly related it to the situation of confinement and the fact that it was difficult to manage the problems. However, the lack of empathy for people with misophonia – sometimes due to ignorance, but mostly due to a lack of consideration – was another aggravating factor in this crisis. A recent study (12) showed there to be neuronal correlates of misophonia that are triggered by audiovisual stimuli, resulting in a conditioned response involving anger and increased physical arousal. Thus, increased activation of the right insula, anterior cingulate cortex and superior temporal cortex was observed in their patients. According to the authors, given that these areas are involved in the moral evaluation of stimuli (59, 60), patients with misophonia may have perceived these stimuli as personal harassment, triggering subsequent anger. With respect to our study, in the ongoing COVID-19 pandemic, fear of the disease and death, as well as present and future uncertainty (this paper and 32) occur in contrasting situations: being exposed to inescapable sounds inside the home, and the silence of empty cities and streets. The sensorimotor gating process may have come up against an unprecedented neurophysiological sensorial imbalance that, in turn, may have enhanced individuals' physiological arousal, heightening their perception of the sounds around them and their interpretation of these sounds as aversive stimuli.

In the context of an extreme situation such as confinement, the most desirable strategy would be to take preventive measures, so that people with misophonia do not develop behaviors and emotional states that are undesirable, both for themselves and the people with whom they live. Based on results of this study, we have produced a series of guidelines and recommendations, which are detailed below.

[1] Awareness needs to be raised about the problem and what its triggers are.
[2] The awareness of family members or the people with whom patients live also needs to be raised.
[3] Prior to being exposed to any extreme situation, such as confinement, the person suffering from misophonia should have learned and internalized relaxation exercises, self-control techniques, and controlled breathing. Other interventions that can help include:
[4] Fitting bedtime and the time for restorative sleep to the circadian rhythm. Avoiding long naps and heavy meals close to bedtime. Alcoholic or caffeinated drinks, or any other stimulants, should also be avoided.
[5] Doing physical exercise daily, as well as having designated objectives to meet and scheduled activities to perform.
[6] When sounds are unavoidable, it is helpful to have a repertoire of prepared strategies to help muffle them, such as: white noise, listening to music on headphones, noise-canceling headphones. In these situations, and to relax, it is effective to place a soft heat pack on the auditory pinna.

CONCLUSIONS

The extreme, unprecedented situations (the fear/risk of death and confinement) caused by the current COVID-19 pandemic have threatened to worsen the symptoms of misophonia sufferers and, consequently, their physical and psychological health. The results of this study, obtained from a sample of people with moderate to extreme misophonia who underwent the strict confinement imposed in Spain, confirm the usefulness of home-monitored HVR to identify a worsening responsiveness to auditory triggers, with respect to two previous basal periods. The loss of cardiac coherence was greater for patients with more severe misophonia. Additionally, imagined or evoked triggering sounds, as well as real ones, resulted in a loss of cardiac coherence. At the same time, the deterioration in patients' interpersonal relationships, especially with partners and neighbors, requires more initiatives at a clinical level but also at a societal level. Finally, participants handled their worsening situations with several coping strategies and by considering the crisis a transitory one that was associated with the severe conditions of confinement. Raising awareness about this disorder would help address the current lack of health and social care and hopefully prevent the impact of this shortfall, currently evidenced in a deterioration in social and affective relationships.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by L'Alfatier Medical Center. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AF-T: interviews, data collection and analysis, and manuscript draft. All authors contributed equally to the concept, design, and scientific discussion, as well as manuscript writing and approval.

ACKNOWLEDGMENTS

We are grateful to the participants for their trust and their willingness to contribute to fighting COVID-19 through scientific research.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.638949/full#supplementary-material

REFERENCES

1. World Health Organization. *Coronavirus Disease (COVID-19) Pandemic 2020.* WHO (2020). Available online at: https://covid19.who.int/ (accessed April 2021).
2. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health.* (2020) 17:1729. doi: 10.3390/ijerph17051729
3. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* (2020) 395:912–20. doi: 10.1016/S0140-6736(20)30460-8
4. Pastor JC. Psychological effects of COVID-19. *Arch Spanish Soc Ophthalmol.* (2020) 95:417–8. doi: 10.1016/j.oftale.2020.06.003
5. Rosenbaum L. The untold toll—the pandemic's effects on patients without Covid-19. *N Engl J Med.* (2020) 382:2368–71. doi: 10.1056/NEJMms2009984
6. Cusack SE, Cash TV, Vrana SR. An examination of the relationship between misophonia, anxiety sensitivity, obsessive-compulsive symptoms. *J Obsessive-Compulsive Relat Disord.* (2018) 18:67–72. doi: 10.1016/j.jocrd.2018.06.004
7. McKay D, Kim SK, Mancusi L, Storch EA, Spankovich C. Profile analysis of psychological symptoms associated with misophonia: a community sample. *Behav Ther.* (2018) 49:286–94. doi: 10.1016/j.beth.2017.07.002
8. Erfanian M, Mitchell AJ, Kang J, Aletta F. The psychophysiological implications of soundscape: a systematic review of empirical literature and a research agenda. *Int J Environ Res Public Health.* (2019) 16:3533. doi: 10.3390/ijerph16193533
9. Luskin F, Reitz M, Newell K, Quinn TG, Haskell W. A controlled pilot study of stress management training of elderly patients with congestive heart failure. *Prev Cardiol.* (2002) 5:168–74. doi: 10.1111/j.1520.037X.2002.01029.x
10. Wu MS, Lewin AB, Murphy TK, Storch EA. Misophonia: incidence, phenomenology, and clinical correlates in an undergraduate student sample. *J Clin Psychol.* (2014) 70:994–1007. doi: 10.1002/jclp.22098
11. Jastreboff PJ, Jastreboff MM. Treatments for decreased sound tolerance (hyperacusis and misophonia). *Semin Hear.* (2014) 35:105–20. doi: 10.1055/s-0034-1372527
12. Schröder A, van Wingen G, Eijsker N, San Giorgi R, Vulink NC, Turbyne C, et al. Misophonia is associated with altered brain activity in the auditory cortex and salience network. *Sci Rep.* (2019) 9:1–9. doi: 10.1038/s41598-019-44084-8
13. Kanji N, White AR, and Ernst. E. Autogenic training reduces anxiety after coronary angioplasty: a randomized clinical trial. *Am Heart J.* (2004) 147:508. doi: 10.1016/j.ahj.2003.10.011
14. Erfanian M, Brout JJ, Keshavarz A. Misophonia, emotional dysregulation and affective disorders: a preliminary study. *Eur Neuropsychopharmacol.* (2018) 28:771–2. doi: 10.1016/j.euroneuro.2017.10.014
15. Rouw R, Erfanian M. A large-scale study of misophonia. *J Clin Psychol.* (2018) 74:453–79. doi: 10.1002/jclp.22500
16. Whalen PJ. Fear, vigilance, and ambiguity: initial neuroimaging studies of the human amygdala. *Curr Dir Psychol Sci.* (1998) 7:177–88. doi: 10.1111/1467-8721.ep10836912
17. Schröder A, van Diepen R, Mazaheri A, Petropoulos-Petalas D, Soto de Amesti V, Vulink N, et al. Diminished N1 auditory evoked potentials to oddball stimuli in misophonia patients. *Front Behav Neurosci.* (2014) 8:123. doi: 10.3389/fnbeh.2014.00123
18. Kumar S, Tansley-Hancock O, Sedley W, Winston JS, Callaghan MF, Allen M, et al. The brain basis for misophonia. *Curr Biol.* (2017) 27:527–33. doi: 10.1016/j.cub.2016.12.048
19. Edelstein M, Brang D, Rouw R, Ramachandran VS. Misophonia: physiological investigations and case descriptions. *Front Hum Neurosci.* (2013) 7:296. doi: 10.3389/fnhum.2013.00296
20. Singer DH, Martin GJ, Magid N, Weiss JS, Schaad JW, Kehoe R, et al. Low heart rate variability and sudden cardiac death. *J Electrocardiol.* (1988) 21:S46–55. doi: 10.1016/0022-0736(88)90055-6
21. McCraty R, Atkinson M, Tiller WA, Rein G, Watkins AD. The effects of emotions on short term heart rate variability using power spectrum analysis. *Am J Cardiol.* (1995) 76:1089–93. doi: 10.1016/S0002-9149(99)80309-9
22. Camm AJ, Malik M, Bigger J, Breithardt G, Cerutti S, Cohen RJ, et al. Heart rate variability: standards of mea-surement, physiological interpretation and clinical use. Task force of the European society of cardiology and the North American society of pacing and electrophysiology. *Circulation.* (1996) 93:1043–65.
23. Gardim CB, Oliveira, B. A. P. D., Bernardo AFB, Gomes RL, Pacagnelli FL, et al. Heart rate variability in children with type 1 diabetes mellitus. *Rev Paul Pediatr.* (2014) 32:279–85. doi: 10.1590/0103-0582201432215513
24. Shaffer F, Ginsberg JP. An overview of heart rate variability metrics and norms. *Front Public Health.* (2017) 5:258. doi: 10.3389/fpubh.2017.00258
25. Karin J, Hirsch M, Akselrod S. An estimate of fetal autonomic state by spectral analysis of fetal heart rate fluctuations. *Pediatr Res.* (1993) 34:134–8. doi: 10.1203/00006450-199308000-00005
26. Lerma C, Infante O, José MV. System for analysis of heart rate variability. *Mem Electr.* (2000) 22, 63–67. doi: 10.1016/S0849-5831(16)30124-0
27. Appelhans BM, Luecken LJ. Heart rate variability as an index of regulated emotional responding. *Rev Gen Psychol.* (2006) 10:229–40. doi: 10.1037/1089-2680.10.3.229
28. Zygmunt A, Stanczyk J. Methods of evaluation of autonomic nervous system function. *Arch Med Sci.* (2010) 6:11–8. doi: 10.5114/aoms.2010.13500
29. Tiller WA, McCraty R, Atkinson M. Cardiac coherence: a new, noninvasive measure of autonomic nervous system order. *Altern Ther Health Med.* (1996) 2:52–65.
30. Erfanian M, Kartsonaki C, Keshavarz A. Misophonia and comorbid psychiatric symptoms: a preliminary study of clinical findings. *Nord J Psychiatry.* (2019) 73:219–228. doi: 10.1080/08039488.2019.1609086
31. Trousselard M, Canini F, Claverie D, Cungi C, Putois B, Franck N. Cardiac coherence training to reduce anxiety in remitted schizophrenia, a pilot study. *Appl Psychophysiol Biofeedback.* (2016) 41:61–9. doi: 10.1007/s10484-015-9312-y
32. McCraty R. *Science of the Heart: Exploring the Role of the Heart in Human Performance*. Vol. 2. Boulder Creek, CA: HeartMath Institute (2015).
33. McCraty R, Shaffer F. Heart rate variability: new perspectives on physiological mechanisms, assessment of self-regulatory capacity, health risk. *Glob Adv Health Med.* (2015) 4:46–61. doi: 10.7453/gahmj.2014.073
34. Kleiger RE, Stein PK, Bigger JT Jr. Heart rate variability: measurement and clinical utility. *Annal Noninvasive Electrocardiol.* (2005) 10:88–101. doi: 10.1111/j.1542-474X.2005.10101.x
35. Pumprla J, Howorka K, Groves D, Chester M, Nolan J. Functional assessment of heart rate variability: physiological basis and practical applications. *Int J Cardiol.* (2002) 84:1–4. doi: 10.1016/S0167-5273(02)00057-8
36. Brout JJ, Edelstein M, Erfanian M, Mannino M, Miller LJ, Rouw R, et al. Investigating misophonia: a review of the empirical literature, clinical implications, and a research agenda. *Front Neurosci.* (2018) 12:36. doi: 10.3389/fnins.2018.00036
37. Quek TC, Ho CS, Choo CC, Nguyen LH, Tran BX, Ho RC. Misophonia in Singaporean psychiatric patients: a cross-sectional study. *Int J Environ Res Public Health.* (2018) 15:1410. doi: 10.3390/ijerph15071410

38. LeDoux J. *Anxious: Using the Brain to Understand and Treat Fear and Anxiety*. New York, NY: Penguin (2015).
39. Jager I, de Koning P, Bost T, Denys D, Vulink N. Misophonia: phenomenology, comorbidity and demographics in a large sample. *PLoS ONE.* (2020) 15:e0231390. doi: 10.1371/journal.pone.0231390
40. Jastreboff MM, Jastreboff PJ. Decreased sound tolerance and tinnitus retraining therapy (TRT). *Aust New Zeal J Audiol.* (2002) 24:74. doi: 10.1375/audi.24.2.74.31105
41. Schröder A, Vulink N, Denys D. Misophonia: diagnostic criteria for a new psychiatric disorder. *PLoS ONE.* (2013) 8:e54706. doi: 10.1371/journal.pone.0054706
42. Cavanna AE, Seri S. Misophonia: current perspectives. *Neuropsychiatr Dis Treat.* (2015) 11:2117. doi: 10.2147/NDT.S81438
43. Zhou X, Wu MS, Storch EA. Misophonia symptoms among Chinese university students: incidence, associated impairment, clinical correlates. *J Obsessive-Compulsive Relat Disord.* (2017) 14:7–12. doi: 10.1016/j.jocrd.2017.05.001
44. Sri AS, Das P, Gnanapragasam S, Persaud A. COVID-19 and the violence against ws and girls: "The shadow pandemic." *Int J Soc Psychiatry.* (2021) 1:20764021995556. doi: 10.1177/0020764021995556
45. González UD. Bad neighborly relations from a criminal perspective. Between blocking and atypicality. *Diario La Ley.* (2020) 9728:1.
46. Ammar A, Chtourou H, Boukhris O, Trabelsi K, Masmoudi L, Brach M, et al. COVID-19 home confinement negatively impacts social participation and life satisfaction: a worldwide multicenter study. *Int J Environ Res Public Health.* (2020) 17:6237. doi: 10.3390/ijerph17176237
47. Pereira-Sanchez V, Adiukwu F, El Hayek S, Bytyçi DG, Gonzalez-Diaz JM, Kundadak GK, et al. COVID-19 effect on mental health: patients and workforce. *Lancet Psychiatry.* (2020) 7:e29–30. doi: 10.1016/S2215-0366(20)30153-X
48. HeartMath Institute. *A Special Gift to Assist With Balance and Emotional Poise During These Challenging Times* (2021). Available online at: https://www.heartmath.org/
49. Hodges PW, Gandevia SC, Richardson CA. Contractions of specific abdominal muscles in postural tasks are affected by respiratory maneuvers. *J Appl Physiol.* (1997) 83:753–60. doi: 10.1152/jappl.1997.83.3.753
50. Bentlage E, Ammar A, How D, Ahmed M, Trabelsi K, Chtourou H, et al. Practical recommendations for maintaining active lifestyle during the COVID-19 pandemic: a systematic literature review. *Int J Environ Res Public Health.* (2020) 17:6265. doi: 10.3390/ijerph17176265
51. Ferrer-Torres A, Giménez-Llort L. Confinement and the hatred of sound in times of COVID-19: a Molotov cocktail for people with misophonia. *Front. Psychiatry.* (2021) 12:627044. doi: 10.3389/fpsyt.2021.627044
52. Oken BS, Salinsky MC, Elsas S. Vigilance, alertness, or sustained attention: physiological basis and measurement. *Clin Neurophysiol.* (2006) 117:1885–901. doi: 10.1016/j.clinph.2006.01.017
53. Breckel TP, Giessing C, Thiel CM. Impact of brain networks involved in vigilance on processing irrelevant visual motion. *Neuroimage.* (2011) 55:1754–62. doi: 10.1016/j.neuroimage.2011.01.025
54. Whalen PJ, Rauch SL, Etcoff NL, McInerney SC, Lee MB, Jenike MA. Masked presentations of emotional facial expressions modulate amygdala activity without explicit knowledge. *J Neurosci.* (1998) 18:411–8. doi: 10.1523/JNEUROSCI.18-01-00411.1998
55. LeDoux J. The amygdala. *Curr Biol.* (2007) 17:R868–74. doi: 10.1016/j.cub.2007.08.005
56. Paus T, Zatorre RJ, Hofle N, Caramanos Z, Gotman J, Petrides M, et al. Time-related changes in neural systems underlying attention and arousal during the performance of an auditory vigilance task. *J Cogn Neurosci.* (1997) 9:392–408. doi: 10.1162/jocn.1997.9.3.392
57. Sturm W, Longoni F, Fimm B, Dietrich T, Weis S, Kemna S, et al. Network for auditory intrinsic alertness: a PET study. *Neuropsychologia.* (2004) 42:563–8. doi: 10.1016/j.neuropsychologia.2003.11.004
58. Schröder AE, Vulink NC, van Loon AJ, Denys DA. Cognitive behavioral therapy is effective in misophonia: an open trial. *J Affect Disord.* (2017) 217:289–94. doi: 10.1016/j.jad.2017.04.017
59. Schaich Borg J, Lieberman D, Kiehl KA. Infection, incest, and iniquity: investigating the neural correlates of disgust and morality. *J Cogn Neurosci.* (2008) 20:1529–46. doi: 10.1162/jocn.2008.20109
60. Pascual L, Gallardo-Pujol D, Rodrigues P. How does morality work in the brain? A functional and structural perspective of moral behavior. *Front Integr Neurosci.* (2013) 7:65. doi: 10.3389/fnint.2013.00065

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 09 July 2021
doi: 10.3389/fpsyt.2021.648569

An Ethnography Study of a Viral YouTube Educational Video in Ecuador: Dealing With Death and Grief in Times of COVID-19

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In Western societies, death is a social and educational taboo. Poor education about death and mourning processes and overprotective family and social attitudes move children away from death to avoid "unnecessary suffering." The COVID-19 outbreak highlighted these shortcomings and the difficult management of grief's complexity under sudden and unexpected scenarios. The need for immediate and constant updates related to COVID-19 benefited from social media coverage's immediacy. The use of YouTube as a digital platform to disseminate/search for knowledge exploded, raising the need to conduct ethnographic studies to describe this community's people and culture and improve the booming social media's educational capacity and quality. The present virtual ethnography studied 255,862 YouTube views/users and their behavior related to "Vuela Mariposa, Vuela," a children's story available online since 2009 (not monetized) about the cycle of life, death, and disenfranchised grief (not acknowledged by society) that went viral (+ >999%) on May. To our knowledge, this case study is the first original research that explores the ethnography of (i) a viral video, (ii) on death and grief taboo topics, (iii) for prescholars, and (iv) before and during the COVID pandemic. The quantitative and qualitative analyses identified a change in the users' profiles, engagement, and feedback. During the previous 11 years, the users were 35–44 years old Mexican and Spanish women. Those in grief used narrative comments to explain their vital crisis and express their sorrow. In the pandemic, the analysis pointed to Ecuador as the virality geographical niche in a moment when the tragic scenarios in its streets were yet unknown. The timeline match with the official records confirmed the severity of their pandemic scenario. The viral video reached a broad population, with normal distribution for age, and including male gender. Engagement by non-subscribers, direct search (traffic sources), and mean visualization times suggested educational purposes as confirmed by the users' feedback with critical thinking referring to the cycle of life's meaning and societal mourning. For the youngest users, the video was part of academic assignments. The ethnography pointed at YouTube as a flexible education resource, immediately reaching diverse users, and being highly sensitive to critical events.

Keywords: pre-school education, death, grief, disenfranchised grief, youtube, ethnography, COVID-19

OPEN ACCESS

Edited by:
Christos Theleritis, National and Kapodistrian University of Athens, Greece

Reviewed by:
Lucas Borrione, University of São Paulo, Brazil
Panagiotis Pentaris, University of Greenwich, United Kingdom

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *26 January 2021*
Accepted: *25 May 2021*
Published: *09 July 2021*

Citation:
Giménez-Llort L (2021) An Ethnography Study of a Viral YouTube Educational Video in Ecuador: Dealing With Death and Grief in Times of COVID-19. Front. Psychiatry 12:648569. doi: 10.3389/fpsyt.2021.648569

INTRODUCTION

In many Western societies, focused on youth and productivity, after a century of health and social advances increasing life expectancy by half a century, death is a taboo (1–3). Most people prefer not to think about it unless it is necessary. They behave as if death will exclusively be the endpoint of old age, and the "word taboo" forces the use of euphemisms. Talking about death is considered inappropriate or offensive outside normative settings restricted to figurative scenarios, the religious doctrine, or when its use is unavoidable in medical situations. The taboo on the dead includes naming the deceased person, touching the dead, those encompassing them, and anything related to it. Grief that does not align with social norms, the so-called disenfranchised grief, is not acknowledged by society and even denied. In other societies, indigenous ceremonies and rituals like those of Mexicans or Australian aborigines provide the opposite scenario, where the celebration of death and dead people are intrinsic to their culture (4, 5).

The emerging, rapidly evolving nature of the COVID-19 scenario results in a strong need for fast and freely accessible medical information resources to spread recommendations, guidelines, and constantly updated advice (6). Internet was already a popular source of healthcare information for both patients and professionals through not only different "social media" formats, such as blogs, microblogs (Twitter), and forums in medical websites, but also social networking sites (i.e., LinkedIn and Facebook) and communities (YouTube) (General Medical Council UK (https://www.gmc-uk.org) (7)). In particular, YouTube is the second most popular website in the world, and its use as a digital platform to disseminate knowledge in the health field is on the rise, along with its ability to be a disinformation niche (8). The increased use of YouTube has highlighted the importance of conducting ethnographic studies to describe this community's culture. This research approach can be defined as studying social interactions, behaviors, and perceptions within groups and communities (9). It is characterized by exploring the nature of a particular social phenomenon rather than testing a hypothesis about it. This research model applied in virtual education aims to improve the educational capacity and quality of the booming social media (10).

Thanatology and current practice in death education are an emerging field in postmodern Western societies, using interdisciplinary approaches (11) to counteract the social taboo of death (12). Poor education about death and mourning processes, together with overprotective family and social attitudes, moves children away from death to avoid what is considered an "unnecessary suffering" (13, 14). The COVID-19 pandemic has highlighted these shortcomings (15, 16) and the severe difficulties that individuals, but mostly society, have to manage grief's complexity under adverse scenarios (17–19) and chronosystem pressure (20). The situation is worsened by multiple mourning, as to the loss of the loved ones, individuals add other material, economic, and social losses that increase the meaning and impact. In children, the protective attitudes postpone their "confrontation" with the concept of death, instead of letting it be a natural part of the child's psychology and maturational development. More recently, among health promotion perspectives, digital storytelling (21) and children's literature have been foreseen to promote students' global development and well-being (22). The approach of death and mourning process through tales is a common educational resource used since prescholar times (23–25) similarly to occasional "teachable moments" where children are in contact with the presence of finitude (26). Under a psychosocial nursing perspective, the most recent work also refers to the relevance of using storytelling with grief reactions in children during the COVID-19 pandemic (27). Experts consider that death education programs are a kind of intervention program to learn coping strategies to deal with the fear of death and manage loss and anxiety (28), which are important to incorporate also into school curricula (29).

The present work is presented as a case study aimed to determine the ethnographic profile of 255,862 YouTube users (as estimated from visualizations) and their behavior related to "Vuela Mariposa, Vuela," a children's story available online since 2009 (not monetized) about the cycle of life, death, and disenfranchised grief (not acknowledged by society) that went viral (+ >999%) on May 2020. To our knowledge, this brief report is the first original research that explores the ethnography describing the YouTube community's people and culture associated with (i) a viral video, (ii) dealing with death and grief taboo topics, (iii) created as a material for prescholars, and (iv) quantifying the change in the ethnography profile before and during the COVID-19 pandemic. The children's story was first published open access in Encuentos.com, a digital editorial before the illustrated book, which also includes a guide for parents and teachers, was published in an independent editorial. The story is also part of a scholarly book for American students. Its professional use is cited in a doctoral thesis and several professional websites and blogs of Spanish and Latino–American psychologists specialized in managing children's grief.

MATERIAL

The material consists of two videos hosted on a non-monetized YouTube channel. They present a Spanish children's story on the cycle of life, death, and disenfranchised grief entitled "¡Vuela, mariposa! ¡Vuela!" (30) and its English version "Fly, Butterfly, Fly!" (31), both original works of the author of the present report. The original version was published on June 23, 2009, and in its English version 2 days later, on June 25 of the same year.

Participants

This study's participants are constituted by an independent, anonymous sample of 255,862 YouTube users, an estimated number by YouTube Analytics based on the number of views from their publication dates (June 23 and 25, 2009) until August 31, 2020. In each ethnography analysis (**Tables 1–6**), the number of estimated users (views) is indicated. The sample of interest refers to the time frames where the virality of the video occurred. It is focused on the 96,019 YouTube views in the 174 days since

TABLE 1 | Comparative analysis on the use of the children's story on cycle of life, death, and grief—indicators and traffic sources.

	!Vuela Mariposa, Vuela!		Fly, butterfly, Fly!	
	(A) Historic	(B) Pandemic	(A) Historic	(B) Pandemic
	2009 to March 10, 2020	March 11 to August 31, 2020	2009 to March 10, 2020	March 11 to August 31, 2020
Indicator	***n***	***n***	***n***	***n***
Visualizations (total: 255,592)	159,573	96,019	1,203	67
Impressions (total: 336,980)	218,892	118,088	398	243
Time (h) of visualization (total: 13,454)	6,662.3	6,791.7	8.1	0.7
Mean duration of the visualizations	3:01	4:14	1:39	1:27
Subscribers (total: 624)	200	424	0	0
Percentage of clicks (%)	5.6	10.0	1.0	1.2
Traffic source	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**
External source	**55,220 (34.6)**	32,702 (34.1)	104 (8.2)	3 (4.5)
Direct or unknown	19,628 (12.3)	**46,615 (48.6)*****	**286 (23.8)**	**26 (38.8)***
YouTube search	44,080 (27.6)	11,738 (12.2)	**286 (23.8)**	2 (3.0)
Suggested videos	20,399 (12.8)	2,312 (2.4)	175 (14.6)	**33 (49.3)*****
Inserted	7,085 (4.4)	—	94 (7.8)	—
Other YouTube functions	2,920 (1.8)	1,749 (1.8)	50 (4.2)	2 (3.0)
Google search	3,487 (2.2)	—	11 (0.9)	—
Promotion for YouTube partners	2,268 (1.4)	—	162 (13.5)	—

*Data for (A) Spanish version and (B) English version of the children's story are expressed as real numbers (n) and percentages (%). In bold, the highest percentages are indicated. The symbol "—" is meant for absence or data not reported or quantifiable, according to YouTube analytics. Statistics: χ^2, *p = 0.05, ***p = 0.0001 vs. pre-pandemic period.*

TABLE 2 | Comparative analysis on the use of the children's story on cycle of life, death, and grief—age and sex.

	!Vuela Mariposa, Vuela!		Fly, butterfly, Fly!	
	(A) Historic	(B) Pandemic	(A) Historic	(B) Pandemic
	2009 to March 10, 2020	March 11 to August 31, 2020	2009 to March 10, 2020	March 11 to August 31, 2020
Age	**% Users, mean duration of visualization and (%)**	**% Users, mean duration of visualization and (%)**	**%, Mean, %**	**%, Mean, %**
13–17 years old	—	4.1%, 3:46 (47.0)	—	—
18–24 years old	—	14.3%,*** 4:06 (51.1)	—	—
25–34 years old	—	**25.8%,*** 4:13 (52.6)**	—	—
35–44 years old	100%, 2:51 (35.5)	**24.8%,*** 4:22 (54.4)**	—	—
45–54 years old	—	19.9%,*** 4:31 (56.4)	—	—
55–64 years old	—	10.1%,** 4:39 (57.9)	—	—
+65 years old	—	1.0%, 4:27 (55.6)	—	—
Sex				
Women	100%, 2:51 (35.5)	69.1%,*** 4:17 (53.5)	—	—
Men	—	30.9%,*** 4:21 (54.2)	—	—

*Data for (A) Spanish version and (B) English version of the children's story are expressed as a percentage of users, mean duration of visualizations expressed as (minute: seconds), and as a percentage. In bold, the main contributors are indicated. The symbol "—" is meant for absence or data not reported or quantifiable, according to YouTube analytics. Statistics: Fisher exact test, **p < 0.01; ***p = 0.0001 vs. pre-pandemic period.*

the start of the official declaration of the pandemic (WHO, March 11, 2020) until August 31, 2020 (**Tables 1**–**3**). After that, the 23,246 users (views) on the day that went viral determine the viral video's engagement indicators (**Table 4**). Service used to share was determined from the behavior of 6,949 users, from whom 3,944 users belong to the historic pre-pandemic period and 3,005

TABLE 3 | Comparative analysis on the use of the children's story on the cycle of life, death, and grief—geographic areas.

	!Vuela Mariposa, Vuela!		Fly, butterfly, Fly!	
	(A) Historic	(B) Pandemic	(A) Historic	(B) Pandemic
	2009 to March 10, 2020	March 11 to August 31, 2020	2009 to March 10, 2020	March 11 to August 31, 2020
Geographical area	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**
Total visualizations	159,573 (100)	96,019 (100)	1,203 (100)	67 (100)
Mexico	**46,577 (29.2)**	3,644*** (3.8)	13 (1.0)	—
Spain	**14,268 (8.9)**	1,210* (1.3)	10 (0.8)	—
Colombia	4,608 (2.9)	1,062 (1.1)	—	—
Argentina	3,049 (1.9)	569 (0.6)	—	—
Chile	1,354 (0.9)	312 (0.3)	—	—
Peru	359 (0.2)	302 (0.3)	—	—
Ecuador	272 (0.2)	**81,524 (84.9)****	—	16 (23.9)***
USA	252 (0.2)	354 (0.4)	—	—
Costa Rica	219 (0.1)	—	—	—
Other Latino—American countries	[a]313 (0.1)	[b]48 (0.05)	—	—

*Data for (A) Spanish version and (B) English version of the children's story are expressed as real numbers (n) and percentages (%). In bold, the highest percentages are indicated. The symbol "—" is meant for absence or data not reported or quantifiable, according to YouTube analytics. Statistics: Fisher exact test, *$p < 0.05$ and ***$p = 0.0001$ vs. pre-pandemic period.*
[a]Other Latino–American countries: Guatemala (95), Uruguay (62), Paraguay (41), Puerto Rico (37), Venezuela (35), Filipinas (20), El Salvador (12), Panamá (11).
[b]Other Latino–American countries: Nicaragua (13), Bolivia (12), Panamá (12), El Salvador (11).

users to the pandemic (**Table 5**). Finally, a total sample of 90 users interacted in the YouTube channel to write commentaries to the video, thus providing feedback during the pre-pandemic (33 users) and the pandemic (57 users) periods.

Instruments and Procedure

Ethnography—Analytics of the Children's Story Videos

All the data from the video publication date until August 31, 2020, were considered for the comparative analysis. As the two versions of the story's publication dates differ in 3 days, the publication date of June 25, 2009, was taken as a standard reference. It was verified that this did not affect the total computations. The data were obtained for three time intervals: the total and the two periods that comprise the historic or pre-pandemic period (from the beginning to March 10, 2020, inclusive) and the first 174 days of the COVID-19 pandemic (from March 11 to August 31, 2020). After that, the data of the viral version were analyzed on the day it went viral.

The virtual ethnographic analysis was made through three instruments. First, YouTube Analytics provides the traffic sources used to watch the video, geographical areas, sex and age of the users, and other social engagement indicators. The concepts behind the different variables are obvious or intuitive, but some may need to be defined. These are Traffic sources (the origin through which people found the site. YouTube traffic sources include search, browse features, playlists, and suggested videos, all power to varying degrees by the YouTube algorithm. Other sources include direct URL or external), viewing time (estimated total hours of viewing of the content by the audience), average view duration (estimated average minutes viewed per replay), impressions (number of times video thumbnails have been shown to viewers), and impressions CTR (click-through rate; views by impressions shown).

Ethnography of the Virality—Timeline, Engagement, Sharing, and Users' Feedback

The data to elaborate the two videos' comparative temporal maps were obtained through YouTube's analytical engine. Total dates were defined from June 25, 2009, to August 31, 2020. The temporal map of the evolution of COVID-19 for Ecuador was taken from the official source of COVID-19 alerts in Google, as offered as of September 1 (the latest to collect data possible for this publication) cites Wikipedia as a source, Creative Commons, free to use.

Analytics of the viral video's engagement indicators measured by the number of views, time of visualization, and the mean duration of visualization was obtained from YouTube Analytics for the day the video went viral. In addition, sharing was measured by the service used to share, for both periods, the historical and the pandemic.

Finally, for the users' feedback, content analysis on the comments posted by users in the viral video was performed. Based on the user profile, three participations or user's typologies were considered: E, entities; W, women; and M, men. Content analysis was done on users' comments to the video for both periods (historic and COVID-19). The presence of grief was recorded and qualified in five typologies as follows: personal loss (of a child, husband, father), loss of a friend, loss of a person in the school, societal loss (referred to COVID-19), and disenfranchised grief (loss of a pet). The content analysis

TABLE 4 | Analytics of the viral video's engagement indicators.

Source	Engagement's indicators		
	Visualizations	Time of visualization (h)	Mean duration of visualizations
	n (%)	*n* (%)	*n* (%)
Total	**23,246**	**2,069.1**	**5:20 (66.5)**
Subscription status			
Non-subscriber	23,161 (99.6)	2,064.7 (99.8)	5:20 (66.5)
Subscriber	85 (0.4)	4.3 (0.2)	3:04 (38.3)
Type of device			
Computer	16,439 (70.7)	1,628.7 (78.7)	5:56 (74.0)
Mobile pone	6,473 (27.9)	408.8 (19.8)	3.47 (47.2)
Tablet	161 (0.7)	13.1 (0.6)	4:52 (60.7)
TV	109 (0.5)	11.6 (0.6)	6:23 (79.6)
Video game console	1 (0.0)	0.1 (0.0)	8:01 (100)
Traffic source			
Direct or unknown	14,453 (62.2)	1,436.7 (69.4)	5:57 (74.2)
External sources	147 (28.5)	462.8 (22.4)	4:11 (52.1)
YouTube search	62 (6.5)	125.2 (12.0)	4:56 (61.5)
Other YouTube functions	36 (1.4)	24.2 (5.1)	4:24 (54.8)
Suggested videos	22 (1.1)	16.5 (3.9)	3:59 (49.8)
Exploration functions	11 (0.2)	1.9 (1.6)	2:39 (33.1)
Page of reproduction list	11 (0.1)	0.8 (2.0)	4:21 (54.2)
Reproduction lists	7 (0.0)	0.9 (1.1)	5:28 (68:2)
Channel's pages	1 (0.0)	0.0 (0)	0:27 (5.7)
Geographic area			
Ecuador	22,903 (98.5)	2,047.5 (99.0)	5:21 (66.8)
United States	117 (0.5)	10.0 (0.5)	5:07 (63.7)
Mexico	42 (0.2)	1.8 (0.1)	2:34 (49.1)
Colombia	35 (0.2)	0.9 (0.1)	1.36 (42.6)
Spain	18 (0.1)	0.7 (0.0)	2:17 (32.1)
Chile	13 (0.1)	0.9 (0.0)	3:56 (28.5)
Peru	12 (0.1)	0.7 (0.0)	3:25 (20.0)
Age			
13–17 years old	— (2.1)	— (25.9)	5:08 (63.9)
18–24 years old	— (11.1)	— (10.9)	4:59 (62.1)
25–34 years old	— (24.9)	— (24.7)	5:00 (62.3)
35–44 years old	— (25.5)	— (25.9)	5:08 (63.9)
45–54 years old	— (22.9)	— (23.0)	5:04 (63.2)
55–64 years old	— (12.3)	— (12.4)	5:95 (63.3)
+65 years old	— (1.2)	— (1.2)	5:01 (62.5)
Sex			
Woman	— (69.7)	— (69.0)	5:01 (62.5)
Man	— (30.3)	— (31.0)	5:10 (64.4)

Data for engagement indicators on the viral children's story are expressed as real numbers (n) and percentages (%). In bold, the highest percentages are indicated. The symbol "—" is meant for absence or data not reported or quantifiable, according to YouTube analytics.

searched for several items related to the video and the story, the emotions, and feelings raised; the cognitive aspects such as critical thoughts; a summary of the video and its interpretation, providing new opinions; consideration of its use; and the target population.

Data Analysis

The data are presented and analyzed using quantitative and qualitative descriptive methods. Differences were analyzed with Student t test, χ^2 test, or Fisher exact test. $p < 0.05$ value was considered statistically significant.

TABLE 5 | Service used to share.

Service	(A) Historic	(B) Pandemic
	2009 to March 10, 2020	**March 11 to August 31, 2020**
	***n* (%)**	***n* (%)**
Total	3,944 (100)	3,005 (100)
WhatsApp	**1,958 (49.7)**	**1,803 (60.0)** *n.s.*
Copy to Clipboard	788 (20.0)	315 (11.1)
Facebook	708 (18.0)	334 (11.1)
Other services	207 (5.3)	437 (14.5)
Facebook Messenger	120 (3.0)	64 (2.1)
Gmail	69 (1.8)	27 (0.9)
E-mail	24 (0.6)	4 (0.1)
Google+	18 (0.5)	—
Text message	16 (0.4)	3 (0.1)
Twitter	12 (0.3)	6 (0.2)
Pinterest	12 (0.3)	3 (0.1)
Blogger	5 (0.1)	1 (0.0)
Hangouts	3 (0.1)	1 (0.0)
Reddit	1 (0.0)	7 (0.2)
Tuenti	1 (0.0)	—
LinkedIn	1 (0.0)	—
Embed	1 (0.0)	—

Data for service used to share the viral children's story are expressed as real numbers (n) and percentages (%). In bold, the highest percentages are indicated. The symbol "—" is meant for absence or data not reported or quantifiable, according to YouTube analytics. Statistics: $\chi^2 = 1.636$, *1 df (degrees of freedom),* $p = 0.2008$, *n.s. (not statistically significant) vs. pre-pandemic period.*

RESULTS

Ethnography—Analytics of the Children's Story Videos

The video statistics provided by YouTube Studio for the video and its English version in the two periods of time, the pandemic and the history of the previous 11 years, are depicted in three tables according to three main analytical domains: (1) indicators and traffic sources (**Table 1**); (2) age and sex (**Table 2**); (3) geographical areas (**Table 3**).

Indicators and Traffic Sources

The database of indicators and traffic sources for "¡Vuela Mariposa!¡Vuela!" (**Table 1**) showed that from its publication in 2009 until August 31, 2020, a total of 255,592 visualizations and 336,980 impressions were recorded. The 37.6% (96,019) and 35.0% (118,088) of them, respectively, were done during the 174 days of the pandemic period recorded. 6,791.7 h, half of the total visualization time (13,454 h) was accumulated during the pandemic, which was as much as the 6,662.3 accumulated hours during the previous 11 years since its publication. The visualizations' mean duration was 4:14, a 52.8% of its total 8:01 duration, while the that of the previous years was 3:01, 37.6%.

During the preceding 11 years, the video captured 624 subscribers, 200 before the pandemic and 64.1% (400) of them in 174 days. The percentage of clicks during the pandemic was twice those of the previous years (10.0 vs. 5.5%). Compared to videos with the same duration, YouTube Analytics scored the audience's relative retention as "high" until minute 2:50 and "over the mean" until minute 6:05. The video received 892 likes vs. 51 dislikes and recorded a 94.6% active response to satisfaction, similar to the mean 94.4% given to the channel. The main traffic source changed during the pandemic with "director unknown" (48.6%) showing a statistically significant increase ($\chi^2 = 30.570$, 1 dg, $p = 0.0001$), as compared to historical, and leading the traffic, ahead of "external source" (34.1%) and "YouTube search" (12.2%), the main sources during the previous years (34.6 and 27.6%, respectively).

As a comparison, the indicators and traffic sources of the English version Fly, Butterfly! Fly! is indicated in **Table 1**. Since its publication in 2009, this version has obtained 1,270 total views and 641 total impressions, representing 0.05 and 0.19% of the original story's total activity, respectively. The 5.3% of total views were done during the pandemic, although views had a similar mean duration (1:27 vs. 1:39) and percentage of clicks (1.2 vs. 1.0) than the previous years. In contrast, the number of impressions was maintained relatively high, with 243 compared to 398 in previous years. Still, these indicators were small as compared to the viral video. From its publication, traffic sources were quite diversified, with 23.8% being "direct or unknown" and 23.8% "YouTube search," followed by "suggested videos" (14.6%), "promotion of YouTube partners" (13.5%), or "external sources" (8.2%). During the pandemic, the "main traffic sources" also changed, as they were found concentrated on "suggested videos" (49.3%) and "direct or unknown" (38.8%) that significantly increased ($\chi^2 = 25.023$, 1 dg, $p = 0.0001$; 4.542, 1 dg, $p = 0.0331$, respectively) as compared to the historic.

Age and Sex

Since its publication, the age and sex of the audience have been very uniform, with 100% of visits being 35–44-year-old women, who spend a mean of 2:51 min in the visualizations, a 35.5% of the video duration. During the pandemic, the audience was broader, showing a normal distribution with the maximum in the 25–34 year (25.8%) and 35–44 year (24.8%) ranges, an increase that reached statistical significance except at the two tails of the curve (χ^2s, age intervals from 18 to 54 years, $p = 0.0001$; 55–64 years old, $p = 0.0015$). The mean duration of visualizations per age group was similar, covering ∼50% of the video duration, with the lowest time (3:46, 47.0%) in the youngest age group (13–17 years old) and the highest (4:39, 57.9%) in those 55–64 years old. Men also viewed the video, with a 30.9% participation, spending 4:21 min (54.2%) of visualization time than 69.1% of women, who spent 4:17 min (53.5%). No data were available for the English version.

Geographical Areas

The description of the geographical areas unveiled a key aspect since the video, which was popular among Mexicans (29.2%) and Spaniards (8.9%), became viral during the pandemic in another location, Ecuador (84.9%). The few data registered for the English

TABLE 6 | Content analysis of comments of users.

	(A) Historic		(B) Pandemic	
	2009 to March 10, 2020		**March 11 to August 31, 2020**	**Statistics**
	***n* (E:W:M) (%)**		***n* (E:W:M) (%)**	*P*
Participants	33 (4:26:3) (100)		57 (0: 44:13) (100)	
Grief	13 (0:11:2) (39.4)		5 (0:3:2) (8.8)	***
Personal loss	8 (0:6.2) (24.2)		1 (0:0:1) (1.8)	
Loss of a friend	2 (0:2:0) (6.0)		1 (0:0:1) (1.8)	
Loss at the school	3 (0:3:0) (9.0)		0	
Societal loss	0		2 (0:2:0) (3.5)	
Disenfranchised grief	0		1 (0:0:1) (1.8)	
Expressivity (use of emoji or emoticons)				
In grief	0		0	
Not in grief	0		11 (0:7:4) (21)	**
Expressivity (number of words)	***n*, Mean ± SEM**		***n*, Mean ± SEM**	
In grief	13, 37.5 ± 7.0		5, 17.0 ± 5.44	(*)
Not in grief	20, 9.8 ± 2.3	GGG	52, 16.1 ± 2.03	(*)

*Data for content analysis of comments of users on the viral children's story are expressed as real numbers (n); ratio of E, entities; W, women; M, men; and percentages (%). In bold, the highest percentages are indicated. The symbol "—" is meant for absence or data not reported or quantifiable, according to YouTube analytics. Statistics: Student t test of Fisher exact test; p < 0.001 vs. the comments not referring to grief; *p < 0.05, one-tailed; **p < 0.01; ***p < 0.001 vs. the historic.*

version also pointed at Ecuador (23.9%) as a geographical area, whereas no information was available for the other areas.

Ethnography of the Virality—Timeline, Engagement, Sharing, and User's Feedback

Timeline

Figure 1 illustrates the temporal map of the video's virality provided by YouTube analytics and plots the views per day of the English version (hardly detectable) for comparison. During the pandemic, March 11 to August 31, 2020, YouTube referred to viral (+ >999%) engagement, and May 19, 2020, as the day with a maximum of 23,246 visualizations and a retention time of 66.5% (5:20 min). Evident synchronicity is shown with Google COVID-19 alert statistics for Ecuador during the same period, March 11 and August 31, 2020. Total cases, cured, and deaths in the world, Ecuador, and different Ecuadorian areas are depicted.

Engagement Indicators

Viral video's engagement indicators (**Table 4**) show that 99.6% of views on May 19, 2020, were from non-subscribers, with a computer (70.7%) being the main type of device used to watch the video, and the mean duration was as high as 5:56 min (74.0%). Those who were already subscribers showed a lower 3:04 retention time. Access through mobile phones was 27.9%, and the mean duration was 3:47 (47.2%). Despite that tablets and TV were used in a hundred persons, the mean duration increased to 4:52 (60.7%) and 6:23 (79.6%), respectively. Only one user viewed the video from a video game console but saw it during its complete duration. Traffic source was direct (62.2%) followed by "External sources" (28.5%) with high visualization rates of 74.2% of video duration. Reproduction lists, while representing only seven visualizations, had a 68.2% retention time. Ecuador was the "main source" of the audience. Geographical areas also pointed at Ecuador as 98.5% of visitors with high retention times of 5:21 (66.8%). While the United States represented only 0.5% of the audience of that day, the retention was 5:07 (63.7%). The age and sex distribution replicated that described for the pandemic period, except for 13–17-year-old visitors who spent 63.9% (5:08 min).

Sharing

The "service used to share" analytics is depicted in **Table 5**. Since its publication, WhatsApp was the "main service" (49.78%) used to share the video, followed by "Copy to Clipboard" (20%) and Facebook (18.0%). During the pandemic, the sharing through WhatsApp was increased (60.0%) whereas the other two devices reduced their use to 11.1% in favor of "other services" (14.5%). The use of Facebook Messenger represented 3.0% of the shares since 2009, or 2.1% during the pandemic. Gmail, emails, Google+, text message, Twitter, Pinterest, Blogger, Hangouts, Reddit, Tuenti, LinkedIn, and Embed were minor.

User's Feedback as Commentaries

Before the pandemic, the feedback from users recorded as commentaries to the video was low but increased with time, reaching a total number of 33 comments (**Figure 2A**). According to the user's profiles and written comments, the 33 comments were written by four bereavement counseling entities, 26 women and 3 men (**Table 6**). The exponential growth of comments was recorded during the 174 days of the pandemic studied, with 57 new commentaries of 44 women and 13 men. No entities contributed with comments.

The content analysis allowed us to identify eight topics (**Figure 2B**). During the years before the pandemic, the commentaries referred to the beauty of the video/story (42.4%)

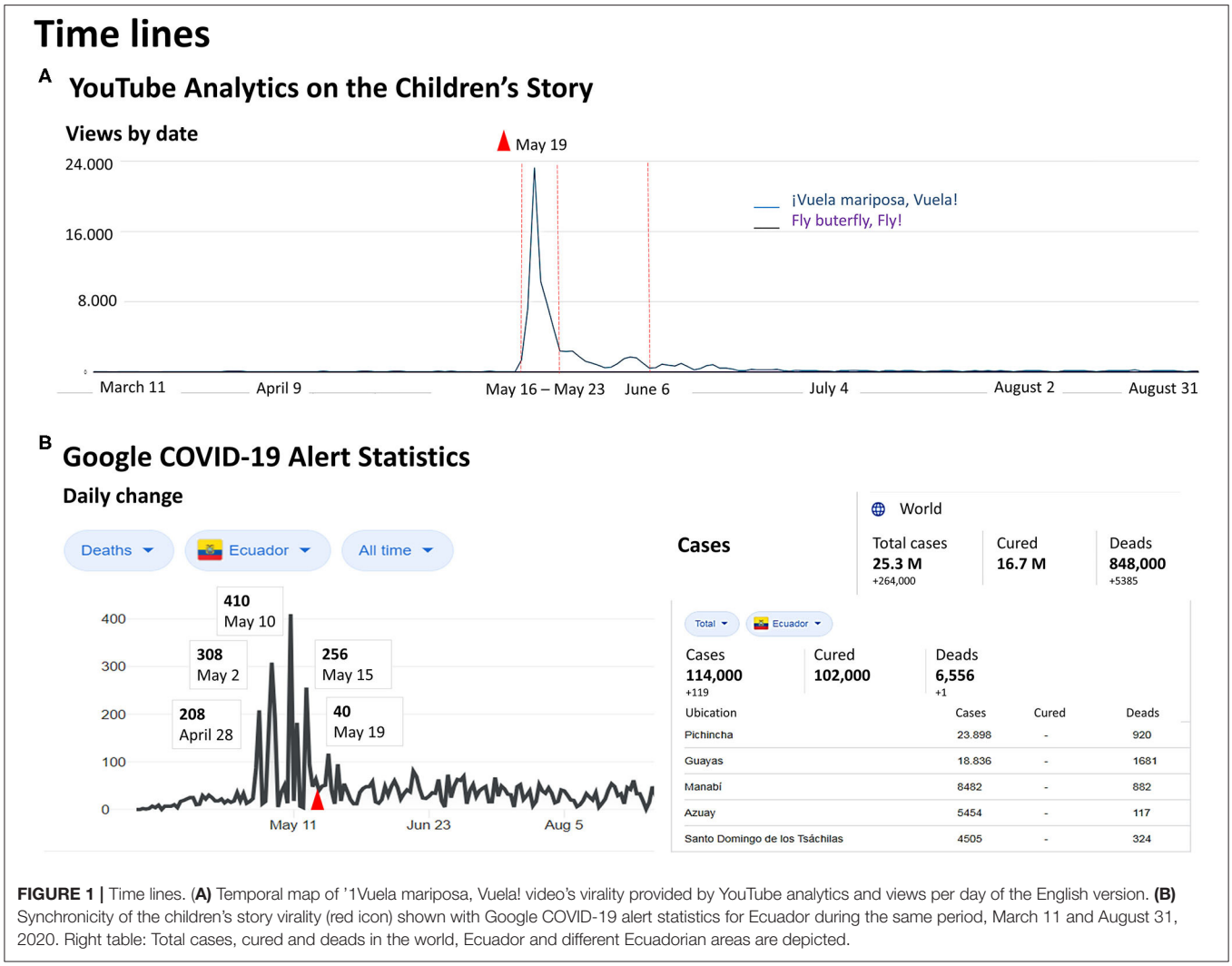

FIGURE 1 | Time lines. **(A)** Temporal map of '1Vuela mariposa, Vuela! video's virality provided by YouTube analytics and views per day of the English version. **(B)** Synchronicity of the children's story virality (red icon) shown with Google COVID-19 alert statistics for Ecuador during the same period, March 11 and August 31, 2020. Right table: Total cases, cured and deads in the world, Ecuador and different Ecuadorian areas are depicted.

and/or described personal details about grief experiences (39.4%, 13 persons: 11 women, 2 men), primarily personal loss (24.2%) but also loss of friends (6.1%) or in the schools (9.1%). Those in grief wrote longer texts to express themselves (37.5 ± 7 words) than those not referring to grief, who used shorter texts (9.8 ± 2.3 words, Student *t* test, $p = 0.0001$). One-third of users (30.3%) found the video "helpful" for themselves or those who had lost a loved one, and they thanked for sharing (21.2%). Users qualified the video as touching or evoking their sadness (18.2%), whereas others referred to it as inviting to do reflections and/or expressed their opinion (18.2%). Thus, some users used the comments to summarize the story. Others extracted one or several messages regarding human qualities, existence, or values such as friendship, acceptance, and immortality of love. Other users used the commentary to provide their point of view and perspective. Finally, a few (9%) used or added an "I love it" to their commentary. This pattern was changed during the pandemic. The ratio of users referring to be in grief or evoking their grief during the semester of the pandemic was 5 (3 women, 2 men) over 57 participants (8.8%), whereas the previous averaged number per year was 1.18 ± 0.23 over 3.0 ± 0.47 participants per year (64.8%), 13 over 33 participants (39.4%) during the whole period (Fisher exact test, $p = 0.0008$). Societal loss, related to the current situation, was referred to in two of five comments. Evocation of the grief for the loss of a pet (considered disenfranchised grief) was also mentioned here for the first time. The other two explicit comments were for a personal loss and the loss of a friend. The length of comments with explicit reference to a grief experience was as long as those that did not (17.0 ± 5.44 vs. 16.1 ± 2.03) (vs. the previous years, one-tailed Student *t* test, in grief, $p = 0.05$; not in grief $p = 0.04$, respectively). Also, the use of emoticons was observed in the comments (Fisher exact test, $p = 0.006$). The content analysis confirmed the categorization of topics but changed their incidence. Thus, while the video's beauty was one of the two most common observations (40.4%), there was an increase in the number of users referring to critical thinking elicitation; users summarized the messages and some added opinions (43.9%). Some comments explicitly referred to watching the video as an assignment from their teacher or as docents, and these comments received positive reinforcement

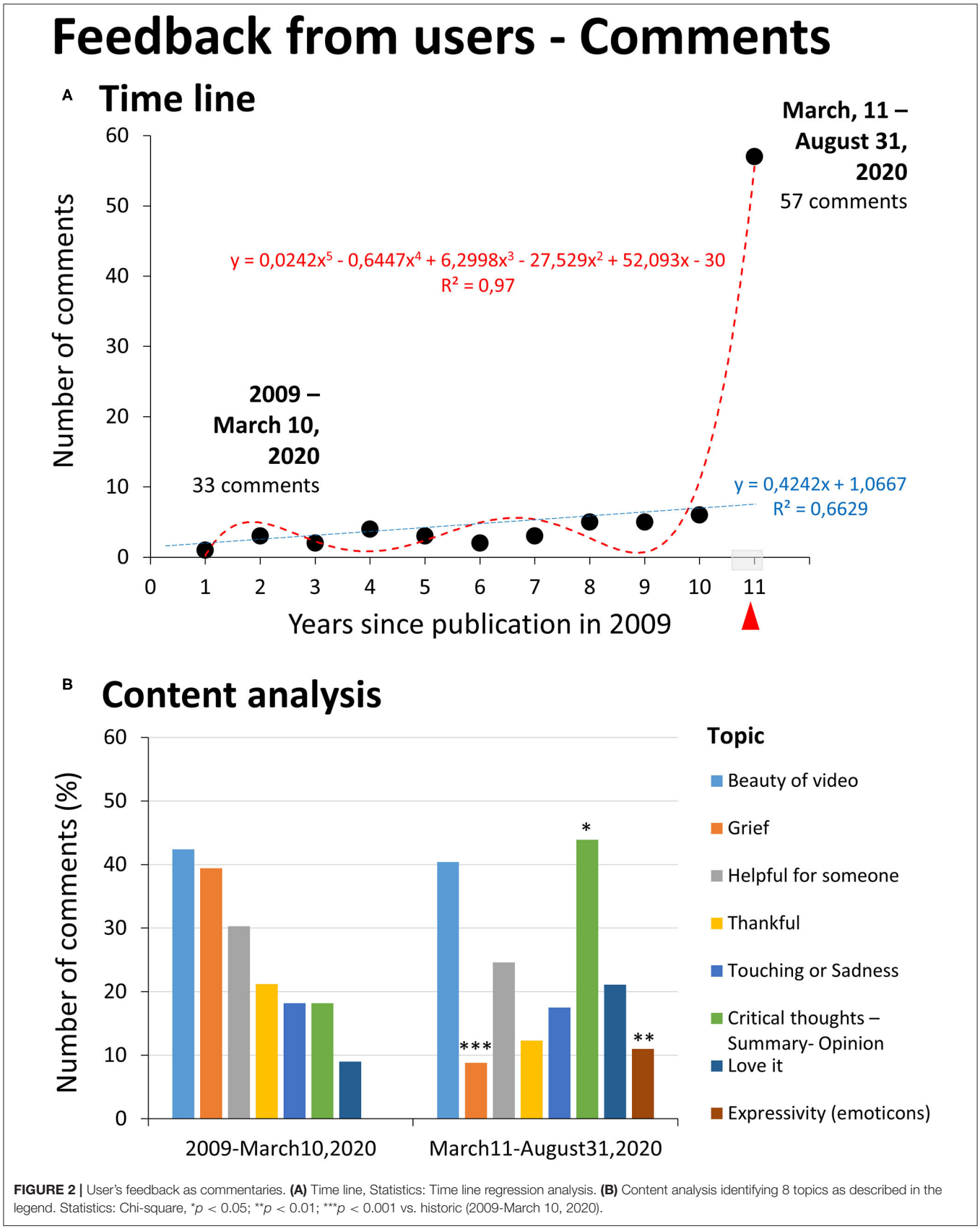

FIGURE 2 | User's feedback as commentaries. **(A)** Time line, Statistics: Time line regression analysis. **(B)** Content analysis identifying 8 topics as described in the legend. Statistics: Chi-square, $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$ vs. historic (2009-March 10, 2020).

from others (up to 35 likes). The comments also qualified the video as helpful for their new role as bereavement counselors to help others.

DISCUSSION

The present study prompted by a children's story about the cycle of life, death, and grief hold in a YouTube channel for more than 11 years, suddenly becoming viral (+ >999% increase of views) in May 2020, 3 months after the pandemic was declared (32). Therefore, because of its nature and singularity, this work is presented as a case study. To our knowledge, this report is the first original research that explores the ethnography of (i) a viral video, (ii) on death and grief taboo topics, (iii) for prescholars, and (iv) the change in the ethnography profile before and during the COVID-19 pandemic.

There is abundant literature about the role of social media and death and grief since the 1980s that emphasizes many of the arguments presented in the discussion of this work. New reports emerging in the advent of COVID-19 pandemic regarding crisis management, mental health challenges, and implications are also noteworthy (33). The original contribution of the present case study's analysis relies on the viral, exponential interest in this children's story in the specific scenario of COVID-19, presenting a different ethnographic profile compared to before the pandemic. The virality *per se* recognized a need for users to find and visualize material related to death and mourning processes that, as confirmed through the temporal overlapping with the tragic events in Ecuador and the user's feedback, mainly was aimed to help manage the sudden and dramatic number of deaths and consequent difficulties of the mourning process. The time when the video went viral was also determinant because time is considered a critical factor to help disrupt grief's vulnerability and support other protective factors (17). However, the most important finding was that the quantitative and qualitative ethnographic analysis allowed identifying a yet unknown severity of the pandemic situation in Ecuador that later could be confirmed by the timeline matches with the official records. The main port of Ecuador and the second most populated city, Guayaquil, was between April and May 2020, which experienced community contagion at an increasing rate. Reports referred to people suddenly collapsing and the deceased's bodies lying in the streets covered with white sheets because of the inability to be buried at once. In summer, Quito D.M., the country's capital, surpassed Guayaquil with the number of confirmed cases and became the new epicenter of the nation's pandemic (34). The geographic area analysis pointing to Ecuador as the video's virality's primary geographical location was also confirmed in the English version, in contrast to precedent Mexican and Spanish geographical locations during the historic. This indication is important since, despite the current devastating scenarios worldwide, the virality of a video on death and grief is a singular phenomenon in the context of the social and educational taboo of death. Here, it is interesting to note that during the previous years, Mexico, with a cultural syncretist tradition of indigenous rituals commemorating the dead and dead people, where monarch butterflies are a symbol of the deceased who are present on the Day of the Dead (4), was reported as the primary geographical location. Altogether, the geographic analysis was key for the ethnographic analysis, corroborated by the timeline and the users' feedback, unveiling the user's needs and use of the video to manage the mourning process, as will be later discussed.

In a formal comparative analysis, results obtained in a period are contrasted against a similar period immediately before or the same time frame in the previous year. In the present work, the idiosyncrasy of virality is significantly different from precedent data, at least for the number of visualizations. As the standard basal levels of the video were trimmed, the analysis was done compared to (1) the English version during the same period of the pandemic and (2) the historical records obtained during the previous 11 years.

The indicators showed that virality allowed to achieve, in a brief time, approximately half of the amount of activity accumulated during the precedent years, as measured by the number of visualizations and impressions. Viewing times of virtual social media are usually very short and, in most cases, rarely exceed 3 min. Therefore, the average viewing duration of the video was greater than the standard and may support its educational use/purpose. Besides, the fact that the time of visualization was equal to pre-pandemic and the mean duration of the visualizations was longer talks in favor of the video's potential impact at the educational level. It also helps to discard that the virality resulted in a sudden but short exposure to the video content, which would reduce this potential. The 2-fold increase in the number of subscribers and the percentage of clicks, which are relevant to measure the impact and quality of the materials, suggests that the viral video was translated into the channel's adherence. Here it is important to note that, as a comparison, these variables were not modified in the English version. It would have been interesting to compare the profiles with those of another contemporary children's story addressing other physical changes or loss in the natural life cycle, such as the first tooth loss. Other interesting comparisons could be made with virtual material about fear of death when experiencing natural disasters. Recent reports on higher acute grief after death due to COVID-19 compared to natural loss allow the researchers to predict that pandemic-related increases in pathological grief are foreseen as a worldwide public health concern (35).

Traffic sources were also informative about the way the video went viral. During the pandemic, the access to the video was direct, in contrast to external sources or YouTube search as main sources used during the previous years. Incoming traffic channeled through websites or direct recommendations via links means that other people participate in the election. These indicators suggest a goal-directed behavior of users compatible with educational purposes. The posterior analysis of sharing was also illustrative and confirmed that WhatsApp's direct links were the most used service to spread the word.

Apart from the geographical area, age, and sex were two relevant socio-demographic factors to identify the audience's profile, which expanded from all cases being "35–44 year-old women" user profile to a broader normal distribution of ages, also including the presence of men. Age and sex factors are

critical to determine the users' profile and elucidate the potential needs of users covered by the material. Thus, during the historic, the adult female profile would respond to mothers confronting the grief process or women in parenting or professional roles toward pre-scholars, as confirmed in the content analysis of the user's feedback. Similarly, the broader coverage of ages and sexes during the pandemic was informative of new use of the pre-scholar material among teenagers as academic assignments or men as fathers/docents. This information helped define subsequent actions for the audience, as a target population, in agreement with other efforts to elaborate and share action lines for death in preschool education (14). Thus, a YouTube video call in the channel offered a guide for education on death and mourning for adults (parents and docents) and organized a webinar on this topic. The resulting survey's ethnographic analysis allowed defining potential professional users' sociodemographic and socioecologic profiles (20). These data were valuable to address their needs on this topic in an immediate and personalized manner. Still, in future lines of analysis and study, within the most rigorous field of education through the use of audiovisual elements, it would be interesting to qualify the video using DISCERNMENT score, a content reliability index, or PEMAT, another evaluation instruments of educational materials for patients for audiovisual materials (8). The level of comprehensibility and the capacity for action the video may allow could be assessed using these scales.

The temporal maps showed that the video became viral immediately after the most severe days of the pandemic outbreak in Ecuador. Among the engagement indicators on the day the video went viral, it is noteworthy that non-subscription as the majoritarian status, the direct traffic source indicating direct connection, and the use of a computer as a device instead of mobile phones, despite WhatsApp was identified as the service used for sharing using the Share on YouTube button. The overrepresentation of females in the two studied periods is common and agrees with bereavement research using voluntary-response sampling and is considered that it may reflect a more vital need for women to share their feelings (19). In this respect, therefore, in the present work, the emergence of masculine participation in the users' profiles and the users' feedback is noteworthy.

The user's feedback to the video can be considered an important exercise to deal with the "word taboo" (verbal omissions related to a taboo topic) (1–3). Despite the low translation of the video virality into written comments, the exponential increase shown in the timeline was noticeable. This is important because the taboo of death also extends to "words taboo" and strongly contributes to grief stigmatization and disenfranchised grief symptoms. Also, although death rituals and mourning practices are highly dependent on the cultural context (5, 36), the COVID-19 pandemic has created a global scenario with commonalities for people in all nations [i.e., (19, 37–42)]. The most important commonalities are the psychological burden associated with confinement (43), the inability to say goodbye or to perform rituals according to believes and culture, and the measures of physical distancing, all of them considered risk factors for traumatic and disenfranchised grief in people with low resistance or resilience (19, 35, 44, 45). Thematic content analysis of Twitter data from bereaved family members and friends (46) or national newspapers (28) has also reported the complexity and difficulty of the current bereavement scenarios.

In the present work, the comparative content analysis highlighted a change in the user's profile concerning the mourning process. This aspect is important as listening and understanding the user's opinions must improve the cultural and pedagogic quality of death education (47). In the precedent years since the publication of the children's story, users referred to the personal loss of a child, another family member, or a student wrote narrative comments to explain the vital crisis they were confronting and expressed their depth sorrow. In addition, some comments were provided by entities specialized in grief management, providing support to bereaved families. In this latter case, users' written comments giving spontaneous feedback to the video could be understood as a kind of virtual grief group where bereaved people amenably expressed their loss personally and socially.

The content analysis of the comments written during the pandemic indicated societal mourning and included disenfranchised grief. The broader range of age of users, including the youth, would also explain the use of emoji and emoticons to express emotions among those not in grief. However, the most relevant difference was that, in agreement with the current situation, most of the comments reflected critical thinking and provided a space for users to summarize the meaning of the children's story. They were also used to provide their own opinion on the scale of values and other important issues related to the cycle of life, death, and mourning. In this sense, this change of expressivity patterns suggests that the material covered the personal needs of bereaved mothers/professionals during the historic, whereas the educational purpose and use of the video were more evident in the new context of COVID-19. As mentioned in some comments, the video was promoted from educative scenarios as an academic assignment for teenagers. Similar to grief support being part of health education (48), the educative areas also showed a strong need to train their fellows. Besides, the commentary forum worked as a scenario to establish symbolic family bonds among unknown people worldwide, similarly to what has been recently described in the organizational ethnography of charities in crisis times (49). In addition, recent grief research using voluntary recruitment before and during the pandemic showed no significant differences in socio-demographic and loss-related variables (19). However, in the present work, a singular change in the ethnography profile before and during the outbreak was determined by viewers' spontaneous and voluntary enrolment.

Understanding the nature and pattern of misinformation infodemic during large-scale disease outbreaks deserves special attention (50). When referring to social media as a source and resource of health information, the topic is controversial, under constant evaluation and debate. This is primarily due to the worrisome number of videos found to present medically misleading information and some patients' abusive behavior using these resources (8, 51). In recent medical online education reports, social media as a medical information source during

the COVID-19 pandemic is critically analyzed (6). Furthermore, the infodemics of the COVID-19 pandemic are also found among healthcare students and professionals (52). Despite these aspects, the analysis of engagement on social media networks and digital newspapers shows that good practices may find a promising scenario for the new native digital generations (46, 53, 54) and can be even foreseen as a palliative social media (55). The present report supports the emerging studies in this pandemic, showing that goal-directed social networks' engagement in health media and healthcare professionals plays an important role (6, 8, 51, 56).

The most important limitation to this work is intrinsic to the virality nature of the material and that the ethnographic analysis focused on a case study. Besides, the singularity video's virality associated with a specific scenario could also be considered a limitation. Other limitations include those related to the sources provided by the analytics of this social media, the spontaneous and voluntary-response sampling, and self-reports in the user's feedback.

In summary, this ethnographic analysis on a case study provided evidence that, under singular circumstances, a YouTube video dealing with the idea of death, a taboo topic even in its most censored forms such as disenfranchised grief presented in the children's story, was able to go viral. The quantitative and qualitative analyses identified a change in the users' profiles, engagement, and feedback. The analysis pointed to Ecuador as the geographical niche of the viral virus before the severity of the nation's pandemic scenarios was known. Engagement by non-subscribers, direct traffic sources, and mean visualization times suggested educational purposes as confirmed by the users' feedback enriched by critical thinking, referring to the cycle of life's meaning and societal mourning. The broad coverage of all age ranges and the inclusion of male gender talk favoring this virtual resource's potential and flexibility allowed an immediate switch of users' profiles responding to their vital crisis needs. Thus, the ethnography pointed at YouTube as a flexible education resource, immediately reaching diverse users and being highly sensitive to critical events. Good practices on using YouTube as a source and resource of health education can make it a promising tool for native-digital users and precedent generations. More importantly, it talks in favor of good practices in this popular social media as eligible as "palliative social media," helping to mitigate the death taboo in the current Western societies in a world devastated by the COVID-19 pandemic.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding authors.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

The present research is the result of the work of LG-L.

REFERENCES

1. Walter T. Modern death: Taboo or not taboo. *Sociology*. (1991) 25:293–310. doi: 10.1177/0038038591025002009
2. Macmillan. *No Regrets: Talking About Death* (2017).
3. Croucher K, Büster L, Dayes J, Green L, Raynsford J, Comerford Boyes L, et al. Archaeology and contemporary death: using the past to provoke, challenge and engage. *PloS one.* (2020) 15:e0244058. doi: 10.1371/journal.pone.0244058
4. Arredondo A, Casillas C. Rituals around life death in mexico; the day of the dead. In: Selin H, Rakoff R, editors. *Death Across Cultures. Science Across Cultures: The History of Non-Western Science*, *Vol 9*. Cham: Springer (2019). p. 225–42. doi: 10.1007/978-3-030-18826-9_14
5. McGrath P, Phillips E. Australian findings on Aboriginal cultural practices associated with clothing, hair, possessions, and use of name of deceased persons. *Int J Nurs Pract.* (2008) 14:57–66. doi: 10.1111/j.1440-172X.2007.00667.x
6. Samy M, Abdelmalak R, Ahmed A, Kelada M. Social media as a source of medical information during COVID-19. *Med Educ Online.* (2020) 25:1791467. doi: 10.1080/10872981.2020.1791467
7. General Medical Council Doctors use of social media (2013). Available online at: https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/doctors-use-of-social-media
8. Dutta A, Beriwal N, Van Breugel LM, Sachdeva S, Barman B, Saikia H, et al. YouTube as a source of medical and epidemiological information during COVID-19 pandemic: a cross-sectional study of content across six languages around the globe. *Cureus.* (2020) 12:e8622. doi: 10.7759/cureus.8622
9. Reeves S, Kuper A, Hodges BD. Qualitative research methodologies: ethnography. *BMJ.* (2008) 337:a1020. doi: 10.1136/bmj.a1020
10. Alvarez C. Ethnography as a research model in education [Etnografía como modelo de investigación en la educación]. *Gazeta de Antropología.* (2008) 24:10. Available online at: https://www.ugr.es/~pwlac/G24_10Carmen_Alvarez_Alvarez.html
11. Fonseca LM, Testoni I. The emergence of thanatology and current practice in death education. *Omega.* (2011) 64:157–69. doi: 10.2190/OM.64.2.d
12. Levinton D. The scope of death education. *Death Educ.* (1977) 1:41–56. doi: 10.1080/07481187708252877
13. Eddy JM, ST Pierre RW, Alles WF, Monismith SW. Death education:enhancing competence across the life span. *Health Values.* (1983) 7:29–32.
14. Gorosabel-Odriozola M, León-Mejía A. Death pre-school education: some action lines for schools/La muerte en educación infantil: algunas líneas básicas de actuación para centros escolares. *Psicol Educ.* (2016) 22:103–11. doi: 10.1016/j.pse.2016.05.001
15. Albuquerque S, Santos AR. In the same storm, but not on the same boat: children grief during the COVID-19 pandemic. *Front Psychiatry*. (2021) 12:638866. doi: 10.3389/fpsyt.2021.638866
16. Weinstock L, Dunda D, Harrington H, Nelson H. It's complicated-adolescent grief in the time of Covid-19. *Front Psychiatry.* (2021) 12:638940. doi: 10.3389/fpsyt.2021.638940
17. Schwartz LE, Howell KH, Jamison LE. Effect of time since loss on grief, resilience, and depression among bereaved emerging adults. *Death Stud.* (2018) 42:537–47. doi: 10.1080/07481187.2018.1430082

18. Wallace CL, Wladkowski SP, Gibson A, White P. Grief during the COVID-19 pandemic: considerations for palliative care providers. *J Pain Symptom Manage.* (2020) 60:e70–6. doi: 10.1016/j.jpainsymman.2020.04.012
19. Eisma MC, Tamminga A. Grief before and during the COVID-19 pandemic: multiple group comparisons. *J Pain Symptom Manage.* (2020) 60:e1–4. doi: 10.1016/j.jpainsymman.2020.10.004
20. Giménez-Llort L. Education on the cycle of life, death and grief in children in times of COVID-19. In: ASUNIVEP, editor. *Salud y cuidados durante el desarrollo. Ampliando campos de intervención*. Almeria: Asociación Universitaria de Educación y Psicología (ASUNIVEP) (2020). Available online at: https://dialnet.unirioja.es/servlet/libro?codigo=782758
21. Rieger KL, West CH, Kenny A, Chooniedass R, Demczuk L, Mitchell KM, et al. Digital storytelling as a method in health research: a systematic review protocol. *Syst Rev.* (2018) 7:41. doi: 10.1186/s13643-018-0704-y
22. Pulimeno M, Piscitelli P, Colazzo S. Children's literature to promote students' global development and wellbeing. *Health Promot Perspect.* (2020) 10:13–23. doi: 10.15171/hpp.2020.05
23. McWhorter G. *Healing Activities for Children in Grief*. Roanoke, VA: Gay McWhorter Publisher (2003).
24. Moreno Llorente C. *La muerte y el duelo a través de los cuentos*. Madrid: Editorial Kolima (2015).
25. Learning MR, Dickinson GE. *Understanding Dying, Death, and Bereavement*. Belmont, CA: Wadsworth (2010).
26. Lasher CL. *Death is No Stranger: Helping Children Grieve*. Lima, OH: CSSPublishing Company (2008).
27. Sullivan MA. The use of storytelling with grief reactions in children during the COVID-19 pandemic. *J Psychosoc Nurs Ment Health Serv.* (2021) 59:13–5. doi: 10.3928/02793695-20201015-02
28. Testoni I, Iacona E, Corso C, Pompele S, Dal Corso L, Orkibi H, et al. Psychology students' perceptions of COVID-19 in a death education course. *Front Public Health.* (2021) 9:625756. doi: 10.3389/fpubh.2021.625756
29. Strupp J, Köneke V, Rietz C, Voltz R. Perceptions of and attitudes toward death, dying, grief, and the finitude of life—a representative survey among the general public in Germany. *OMEGA.*(2019) 2019:30222819882220. doi: 10.1177/0030222819882220
30. Giménez-Llort L. *¡Vuela, Mariposa!* ¡ Lulu, editor. Washington, USA (2009).
31. Giménez-Llort L. *Fly, Butterfly! Fly!* Lulu, editor. Washington, USA (2009).
32. World Health Organization (WHO). *Statement on the Second Meeting of the International Health Regulations* 2005. Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV) (2020). Available online at: https://web.archive.org/web/20200131005904/https:/www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)
33. Abbas J, Wang D, Su Z, Ziapour A. The role of social media in the advent of COVID-19 pandemic: crisis management, mental health challenges and implications. *Risk Manage Healthc Policy.* (2021) 14:1917–32. doi: 10.2147/RMHP.S284313
34. World Health Organization (WHO). *Timeline of WHO's Response to COVID-19*. (2020). Available online at: https://www.who.int/news-room/detail/29-06-2020-covidtimeline.~
35. Eisma MC, Tamminga A, Smid GE, Boelen PA. Acute grief after deaths due to COVID-19, natural causes and unnatural causes: an empirical comparison. *J Affect Disord.* (2021) 278:w—6. doi: 10.1016/j.jad.2020.09.049
36. Kagawa-Singer M. The cultural context of death rituals and mourning practices. *Oncol Nurs Forum.* (1998) 25:1752–6.
37. Ali I. Rituals of containment: many pandemics, body politics, and social dramas during COVID-19 in Pakistan. *Front Sociol.* (2021) 6:648149. doi: 10.3389/fsoc.2021.648149
38. Bilimoria P. Hindu response to dying and death in the time of COVID-19. *Front Psychol.* (2021) 12:636384. doi: 10.3389/fpsyg.2021.636384
39. Carvalheiro AM, Faria C, Semeão I, Martinho SM. Caring for end-of-life patients and their families, during life, and mourning, in the COVID-19 era-the experience of a palliative care team in Portugal. *Front Psychiatry.* (2021) 12:624665. doi: 10.3389/fpsyt.2021.624665
40. Coppola I, Rania N, Parisi R, Lagomarsino F. Spiritual well-being and mental health during the COVID-19 pandemic in Italy. *Front Psychiatry.* (2021) 12:626944. doi: 10.3389/fpsyt.2021.626944
41. Matsuda Y, Takebayashi Y, Nakajima S, Ito M. Managing grief of bereaved families during the COVID-19 pandemic in Japan. *Front Psychiatry*. (2021) 60:e70–4. doi: 10.3389/fpsyt.2021.637237
42. Murphy M, Moret-Tatay C. Personality and attitudes confronting death awareness during the COVID-19 outbreak in Italy and Spain. *Front Psychiatry*. (2021) 12:627018. doi: 10.3389/fpsyt.2021.627018
43. Imran N, Aamer I, Sharif MI, Bodla ZH, Naveed S. Psychological burden of quarantine in children and adolescents: a rapid systematic review and proposed solutions. *Pak J Med Sci.* (2020) 36:1106–16. doi: 10.12669/pjms.36.5.3088
44. Eisma MC, Boelen PA, Lenferink LIM. Prolonged grief disorder following the Coronavirus (COVID-19) pandemic. *Psychiatry Res.* (2020) 288:113031. doi: 10.1016/j.psychres.2020.113031
45. Kokou-Kpolou CK, Fernández-Alcántara M, Cénat JM. Prolonged grief related to COVID-19 deaths: do we have to fear a steep rise in traumatic and disenfranchised griefs? *Psychol Trauma.* (2020) 12:S94–5. doi: 10.1037/tra0000798
46. Selman LE, Chamberlain C, Sowden R, Chao D, Selman D, Taubert M, et al. Sadness, despair and anger when a patient dies alone from COVID-19: a thematic content analysis of Twitter data from bereaved family members and friends. *Palliat Med*. (2021) 2021:2692163211017026. doi: 10.1177/02692163211017026
47. Brabant S, Kalich D. Who enrolls in college death education courses? a longitudinal study. *Omega.* (2008) 58:1–18. doi: 10.2190/OM.58.1.a
48. Sikstrom L, Saikaly R, Ferguson G, Mosher PJ, Bonato S, Soklaridis. S. Being there: a scoping review of grief support training in medical education. *PLoS ONE.* (2019) 14:e0224325. doi: 10.1371/journal.pone.0224325
49. Grau Rebollo J, Escribano Castaño P, Valenzuela-Garcia H, Lubbers MJ. Charities as symbolic families: ethnographic evidence from Spain. *J Organizat Ethnogr.* (2019) 8:25–41. doi: 10.1108/JOE-03-2018-0012
50. Chowdhury N, Khalid A, Turin TC. Understanding misinformation infodemic during public health emergencies due to large-scale disease outbreaks: a rapid review. *Zeitschrift fur Gesundheitswissenschaften.* (2021). doi: 10.1007/s10389-021-01565-3. [Epub ahead of print].
51. Szmuda T, Syed MT, Singh A, Ali S, Özdemir C, Słoniewski P. YouTube as a source of patient information for Coronavirus Disease (COVID-19): a content-quality and audience engagement analysis. *Rev Med Virol.* (2020) 30:e2132. doi: 10.1002/rmv.2132
52. Datta R, Yadav AK, Singh A, Datta K, Bansal A. The infodemics of COVID-19 amongst healthcare professionals in India. *Med J Armed Forces India.* (2020) 76:276–83. doi: 10.1016/j.mjafi.2020.05.009
53. Campbell IH, Rudan I. Analysis of public engagement with ten major global health topics on a social network profile and a newspaper website. *J Global Health.* (2020) 10:010902. doi: 10.7189/jogh.10.010902
54. Deeken AH, Mukhopadhyay S, Jiang XS. Social media in academics and research: 21st century tools to turbocharge education, collaboration, and dissemination of research findings. *Histopathology*. (2020) 77:688–99. doi: 10.1111/his.14196
55. Taubert M, Watts G, Boland J, Radbruch L. Palliative social media. *BMJ Support Palliat Care.* (2014) 4:13–8. doi: 10.1136/bmjspcare-2013-000584
56. Pérez-Escoda A, Jiménez-Narros C, Perlado-Lamo-de-Espinosa M, Pedrero-Esteban LM. Social networks' engagement during the COVID-19 pandemic in spain: health media vs. healthcare professionals. *Int J Environ Res Public Health.* (2020) 17:5261. doi: 10.3390/ijerph17145261

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 02 August 2021
doi: 10.3389/fpsyt.2021.619684

Conflicts Between Women's Religiosity and Sense of Free Will in the Context of Elective Abortion: A Qualitative Study in the Worst Period of Italy's COVID-19 Crisis

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OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Paula Borges Santos, Universidade Nova de Lisboa, Portugal
Benno Torgler, Queensland University of Technology, Australia

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: 20 October 2020
Accepted: 05 July 2021
Published: 02 August 2021

Citation:
Testoni I, Finco N, Keisari S, Orkibi H and Azoulay B (2021) Conflicts Between Women's Religiosity and Sense of Free Will in the Context of Elective Abortion: A Qualitative Study in the Worst Period of Italy's COVID-19 Crisis. Front. Psychiatry 12:619684. doi: 10.3389/fpsyt.2021.619684

This qualitative study considers the relationship between abortion, bereavement, and the effects of the COVID-19 lockdown nine women who had undergone an elective abortion, which is voluntarily termination of a pregnancy at the woman's request. These women were interviewed in three time points (1 month, 6 months, and 1 year after the event) to consider the possible evolution of their experience. The third phase was concurrent with the COVID-19 pandemic and particularly with Pope Francis's Easter declaration against abortion. All the interviews were conducted and analysed through qualitative research in psychology. Results showed that the abortion experience led to physical, relational, and psychological suffering, similar to perinatal grief. Participants were non-practising Catholics and religiosity did not help them to overcome their sorrow. Though religiosity is a possible resilience factor in other stressful conditions, in this case it is a factor that aggravated suffering. Finally, we discuss the difficulties experienced by Catholic women who choose to have an abortion and assert the necessity of psychological and spiritual interventions to support these women.

Keywords: abortion, grief, religion, COVID-19 pandemic, qualitative research

INTRODUCTION

Elective abortion (i.e., the voluntary termination of a pregnancy at the woman's request), is the cause of significant ideological and social controversy and may cause psychological distress for some women (1). This issue involves many countries because of ideological arguments between the pro-life and pro-women's rights perspectives. From the pro-women's rights point of view, the legalisation of abortion is considered to be an important accomplishment by the second-wave feminist movement that introduced the concept of "reproductive freedom" and advocated for abortion access as a civil right (2). In this regard, the World Health Organisation (WHO) (3) assumes the perspective of the International Conference on Population and Development (ICPD) (4), affirming that

> every individual has the right to decide freely and responsibly—without discrimination, coercion and violence—the number, spacing, and timing of their children, and to have the information and means to do so, and the right to attain the highest standard of sexual and reproductive health. The access to legal, safe and comprehensive abortion care, including post-abortion care, is essential for the attainment of the highest possible level of sexual and reproductive health.

Although in most Western countries, the legitimacy of abortion is now fairly well-established and the principle of women's self-determination is sufficiently respected, abortion is still stigmatised which may cause significant psychological distress (5–7). Some religiously oriented pro-life attitudes contribute to the spread of social hostility toward women who have elective abortions (8–11).

Scholars have widely shown that religious individuals may manage their grief and mourning more effectively than those who are not religious (12, 13). However, as indicated in the literature (14), religions are often a significant cultural factor in subordination of females. This is an important concern because, in the case of elective abortion, religion may exacerbate psychological difficulties if or when this choice causes grief and bereavement. The present qualitative study examines whether elective abortion causes grief and mourning and how religion may provide support or be detrimental to women who voluntarily have an abortion. In addition, this study discusses some implications inherent to the representation of the foetus and addresses how cultural factors may contribute to an increase in potential mourning.

THE REPRESENTATION OF THE FOETUS AS A PERSON

One of the ideological positions of the pro-life movement that may cause psychological distress to women who elect to have abortions is the representation of the foetus as a person, from which the discussion of foetal rights derives. "Fetal rights are the moral or legal rights of the human fetus under natural and civil law. This concept includes not only abortion but also any issues of maternal misbehavior that may damage the fetus" (15). Indeed, the American Convention on Human Rights (ACHR) (16) affirms that foetal right to life begins from the moment of conception, whereas the European Court of Human Rights (ECHR) (17) contends that Article 2 of the European Convention on Human Rights does not extend to abortion. However, while European law generally considers the rights of a foetus to be within the mother's rights, ACHR conventions consistently the foetus as a person (16).

Foetal rights viewpoints are influenced by religious perspectives and by the way religions conceptualise "ensoulment" (i.e., the infusion of the soul into the human body) as a sign of becoming a person. This concept is partially shared by Eastern religions and Abrahamic religions (i.e., Judaism, Christianity, and Islam), underlining how a foetus becomes a person only after ensoulment. Members of the Hindu religion, for example, believe that the beginning of personhood coincides with the occurrence of reincarnation at the moment of conception. Thus, even the earliest version of a human foetus deserves protection and respect, but priority is given to the alleviation of suffering of living adult humans (18). The Islamic religion does not provide a clear answer about the time of ensoulment related to conception. Islam respects the foetus because of its potential to grow into a human being, but it does not consider the foetus to be a person, thus distinguishing between actual life and potential life (19). Both Islam and Hinduism emphasise the need to respect and protect the respect and protect thefoetus, but these religions also maintain that abortions can be performed under risky circumstances for the mother. According to the Jewish faith, a foetus does not count as a life and has no legal status until it emerges from the mother's womb and lives for at least 30 days (20). Judaism respects the foetus, as it has the potential to become a human being, but according to this religion, the foetus is not considered a living being, and therefore, the life of the mother takes precedence. In risky situations where the mother faces a clear, life-threatening danger by continuing the pregnancy, Jewish law states that a medical abortion must be performed to save the mother's life because she is considered to be a person while the foetus, until the time of the birth, is not (21).

Regarding Christianity, the current position of the Catholic Church considers human life to begin at the time of conception. Accordingly, the Catholic Church believes that an early foetus is a person and has the same legal rights. However, this belief did not always represent the position of the Catholic Church. This issue continues to be discussed in bioethics, especially concerning artificial insemination, a practise to which the Catholic Church remains opposed (22). In this context, a prominent Catholic theologian, Thomas Aquinas, is considered fundamental. According to Aquinas, one must not confuse the "vegetative soul," which characterises all forms of living plant and animal matter, with the "rational and volitional soul," which differentiates humans from animals. As indicated in the first part of Aquinas's *Summa Theologica* (23), the rational soul has supernatural origins and is infused by God into matter, the human body (ensoulment). Accordingly, without the rational soul, a foetus is not considered to be a person and is therefore not equal. However, since the seventeenth century, the belief put forward by Aquinas was not sustained; other attitudes pervaded the Catholic belief, and this novel attitude positions the rights of a foetus equal to those of a person (20).

PSYCHOLOGICAL PROBLEMS RELATED TO THE REPRESENTATION OF THE FOETUS AS A PERSON

The literature on elective abortion is not as extensive as that on perinatal grief, and the findings are mixed (24, 25). The literature on mental health problems following an elective abortion is often contradictory (26), whereas a report by the American Psychological Association (APA) suggests that "women who are denied an abortion are more likely to initially experience higher levels of anxiety, lower life satisfaction, and lower self-esteem compared with women who received an abortion" (27). Existing

literature on potential grief following an elective abortion is scarce, and most studies indicate that the majority of women who have elective abortions do not experience significant emotional or mental health problems (28, 29). However, some scholars have identified a subgroup of women who are negatively affected by this experience (1, 24, 30–32), particularly young women (33). Scholars explored the possibility that an elective abortion has the potential to elicit a short-term grief response (34). However, this area still requires research to identify which phenomenon causes this effect and which women are at greatest risk (25). Furthermore, grief response should be acknowledged and supported (34).

In the area of research about stillbirth, literature has already discussed this as a form of natural abortion that may cause severe and complicated grief because the loss is involuntarily, and the pregnant women who want to have a child already represents the foetus as a baby (12, 13, 35, 36). The representation of the foetus as a child is at the basis of the idea that a foetus is already a person. When a being who is considered a person dies, this death may cause grief and bereavement, as in the case of stillbirth (37, 38). The representation of the embryo/foetus as a baby who is independent of the pregnant woman has been developing since the twentieth century (37, 39). As shown in existing studies on stillbirth, from the perspectives that aim to define and consider the foetus as a child, a particular sense of suffering derives.

Reproductive choice line studies have emphasised the personification of the foetus and specifically blame the social communication that assumes a *foetus-centric* position. In particular, these studies condemn the representation of women's perpetual mourning caused by the loss of their unborn children (40, 41). In this perspective, the centrality of the foetus passes through the description of grief that dominates accounts of abortion across varied and opposite narrations. As Millar underlines (42), the recurrence of foetus-centric grief throughout the media is distressing to women because the emotions convince pregnant women to be already mothers to the autonomous "children" within their wombs. Furthermore, this form of communication represents the abortion experience to be morally problematic and harmful to women (40, 41). Similarly, for Ursula Barry (43) foetus-centrism is an ideology that became pervasive in Ireland since it was assumed by the Irish Constitution in 1983. Furthermore, the Dublin Declaration on Maternal Healthcare, achieved by pro-life activists in 2012, states that abortion is never medically necessary, even to save the life of a pregnant woman (44). In Ireland, anti-abortion discourses used brutal imagery and violence of language before the legal permission under certain conditions was approved by law in 2018 (43). According to Barry (43), the social condemn causes the recourses of medical tourism (45), and underground abortion (46, 47).

The situation in Italy is somewhat similar because Catholicism maintains that life is an unassailable good and that "deliberate and direct killing, however it is carried out, of a human being in the initial phase of his existence, between conception and birth" (48) is tantamount to murder. In fact, this action is considered to be a particularly serious mortal sin (49). The effect of the Catholic Church's influence on the management of the Italian health system is apparent because, despite Law 194/1978 that officially gave Italian women the right to obtain a legal abortion in the first 3 months of pregnancy, abortion is almost impossible to obtain in public hospitals. This is because Article 9 of that same law permits the conscientious objection of medical personnel. This professional freedom has created serious obstacles to the effectiveness of how Italian women can exercise their right to abortion. In 2018, conscientious objection by gynaecologists was 69%, compared to 68.4% in 2017 (50), and Elena Caruso (51) reported several aberrant cases of medical conduct that resulted in the death of the pregnant woman. Literature (52) has also widely underlined how, as suggested by the European Committee of Social Rights (ECSR) (53), balancing women's right to health and medical personnel's right to conscientious objection results in the reduction of legal surgeries/interventions and more women finding recourse in clandestine abortions. As the United Nations (UN) Human Rights Council working group on the issue of discrimination against women in law and practise (54) emphasises, the problem of clandestine abortions is quite significant because "unsafe abortions cause the deaths of some 47,000 women each year and a further five million suffer some form of temporary or permanent disability."

From a psychological point of view, because the nature of unwanted pregnancy and subsequent abortion causes women to perceive a lack of freedom regarding the control of their lives or bodies, women often feel compelled to keep their choice a secret, or they feel delegitimized in their suffering (55). Since the right to access safe abortions is influenced by ideological arguments, the possibility of grief—even in a subgroup of women who had an elective abortion and for some reason remained affected by the social representation of the foetus as a child—is not recognised. The disenfranchisement of this possible grief is due to the fact that it is considered negative both by pro-life movements and by pro-woman line movements (56–58). The most significant problem, from a psychological point of view, is that when grief is delegitimized, it can degenerate into prolonged grief (58).

Indeed, the problem of potential grief following an elective abortion is trapped in ideological and cultural arguments between foetus rights vs. women's rights (59, 60): from a pro-life perspective, a woman who has an abortion is considered a murderer; from a pro-woman line perspective, she should not suffer because the foetus is not a person and because any potential grief is the result of the media's influence to construct the personification of the foetus.

MATERIALS AND METHODS

Context and Aims

The present study has adopted the socio-cultural perspective, starting from the report of the APA Task Force on Abortion and Mental Health (61). From this point of view, women's experiences with abortion are shaped by negative social and cultural messages; however, it would be possible to promote women's emotional well-being (1, 61). This study was born from the idea that adequate psychological support can help those who elect to have an abortion so that women can resolve their conflicts or possible grief, becoming aware of the cultural complexity that characterises the practise of abortion (62).

This study was specifically inspired by the clinical experience of researchers who had several cases of women, especially one, who suffered from complicated grief due to an elective abortion (63, 64). Subsequently, the study analysed the experiences of women who elected to have abortions and thereby understand the psychological, emotional, and relational aspects involved in their possible distress or grief. In the further conviction that it is important to consider the elaboration of grief and its complexity in elective abortion, which may be similar to the suffering caused by stillbirth, the present research paid particular attention to the nature of this possible conflict.

This research assessed participants' abortion experiences at three distinct points in time—1 month, 6 months, and 1 year following each participant's abortion—in order to examine the persistence of their potential mourning. Coincidentally, the final phase of this research occurred during the most severe period of Italy's COVID-19 lockdown. Furthermore, around that time, Pope Francis publicly condemned abortion, listing it among the worst sins in the world, along with war and arms trafficking (65). This condemnation by the Pope Francis resulted in surprise because it was a particularly difficult period, especially for women. Indeed, the lockdown conditions were exacerbating the conditions of most women, especially those who were victims of domestic violence (66–68), those who lost employment, and those who had to enlarge their commitment to their children at home. His statement seemed to contradict the attitude of his predecessor, Pope Francis, who had previously seemed more tolerant. For example, during the Jubilee of 2016, he granted all Catholic priests the authority to absolve women who had had abortions of their sins (69). The pope's declaration could have negatively affected women who were also stressed because of the lockdown.

Participants and Procedure

In line with the thematic analysis (TA) procedure (70), the study followed a qualitative research-in-psychology design that utilised in-depth interviews (71) concerning the existential and personal dimensions related to abortion. The invitation to participate in an interview was presented by the medical staff before the intervention. In 2019, roughly 600 women who received an abortion at one of three hospitals in northern and central Italy were invited to participate in the study; 21 initially agreed to participate, but only nine took part in the telephone interview. The average age of participants was 29 years ($SD = 5.40$). Six participants had no children, one had two children, and two had one child. Five participants were living in stable relationships, one was single, and three reported being in unstable relationships. Seven participants selected a pharmacological abortion (RU-486 pill) and two chose surgery. The average gestational age at the time of abortion was 5.8 weeks. All participants reported that they had received a Catholic education and that they identified as Catholic, despite not actively practising the religion.

The number of participants was small, due to the sensitivity of the issue, although it was possible to proceed because qualitative research makes no inferential or generalisation claims, so even small groups can be analysed (72–74). Because the study attempted to make sense of how women think through their lived experiences during and after their abortion and during the COVID-19 pandemic, the semi-structured interviews were conducted by Interpretative Phenomenological Analysis (IPA) (75, 76). The participants were then asked whether they felt comfortable enough to support the research and were required to sign an informed consent form before proceeding. They were also asked to confirm their consent after all the interviews. We preferred to use a qualitative methodology to track women's individual perspectives and narratives. Furthermore, intending to carry out longitudinal research, we did not want to utilise standardised tools to avoid the risk of any learning related to the questionnaires used. This may have been the reason why such a significant number of women preferred not to participate. It is unclear if we could have achieved a greater level of participation if a simple questionnaire had been presented.

The interviews were conducted in three timepoints over the course of a year: first-phase interviews occurred in April–May 2019; second-phase interviews occurred in September–October 2019; and third-phase interviews occurred in April–May 2020, when the COVID-19 outbreak was most severe in Italy. Interviews lasted about 1 h each. Interviews were audio recorded and then transcribed verbatim in Italian (75, 77).

The interviews elicited respondents' horizons of meaning, as is characteristic of IPA, and the analysis attempted to recognise the main themes that were common among interviewees rather than within each of them (78). Similarly, as in other studies that integrate two methodologies (in this case, TA and IPA) (79–81), the texts underwent an analysis to identify similarities and specificities across all the narratives (82). In this process, thematic patterns were identified using Atlas.ti software (83). The analysis performed by the interviewer and supervisor followed six fundamental phases: conducting preparatory organisation; generating categories or themes; coding data; testing emerging understanding; searching for alternative explanations; and writing up the report (70, 84). To verify the correctness of the analysis and interpretive procedures adopted by the interviewer and the supervisor, two other members of the research team worked on the texts until agreement was reached among all the researchers. Common patterns and emergent themes were identified to illustrate convergences and specificities among all participants' answers through a systematic comparison across the texts. The connexions were identified and interpreted through abstraction, which allowed the researchers to recognise the main emergent themes (85). Two of the authors jointly developed a temporary codebook using the transcripts and attempted to ground each code in the participants' narrated experiences. Together, in an iterative process, they extracted codes and identified sentences that contained a single theme. After this, the coding was organised to refine and reduce the various themes to produce inclusive main themes. All differences of opinion were resolved through discussion until the codes were agreed upon unanimously. The codes were assigned descriptive labels that were consolidated into themes, then reviewed and revised several times through discussion. Finally, a consensus was reached with additional, supervising authors. The flexibility of this approach allowed for unexpected issues to emerge from the narratives

without the use of a structured hypothesis guided by the literature (86, 87).

The research followed APA Ethical Principles of Psychologists and Code of Conduct and the principles of the Declaration of Helsinki, so participants were told in detail about all the objectives of the research and the methodology of analysis used. They were asked permission to record the conversations, to transcribe their answers, and to analyze their contents to study the phenomenon. We guaranteed to anonymize the contents of the obtained texts and only those who gave written and signed consent participated in the research. All the names cited below are fictitious, and the quotations have been slightly changed to prevent any possibility of identification of the participants. The study was approved by the Ethics Committee for Experimentation, University of Padua (n. 8F57FABE51217661765620C2987CE97C).

RESULTS

The analysis of all the texts revealed three prevalent themes. The first was "pregnancy and abortion," which distinguished the first phase and involved the following main issues: abortion as a traumatic event; abortion as liberation; guilt; forgiveness; various reasons for pharmacological abortion (maintain consciousness, less invasive, respect the embryo); various reasons for abortion in general (socioeconomic or relational reasons, or the view that motherhood is a choice); and awareness of having killed. The second prevalent theme was "the relationship with the partner in the context of loss and mourning," which characterised the second phase and involved the following main issues: conclusion of the relationship with the partner; blaming the partner; strengthening of the relationship with the partner; loss of maternal desire; and trauma when seeing the embryo. The third prevalent theme was "the COVID-19 experience in the context of the pope's declaration, fault, and avoidance," which typified the third phase and involved the following issues: COVID-19 experience and anniversary; religious crisis and failure of the pope's intervention.

All the names cited below are fictitious and the quotations have been slightly changed to prevent any possibility of identification of the participants.

First Theme: Pregnancy and Abortion

The first theme corresponded to the first phase of the research. Most of the participants described the discovery of their pregnancy as traumatic, as demonstrated by Arianna:

> It was very traumatic for me to find out that I was pregnant. Indeed, I used the morning-after pill and was convinced that I had solved the problem, and I didn't know that this kind of intervention might not work.

This was also the case for Eleonora, who used the morning-after pill, but also found that it did not work. Because she could no longer trust chemical remedies, she opted for a surgical abortion:

> Yes, it was traumatic to discover that this medical device may not work. In addition, we always used a condom and never had any problems. I don't want to have a child before marriage or before I am ready for this step.

For almost all participants, the shock was accompanied by anguish and guilt, as Franca clearly expressed:

> I experienced a period of anguish. I felt guilty from the very first moment. I was moving house and I also had to change my job. Nothing was stable in my life, and I had economic problems. Finally, I was afraid of losing my partner because I had an abortion.

Michela chose to have an abortion based on the will of her partner:

> Everything was already very difficult with my partner. When I found out that I was pregnant, I discovered that he didn't want to be a father. He doesn't even care about the child I had from a previous relationship. I didn't want to tell my future son that he has no father because his father didn't want him.

The use of the RU-486 pill helped some of the participants to manage the initial trauma of their pregnancy, as in the case of Rebecca:

> Pregnancy was traumatic because I was sterile. I perceived that I was supposed to use RU-486 because abortion was my responsibility and I had to be aware of it. I had the impression that, if I had done the surgery under anaesthesia, I would not have been conscious. I preferred to use the pill because it seemed more natural. I wanted to respect the embryo and act as if it were a natural miscarriage.

This narrative was similar to that of Sonia:

> As traumatic as it was, I always thought that the first person to decide is me, regardless of my partner. I wanted to fully undergo this experience and become aware of what it means. That's why I chose the pill instead of surgery.

Two Catholic physicians chose the same method for different reasons. Caterina chose to use the RU-486 pill because "it is a less invasive method. It creates fewer problems because it avoids anaesthesia, and you don't have to suffer all the consequences of scraping." Cristina did not experience the discovery of her pregnancy or the use of the RU-486 pill as particularly traumatic. She explained, "This experience was not particularly traumatic; the use of the pill caused a stronger, more liberating menstruation."

Contrary to Cristina, almost all the other participants found the experience of abortion to be difficult. Federica testified,

> It was all very traumatic, and I reacted very badly. I perceived every moment, from the discovery of the pregnancy to the failure of the morning-after pill to the hospital, as a terrible experience. I chose surgery because I didn't trust the pills anymore. I didn't

> want to have a child and that's why I had an abortion, but I also didn't want to have that experience.

Michela said:

> After the pill, my hands were shaking—I couldn't hold a glass of water. I spent half an hour in an empty waiting room. They left me completely alone. I was suffocating with anxiety, but also with rage. (…) I wished my partner were dead, not my son. That's the only truth.

Similarly, Rebecca said:

> When I began to feel the detachment and the first bleeding, I felt myself sinking. I realised that the pill I had taken was doing its job, and I felt that I was in an abyss. The most terrible thing was that I felt like a mother that couldn't protect the creature I was carrying due to the pill I had taken. (…) After this moment, I no longer wanted to be supported, and I wanted to continue to face the situation alone.

Arianna shared:

> The closer the day of surgery got, the more I was aware of what I was going to do because my body had changed. I felt guilty, as if I were going to kill a human being. But if I thought about it, I knew that I wasn't killing a person but an embryo. But the last few days have been very, very difficult.

Two participants saw the embryo as it was expelled. Michela reported:

> I really saw the placenta. I think it was the placenta. I saw a smooth ball altogether, and I had no more losses—apart from a few small drops. I started crying inside the bathroom. I felt terribly lonely. God might have been there, but it wouldn't have changed anything because I would have been lonely anyway.

Similarly, Cristina said, "When I expelled the embryo, a small embryo, I realised I had expelled my child. The others did not take it away from me, and this made me feel alone in front of this fact." For Caterina, the representation of "killing" was an important element of this experience:

> Unfortunately, I am in too unstable a relationship with my husband, and I didn't feel like having a third child. Too much uncertainty and too much responsibility. I am a believer, and therefore I underwent this experience knowing that I was killing my child. And now I keep thinking that I don't have my baby anymore. It would have been better to lose my husband than to lose my son. Instead, I killed my baby, and that is why he will not be with me as well. Now I often think that it's my fault; I didn't save him.

Second Theme: The Relationship With the Partner in the Context of Loss and Mourning

The experience of loss and mourning emerged in the second phase of the study. Arianna experienced an episode in which she wanted to leave her partner:

> It was his fault that I got pregnant. He could have been more careful. So, I really tried to get as far away from him as possible, and to not have sex with him anymore. After this, he helped me to overcome this feeling, and we found another way to stay together and to deal with this sorrow.

Franca's experience produced the opposite result: "There was a period before and after the operation when I didn't want to see him. I was so sorrowful that, for a while, I thought it was all over for me. Finally, I left him." For Caterina, the abortion triggered a deep mourning period because she became aware of her fatigue in managing an unstable marital life and a parallel relationship:

> I had to face the painful problem of my really unstable marital relationship, and I had to make sense of the parallel relationship with another person. Now, this storey is closed. I'm sorry for both: the abortion and the end of this storey.

Sonia also fell into a deep mourning period, which was characterised by resentment over the past:

> I began to ask myself if he could be a life partner or if it was a superficial relationship. I was dealing with an immature man, so much so that, when I told him it was over, he got angry and started screaming that he would have wanted the child. But I don't think he even thought that because he never showed any interest in my pregnancy. After I left him, I started another love storey, and my new partner and I are thinking about having a baby.

Rebecca also fell into a crisis with her partner:

> I'm very sorry for the loss of the child. I couldn't forgive my partner for what happened. I kept telling myself that, if I had had a man around me who could take responsibility, I wouldn't have felt compelled to do what I did. Now, this storey is over and I'm just alone. I don't believe in stable relationships, so I just stay that way, with my son.

For Alice, the biggest cause of mourning was the abortion's potential consequences for her future prospects of having a child:

> I didn't want to have a child at that time, but I want to have children in the future. My worry is that, since I didn't want the child when it came, he or she won't come in the future when I want to be a mother. It's a thought that has been distressing me constantly.

After the experience of seeing the foetus, Caterina and Michela felt an intense sense of guilt. Perla tried to solve it by asking God for forgiveness: "I was suffering a lot for what I had done. Finally, I went to speak to a priest who understood my problems. In

confession, I explained the whole situation to him and obtained absolution." Similarly, Michela explained:

> I also sought comfort in religion. After years of not reciting the Lord's Prayer, I began to pray during mass at a neighbourhood celebration. Then I spoke with a nun. Unfortunately, it did not help me, and my sense of guilt remained the same. I also thought about going to a psychologist. Maybe I should have done it earlier, as I can't get past this blockage. Finally, I asked the son I had aborted for forgiveness, and I hope he has forgiven me. I would like him to be well, wherever he is.

Third Theme: The COVID-19 Experience in the Context of the Pope's Declaration, Fault and Avoidance

On the contrary, the third phase of the research occurred exactly 1 year after the abortion experience, during the COVID-19 lockdown and Easter time, and straddling Pope Francis I's declaration against abortion. The experiences described are diverse in nature. Caterina suffered badly during this period because she is a doctor and had to separate herself from her two children. She often thinks back to the experience of abortion, realising how difficult it was and how difficult it is now to manage this thought together with COVID-19:

> Abortion took me away from others. Now, COVID-19 accentuates this difficult experience. It is as if I can no longer return to normal. I have all this experience of death, remembering every day what happened to me the year before. I keep thinking back to the moment I found out I was pregnant, to the decision to have an abortion, where I made the call to make the appointment... I went back voluntarily to the place where I had the abortion. I'd been there a million other times before for work, but it never really hit me. This time, I looked at it another way. I gave myself permission to remember. Obviously, all this hurts. My psychologist says I think I've committed murder. Maybe or maybe not, because I'm Catholic, but I know I did something very serious. Even if I had the right, I can't pretend it didn't happen.

Although Cristina is a non-observant Catholic, she judges the pope's intervention as unsuccessful:

> It is not fair to absolutize this. I really disagree. Women must be left free to choose. It is not fair to compare abortion to murder, to the sale of weapons, to the violence of war. It is universally right to urge men not to kill, but abortion cannot be compared to it. Indeed, I agree that one should not abort lightly, but I did not kill a man with a gun. An agglomeration of cells cannot be compared to a sentient, conscious, living human being. For me, it was a matter of choosing life—my life—and in similar situations we must leave the woman free to choose.

Rebecca also underwent the COVID period remembering each day what had happened the year before:

> COVID's nightmare came exactly 1 year after my abortion. Everything became more difficult because of the pandemic, and I inevitably thought that, if I had carried on with my pregnancy, I would have found myself in unmanageable conditions. I have had to face serious practical and economic problems and also loneliness. If I had not made that choice, I would have found myself even more lonely, facing enormous responsibilities without any help. (…) I'm Catholic, and the fact that the pope compares me to warmongers, to murderers and to those who sell weapons baffles me. Although I'm pained by the choice I made, and although I consider it to not be a good thing, I certainly don't think I can be associated with an assassin, someone who kills people for money. The pope's way of thinking is not Christian, it is Catholic. It is a way of thinking that does not enter into the lives of women and their worries. I agree that abortion is horrible, that it is an act against nature, but the women who chose abortion must be supported and understood, not condemned as assassins.

Sonia handled the issue of abortion more thoroughly with her new partner:

> During pandemic, the time spent living with my new partner has increased. We've had more time to be together and even to sit at the table, facing each other, in order to talk about important personal things, and this is important. It occurred to me (that) it was the anniversary. During the lockdown, I had time to rethink that whole experience. It's not right to inflame the matter like the pope did.

Arianna dreamt of the child she could have had if she hadn't had an abortion:

> Once I dreamt that I was in a situation where there was an already-big baby that I was raising as my own, but he wasn't mine. I thought that the child was growing up in another dimension that we don't know, where we go after death. I don't think it's "heaven," but I hope it's a place where we're going to be good anyway.

Similarly, Cristina said, "He still exists somewhere and is preparing to be born again in the future. I think it is a person who will come here at another time." Alice, however, is uncertain: "I am a Christian, and I believe that my religion says that children go to heaven, but this was nothing more than an embryo. I don't know what an embryo is and what existence it can have in heaven."

In Arianna's opinion, the best way to overcome the trauma is to eradicate it from her mind:

> My mind wanted to eliminate this experience (as this is), the best way to do it and prevent me from thinking about it, because it is painful. I didn't want to talk about it with anyone. I asked something to a woman who had had the same experience to understand if my body's reactions were normal. She was the only person I talked to.

Eleonora shared a similar perspective:

> Even though I needed to talk about it, I didn't, and I faced this experience alone, without talking about it with anyone. I tried to close up, to not follow the saddest thoughts, and now I no longer feel the need to confide in someone.

The avoidance of abortion-related thoughts and memories was even more explicit for Michela: "I forced myself to not think about it anymore, to erase all this pain. I have rejected everything that has happened to me. I don't even remember what happened or why I did that." Rebecca said:

> I don't tell anyone about it. I try to get through it all by myself, and I realise that I'm getting loaded with so many things to avoid thinking about it because this thought still makes me suffer a lot.

Similarly, Sonia said, "I avoid talking about it now, even with my closest friends. I'd like to erase everything from my brain, remove all this experience."

DISCUSSION

Our results are in line with the existing literature on women's reasons for having an abortion. For example, similar to what by Littman, Zarcadoolas, and Jacobs (62) described, "women make hard choices about pregnancy and abortion because they care about raising children well," assumed that "women have abortions because they need to take care of the children they already have. …Some women feel that by having an abortion now, they will be in a better place to raise children in the future …Sometimes, abortion is the best option we have to protect the long-term health and well-being of ourselves, our families, and our future families" (62). These results are also in line with those of a study conducted by Aléx and Hammarström (88), involving five women, and using a similar research design, in which the experiences of abortion related to financial problems, being too young, and an insecure partnership.

However, unlike all literature that describes abortion as an unproblematic experience, the narrative paths of our participants took three different trajectories: a positive path for one participant, a permanently negative trajectory for five participants, and one worsening path for three participants. Arianna was the only participant who demonstrated a progressive path of improvement and an exit from the initial negative experience. The crisis of her first interview evolved positively in the second, and her third interview indicated that the pope's announcement caused no negative effects. Unlike Arianna, however, Michela, Caterina, and Rebecca maintained a substantial negativity throughout the meetings. Furthermore, for Caterina and Rebecca, the pope's speech worsened their discomfort. Indeed, the reactions to the pope's condemnation were different. In fact, Sonia and Cristina took a strongly critical stance that distanced them from the Church's position. If religiosity is a protective factor for the management of suffering, especially concerning death and mourning, the evolution of Sonia and Cristina must also be considered in some way pejorative. During the first two interviews, the topic of religion was managed in a soft way as not to generate discomfort in the participants. Their answers regarding the topic of religiosity were elusive. On these occasions, all participants stated that they had received a Catholic education and considered themselves generally Catholic but were not practising or actively involved in a parish. In the third interview, the religious issue was unavoidable and also negative. Only one participant, Marzia, became a practising Catholic to resolve her sense of fault and loneliness.

The negative aspects of the abortion experience are multiple, oscillating between trauma, an ambivalent sense of liberation, and a sense of fault, loneliness, and failure.

In the first interview, it was clear that, as with other instances described in the literature (89), our participants found the discovery of their pregnancy to be traumatic, and they portrayed it as an event that made everything uncertain. All reasons for electing to have an abortion involved the restoration of equilibrium, which, in nearly all cases, had been compromised before their respective pregnancies on both the socioeconomic and emotional/family levels. Similar to the results described by Kero and Lalos (90) and Aléx and Hammarström (88), the women's experiences were ambivalent: distressing on one side and liberating on the other. The concept of ambivalence implies a "both-and" rather than an "either-or" process and content (91). In social psychology, ambivalence is described as an attitude that can contain separate positive and negative components (92, 93). Indeed, our participants were ambivalent because they expressed relief while simultaneously experiencing the termination of the pregnancy as a loss that elicited negative feelings of grief. However, despite their suffering, the participants' respective abortions led to increased self-awareness. Thus, this ambivalence can be regarded as not only problematic but also indictive of an openness to the complexity of the abortion issue from a moral point of view. Indeed, participants invoked the principle of self-determination and recognised that it was linked to their freedom (55).

It is important to not underestimate the distress related to this profound ambivalence. Multiple factors caused the negativity of the experience. Among them was the indifference of health-care personnel during the abortion experience, which plunged the participants into strong estrangement experiences, exacerbating the stress accumulated in the pre-abortion phase. Also, for participants who used the abortion pill, the sight of the embryo was highly traumatic. This is perhaps inevitable considering the social representation of the foetus as a child that characterises the Italian culture. The participants reported three primary reasons for choosing a pharmacological abortion: to maintain consciousness, respect the embryo, and select a less invasive method. For some participants, this experience was particularly painful, so much so that Arianna concluded that surgery would have been preferable. There are discrepancies in the literature on this subject. Some researchers argue that pharmacological abortion is not related to psychological distress (94), while other authors claim that trauma can be sustained when women see the aborted embryo (95), as demonstrated in Caterina and Michela's experiences.

Nonetheless, the participants in this study ultimately and consistently characterised their outcomes as liberating. Still, this did not prevent the experience of grief and mourning, especially because of a lack of social support. Previous literature has highlighted how important it is for women in this situation to receive positive support (96). However, this often does not happen because women feel too guilty and ashamed of their

conditions to seek support (97). This kind of grief may lead to perinatal suffering, as it fails to neatly adhere to cultural grieving expectations that determine whether and how the suffering of individuals is acknowledged. As illustrated in both literature and the results of our study, abortion precipitates the deterioration of both the source relationship with the partner and, by extension, one's relationship with oneself. Thus, women require psychological support to process the experience as a whole and to manage the resulting suffering (28).

The coinciding religious condemnation of abortion by Pope Francis, which was associated with feelings of guilt, shame, and a lack of social support, likely contributed to the women's avoidance of painful thoughts related to the traumatic experience. All of these feelings certainly contributed to worsening relationships between participants and their partners, which in some cases resulted in the termination of the relationship. Furthermore, the Church's intransigent position on abortion caused participants to experience additional trauma based on religious stigma and the pope's explicit rejection.

From these narratives, we learned that the experience of loss was traumatic for our participants and that the mourning process stimulated a desire to quell related thoughts and feelings of pain, shame, and guilt, given the impossibility of finding social support. This strategy essentially entails a suspension of suffering through processes of removal and negation. Neimeyer points out that overcoming trauma requires a deep awareness of what has been suffered (98), which is achieved by thoroughly reconstructing the existential meanings of the experience of loss (99, 100). Because this awareness was inaccessible to the participants during this study, they seemed more vulnerable to the effects of COVID-19 and the discourse caused by the pope's announcement. The pope's denunciation may have further distanced the participants from any form of support and from a resolution to their mourning. Participants blamed the pope for his unwillingness to understand their situation while also asserting that abortion is a sin. Based on the pope's statement, the Catholic Church does not allow any mediation between these two elements, resulting in a cognitive dissonance from which Catholic women cannot free themselves except through denial and removal. These particular narratives help to understand how previous clinical cases that authors encountered could have developed prolonged and unresolved grief. Catholic women who choose abortion may be particularly susceptible to self-blame, and this suffering may persist in the future, even after many years (16, 101). Though religiosity can greatly assist those who endure the pain of loss and trauma (63, 102), in this case, the pain embodies an additional trauma—that is, feeling rejected by the religion to which one is devoted. As evidenced in the literature, this experience is similar to that of divorced Catholic individuals (103) and of Jehovah's Witnesses who broke away from their original group (104). All of these religious people suffer from cumulative ostracism which generates great psychological distress because of a series of rapid losses. For example, within the couple, there can be the loss of individual identity and the loss of partner support; however, within the religious group, there can be the loss of social identity derived from the religious affiliation, the loss of group support, and for some, even the loss of faith. Thus, the women in this study required support to manage both the trauma of abortion and the trauma of religious rejection. The study of Kero and Lalos (90) confirms that social perspectives legitimise the decision to have an abortion, while ethical perspectives complicate that decision. In such a milieu, feelings of guilt and psychological distress inevitably derive.

The existing psychological literature, in line with the APA indications (61, 105), shows that it is possible to intervene, to offer a positive process of such an experience, giving it meaning. As argued extensively in the National Academy of Medicine report (106), it is possible to ensure that women receive adequate support before and after an abortion and, if engagement is positive, the supportive relationship has a greater chance of effectiveness because women trust the health service. In particular, the intervention of Littman et al. (62) demonstrated that it is possible to introduce women to a "culture of support" by providing them with a positive framing of their experiences. The authors provided validation and information about available support services to sustain women in the reproductive choices they had made and informed women about the services and sources that provided misinformation.

As the UN (54) asserted, it is not by criminalising abortion that its incidence is reduced.

There are no sufficient studies regarding support for the spiritual elaboration of the abortion when it might be experienced. The unique research on this issue by Layer and collaborators (32) showed that in the subgroup of women who had post-abortion grief, characterised by shame and post-traumatic stress disorder (PTSD), a spiritually based group intervention could help to mitigate the negative effects. Indeed, post-intervention measures indicated decreases in shame and PTSD symptoms, and religious motivation was the basis of this activity's participation. An intervention such as this should elaborate upon the difficulties that emerge from the representation of the embryo as a person that perpetuates the perception of having killed a child.

The study of Inglehart (107) shows that from 2007 to 2020, an overwhelming majority of countries became less religious. This decline in belief was the strongest in high-income countries. Inglehart outlines the reasons why this religious decline has been so sudden and systematic throughout most of the world. The most powerful factor that causes this decline in religiousness is closely related to the imperative of maintaining high birth rates. In the past, most societies assigned women the role of producing as many children as possible. While this societal role primarily discouraged abortion, it was also intended to discourage divorce, homosexuality, contraception, or any other sexual behaviour not intended for purposes of reproduction. In the opinion of Inglehart (107), all major religions, including Catholicism, encourage high fertility in periods of high infant mortality and low life expectancy, presenting pro-fertility norms as an absolute and attributing them to the will of God. Throughout history, religions that did not promote the high birth rate as a value gradually disappeared because of the extinction of their followers due to infant mortality and low life expectancy. At present, a higher quality of life and the discoveries of medicine have drastically modified the situation, making these traditional

cultural norms no longer necessary. In societies that reach a sufficiently high level of economic and physical security, younger generations have grown up abandoning the norms regarding fertility and the ideologies that absolutize them. The seventh wave of the World Values Survey (WVS) (108), which took place in 2017–2021, indicated that in those countries, secular-rational values are contrary to traditional values and that these societies place less emphasis on religion, traditional family values, and authority. Divorce, abortion, euthanasia, and suicide are seen as relatively acceptable. In this way, cultural representations and attitudes toward gender equality, divorce, abortion, and homosexuality are now rapidly changing.

The situation is the same in Italy (109). Regarding abortion, only 23% of the sample interviewed in WVS-7 considered this choice "never justifiable," while in WVS-5/2005–2009 (110), the figure was 40%. Similarly, religion resulted in responses of "very important" in WVS-7 (109) from 23% of the sample, while that figure was 34% in WVS-5 (110).

What we want to emphasise here is that religions risk losing credibility because of this issue of not allowing people access to the substantive idea, which is now much more important than reproductive instances; that is, the mourning implied regarding death and the suffering. On the other hand, it is undeniable that literature on abortion may be biassed to some degree by the different ideologies that drive research on the subject. Given the ongoing conflict surrounding abortion, continuing and future research must reflect more widely on the multiple perspectives that inform this issue (111). Moreover, this field still requires more specific research to guarantee better support for women who suffer from this potential and specific form of grief.

CONCLUSION

This study confirms that elective abortion may be a traumatic experience that has very negative repercussions for affected women's psychological, physical, and relational well-being. All areas of psychological life are affected, and this suffering may become in some cases very similar to perinatal grief. However, abortion-related grief differs from perinatal mourning with respect to the strong moral-religious connotations attached to this event, which make affected women feel guilty and socially isolated. The participants in this study perceived the pope's public condemnation of abortion during the Easter Vigil—in the worst period of Italy's COVID crisis—as disproportionate to the reality of abortion, and they interpreted it as a testimony of the Church's non-acceptance of their needs and difficulties. Clearly, it is necessary to improve appropriate counselling resources for women who undergo a similar experience, as religiously derived moral guilt and social disenfranchisement may facilitate the future onset of prolonged grief disorder, especially in Italy, where religious attitudes are especially pronounced.

STUDY LIMITATIONS AND FUTURE DIRECTIONS

Although the study demonstrates the need to make sense of the abortion experience and addresses a serious lack of research and literature on the associated form of grief, the limitations of this research are numerous.

One limitation is the small number of participants. Given the strong condemnation of abortion that persists in Italy, many women decline the opportunity to discuss their experiences. In this article, it may seem that the condemnation of abortion by the Catholic Church is the main reason why women who make this choice are stigmatised. Obviously, this is not always the case, as literature has shown (11, 112), even if in Italy, Catholic culture has a strong influence on both political and cultural life. Although many women were contacted, only nine were interviewed. Therefore, it is likely that a complete account of the phenomenon investigated here cannot be achieved through this small number of participants. What characterised the group may have been the need to give meaning to the abortion experience, and the women who did not respond to the invitation may not have had this need. Thus, it is conceivable that the group of participants was not representative not only because of the small sample size but also because of the specific motivation to participate in this research. Indeed, it was not possible to control the entire process of participant selection and to start with engagement that accounted for reasons why women participated. Future research could begin this process through an invitation during a counselling session in the pre-abortion phase. In our case, only the participants showed that they could or would talk about their abortion experience, and the interview was probably a surrogate for another type of need that could have been handled with a counselling intervention.

Moreover, to avoid making the participants suffer too much, the possible relationship between guilt and religious belief has not been sufficiently investigated. However, future research could focus on this issue and then find suitable strategies to reduce any risk of stress for the participants. A more specific analysis could address the experiences of shame and insecurity related to social desirability. This type of future investigation, which was not carried out in this study, should therefore consider participants' cultural context. The researcher should determine the extent to which their contexts influence the social representations of the role of women and if they are rooted in a religious sense and not only with respect to Christian religions. In fact, the limitations of this study are also related to the fact that women's histories change, and the way their roles are represented also changes according to different contexts. Future research, therefore, will need to focus in greater detail on the analysis of the relationship between the individual, the social context, and the religious culture of reference.

A quantitative multicenter study could also be carried out with measurement scales focused on these issues to be administered to randomised groups throughout the country to verify how some variables such as guilt and stress can change depending on the context of reference. Further future studies could include quantitative and longitudinal surveys to cheque any possible changes in the relationships between religiosity, social desirability, PTSD, and grief in a randomised control trial. This requires employing a more participatory design, thus increasing women's motivation to participate by allowing them to better understand the study's purpose and the usefulness of elaborating abortion-related feelings. The findings highlight the need for

future intervention studies on this topic, which could employ experiential approaches such as psychodrama and arts therapies (113–116) to help participants further process their loss and foster their empowerment.

From the point of view of future perspectives of clinical and psychosocial intervention, the present study suggests that counselling and support services should be provided and activated, capable of not imposing a specific ideology in order to free women from guilt, even when they are Catholic. This type of counselling serves to protect the quality of their lives and to allow them to maintain a deep and positive relationship with their spirituality, since this is a very important aspect for all people, especially when they must face difficulties, illness, and death.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethical Committee for the Psychological Research of the University of Padova. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

IT: research design and project planning, supervision of the research, analysis of the texts, methodology, and article writing. NF: project planning, interviews, analysis of the texts, and article writing. SK, HO, and BA: article writing. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

The authors acknowledge Dr. Mirella Parachini Pannella.

REFERENCES

1. Major B, Appelbaum M, Beckman L, Dutton MA, Russo NF, West C. Abortion and mental health: evaluating the evidence. *Amer Psychol.* (2009). 64:863–90. doi: 10.1037/a0017497
2. Smyth L. Feminism and abortion politics. *Womens Stud Int Forum.* (2002) 25:335–45. doi: 10.1016/S0277-5395(02)00256-X
3. World Health Organization. Abortion. *WHO* (2019, October 11). Available online at: https://www.who.int/health-topics/abortion#tab=tab_1 (accessed May 11, 2021).
4. *International Conference on Population and Development (ICPD)*. Available online at: https://www.unfpa.org/events/international-conference-population-and-development-icpd (accessed May 11, 2021).
5. Pacilli MG, Giovannelli I, Spaccatini F, Vaes J, Barbaranelli C. Elective abortion predicts the dehumanization of women and men through the mediation of moral outrage. *Soc Psychol.* (2018) 49:287–302. doi: 10.1027/1864-9335/a000351
6. Hanschmidt F, Treml J, Klingner J, Stepan H, Kersting A. Stigma in the context of pregnancy termination after diagnosis of fetal anomaly: associations with grief, trauma, and depression. *Arch Womens Ment Health.* (2018) 21:391–9. doi: 10.1007/s00737-017-0807-9
7. Kumar A. Everything is not abortion stigma. *Women's Health Issues.* (2013) 23:e329–31. doi: 10.1016/j.whi.2013.09.001
8. Cannold L. Understanding and responding to anti-choice women-centred strategies. *Reprod Health Matters.* (2002) 10:171–9. doi: 10.1016/S0968-8080(02)00011-3
9. Mauro D, Joffe C. The religious right and the reshaping of sexual policy: an examination of reproductive rights and sexuality education. *Sex Res Soc Policy*. (2007). 4:67–92. doi: 10.1525/srsp.2007.4.1.67
10. Kulczycki A. Ethics, ideology, and reproductive health policy in the United States. *Stud Fam Plann.* (2007) 38:333–51. doi: 10.1111/j.1728-4465.2007.00145.x
11. Kumar A, Hessini L, Mitchell EMH. Conceptualising abortion stigma. *Cult Health Sex.* (2009) 11:625–39. doi: 10.1080/13691050902842741
12. Pereira MUL, Gonçalves LLM, Loyola CMD, da Anunciação PS, da Silva Dias R, Reis IN, et al. Communication of death and grief support to the women who have lost a newborn child. *Rev Paul Pediatr.* (2018) 36:422–7. doi: 10.1590/1984-0462/;2018;36;4;00013
13. Burke LA, Neimeyer RA, Holland JM, Dennard S, Oliver L, Shear MK. Inventory of complicated spiritual grief: development and validation of a new measure. *Death Stud.* (2014) 38:239–50. doi: 10.1080/07481187.2013.810098
14. Brown JC, Bohn CR. *Christianity, Patriarchy, and Abuse: A Feminist Critique*. New York, NY: Pilgrim. (1989).
15. Linder EN. *Punishing Prenatal Alcohol Abuse: The Problems Inherent in Utilizing Civil Commitment to Address Addiction*. University of Illinois Law Review. (2005). p. 873–902.
16. Paul A. Controversial conceptions: the unborn and the American convention on human rights. *Loy U Chic Int Law Rev.* (2012) 9:209–48.
17. *European Court Of Human Right (ECHR) Guide on Article 2 of the European Convention on Human Rights*. (2020). Available online at: https://www.echr.coe.int/Documents/Guide_Art_2_ ENG.pdf (accessed May 11, 2021).
18. Sivaraman MAF, Noor SNM. Ethics of embryonic stem cell research according to Buddhist, Hindu, Catholic, and Islamic religions: perspective from Malaysia. *Asian Biomed.* (2014) 8:43–52. doi: 10.5372/1905-7415.0801.260
19. Opoku JK, Manu E. The status of the human embryo: an analysis from the Christian and Islamic viewpoints. *Eur J Biol Med Sci Res.* (2015) 3:24–60.
20. Neaves W. The status of the human embryo in various religions. *Development.* (2017) 144:2541–3. doi: 10.1242/dev.151886
21. Feldman P. Sexuality, birth control and childbirth in orthodox Jewish tradition. *CMAJ.* (1992) 146:29–33.
22. Koch-Hershenov R. Totipotency, twinning, and ensoulment at fertilization. *J Med Philos.* (2006) 31:139–64. doi: 10.1080/03605310600588673
23. Aquinas T. *Summa Theologiae (Engl Transl)*. New York, NY: Benzinger Brothers (1948).
24. Fergusson DM, Horwood LJ, Ridder EM. Abortion in young women and subsequent mental health. *J Child Psychol Psychiatry.* (2006) 47:16–24. doi: 10.1111/j.1469-7610.2005.01538.x
25. Fergusson DM, Boden JM, Horwood LJ. Abortion among young women and subsequent life outcomes. *Perspect Sex Reprod Health.* (2007). 39:6–12. doi: 10.1363/3900607
26. Jacob L, Gerhard C, Kostev K, Kalder M. Association between induced abortion, spontaneous abortion, and infertility respectively and the risk of psychiatric disorders in 57,770 women followed in gynecological practices in Germany. *J Affect Disord.* (2019) 251:107–13. doi: 10.1016/j.jad.2019.03.060
27. American Psychological Association. *Abortion and Mental Health*. Available online at: https://www.apa.org/pi/women/programs/abortion (accessed May 11, 2021).
28. Kero A, Högberg U, Lalos A. Wellbeing and mental growth-long-term effects of legal abortion. *Soc Sci Med.* (2004) 58:2559–69. doi: 10.1016/j.socscimed.2003.09.004
29. van Ditzhuijzen J. ten Have M, de Graaf R, Lugtig P, van Nijnatten CHCJ, Vollebergh WAM. Incidence and recurrence of common mental disorders after abortion: Results from a prospective cohort study. *J Psychiatr Res.* (2017) 84:200–6. doi: 10.1016/j.jpsychires.2016.10.006

30. Testoni I, Bregoli J, Pompele S, Maccarini A. Social support in perinatal grief and mothers' continuing bonds: a qualitative study with Italian mourners. *Affilia.* (2020) 35:485–502. doi: 10.1177/0886109920906784
31. Ney PG, Fung T, Wickett AR, Beaman-Dodd C. The effects of pregnancy loss on women's health. *Soc Sci Med*. (1994). 38:1193–200. doi: 10.1016/0277-9536(94)90184-8
32. Layer SD, Roberts C, Wild K, Walters J. Postabortion grief: evaluating the possible efficacy of a spiritual group intervention. *Res Soc Work Pract*. (2004). 14:344–50. doi: 10.1177/1049731504265829
33. Pedersen W. Abortion and depression: a population-based longitudinal study of young women. *Scand J Publ Health*. (2008). 36:424–8. doi: 10.1177/1403494807088449
34. Williams GB. Short-term grief after an elective abortion. *J Obstetr Gynecol Neonatal Nurs.* (2001) 30:174–83. doi: 10.1111/j.1552-6909.2001.tb01533.x
35. Burden C, Bradley S, Storey C, Ellis A, Heazell AEP, Downe S, et al. From grief, guilt pain and stigma to hope and pride - a systematic review and meta-analysis of mixed-method research of the psychosocial impact of stillbirth. *BMC Pregnancy Child Birth.* (2016) 16:9. doi: 10.1186/s12884-016-0800-8
36. Turton P, Hughes P, Fonagy P, Fainman D. An investigation into the possible overlap between PTSD and unresolved responses following stillbirth: an absence of linkage with only unresolved status predicting infant disorganization. *Attach Hum Dev*. (2004). 6:241–53; discussion 255–61. doi: 10.1080/14616730412331281575
37. Verdaguer M. Mothering cancer: maternal subjectivity and the status of the fetus in a case of cervical ectopic pregnancy. *Womens Stud Int Forum.* (2019) 74:27–34. doi: 10.1016/j.wsif.2019.02.008
38. Engel J. Still Here: Miscarriage and the ontology of the silent cradle. *Cult Stud Crit Methodol.* (2020) 20:16–25. doi: 10.1177/1532708619885405
39. Boltanski L. *The Foetal Condition: A Sociology of Engendering and Abortion*. Oxford: Polity Press. (2013).
40. Baird B, Millar E. More than stigma: interrogating counter narratives of abortion. *Sexualities.* (2019) 22:1110–26. doi: 10.1177/1363460718782966
41. Baird B, Millar E. Abortion at the edges: politics, practices, performances. *Womens Stud Int Forum.* (2020) 80:102372. doi: 10.1016/j.wsif.2020.102372
42. Millar E. Mourned choices and grievable lives: the anti-abortion movement's influence in defining the abortion experience in Australia since the 1960s: defining the abortion experience in Australia. *Gend Hist.* (2016) 28:501–19. doi: 10.1111/1468-0424.12220
43. Barry U. Discourses on foetal rights and women's embodiment. In: Quality A, Conlon C, Kennedy S, editors. *The Abortion Papers Ireland: Vol. 2*. Cork: Cork University Press (2015). p. 1-7.
44. Morgan LM. The Dublin Declaration on maternal health care and anti-abortion activism: examples from Latin America. *Health Hum Rights.* (2017) 19:41–53.
45. Sethna C, Doull M. Accidental tourists: Canadian women, abortion tourism, and travel. *Womens Stud.* (2012) 41:457–75. doi: 10.1080/00497878.2012.663260
46. Calkin S. Transnational abortion pill flows and the political geography of abortion in Ireland. *Territ Politic Gov.* (2021) 9:163–79. doi: 10.1080/21622671.2019.1704854
47. Human Rights Watch. *A State of Isolation: Access to Abortion for Women in Ireland*. Washington, DC: Human Rights Watch (2010).
48. Paul J II. *Evangelium Vitae*. (1995). Available online at: http://www.vatican.va/content/john-paul-ii/it/encyclicals/documents/hf_jp-ii_enc_25031995_evangelium-vitae.html (accessed May 11, 2021).
49. Paul PJ II. *Instruction Dignitas Personae on Certain Bioethical Questions, Congregation for the Doctrine of the Faith*. Vatican (2008). Available online at: https://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20081208_dignitas-personae_en.html (accessed May 11, 2021).
50. Ministero della Salute. *Relazione Ministro Salute Attuazione Legge 194/78 Tutela Sociale Maternità e Interruzione Volontaria di Gravidanza - Dati*. (2018). Available online at: http://www.salute.gov.it/portale/documentazione/p6_2_2_1.jsp?lingua=italiano&id=2924 (accessed May 11, 2021).
51. Caruso E. Abortion in Italy: forty years on. *Fem Leg Stud.* (2020) 28:87–96. doi: 10.1007/s10691-019-09419-w
52. Caruso E. The ambivalence of law: some observations on the denial of access to abortion services in Italy. *Fem Rev*. (2020) 124:183–391. doi: 10.1177/0141778919894965
53. European Committee of Social Rights (ECSR). *Follow-up to Decisions on the Merits of Collective Complaints – Findings*. Strasbourg Cedex: ECSR (2018). Available online at: https://rm.coe.int/findings-2018-on-collective-complaints/168091f0c7
54. *Access to Legal Abortion Services Needed, to Prevent 47,000 Women Dying Each Year - UN Rights Experts*. Available online at: https://news.un.org/en/story/2018/09/1021332 (accessed May 11, 2021).
55. Furedi A. *The Moral Case for Abortion. 1st ed.* Basingstoke: Palgrave Macmillan UK (2016). doi: 10.1057/978-1-137-41119-8_1
56. Siller H, Hochleitner M. Abortion as one aspect of Women's Health. *Health Care Women Int.* (2017) 38:907–12. doi: 10.1080/07399332.2017.1345561
57. Doka KJ. *Disenfranchised Grief: Recognizing Hidden Sorrow*. Lexington: Lexington Books/DC Heath and Com (1989).
58. Doka KJ. *Disenfranchised Grief: New Directions, Challenges, and Strategies for Practice.* Champaign, IL: Research Press (2001).
59. Lowe P. *Reproductive Health and Maternal Sacrifice*. London: Springer. (2006).
60. Testoni, I. Essentialism between social psychology and gender studies: Italian paradoxes in the discus-sion on difference. (Essenzialismo tra psicologia sociale e studi di genere: paradossi italiani intorno alla diffe-renza). *Psicol Soc*. (2012). 7:285–9. doi: 10.1482/37699
61. Major B, Appelbaum M, Beckman L, Dutton M, Russo, NF, West C. *Report of the APA Task Force on Mental Health and Abortion*. (2008). Available online at: http://www.apa.org/releases/abortion-report.pdf (accessed May 11, 2021).
62. Littman LL, Zarcadoolas C, Jacobs AR. Introducing abortion patients to a culture of support: a pilot study. *Arch Womens Ment Health.* (2009) 12:419–31. doi: 10.1007/s00737-009-0095-0
63. Testoni I. Psicologia del lutto e del morire: dal lavoro clinico alla death education. *Psicoter Sci.* (2016) (2):229–52. doi: 10.3280/PU2016-002004
64. Prigerson HG, Horowitz MJ, Jacobs SC, Parkes CM, Aslan M, Goodkin K, et al. Prolonged grief disorder: psychometric validation of criteria proposed for DSM-V and ICD-11. *PLoS Med.* (2009) 6:e1000121. doi: 10.1371/journal.pmed.1000121
65. Pope Francis. *Veglia Pasquale nella Notte Santa.* Vatican.va (2020). Available online at: http://www.vatican.va/content/francesco/it/homilies/2020/documents/papa-francesco_20200411_omelia-vegliapasquale.html (accessed May 11, 2021).
66. Bradbury-Jones C, Isham L. The pandemic paradox: the consequences of COVID-19 on domestic violence. *J Clin Nurs.* (2020) 29:2047–9. doi: 10.1111/jocn.15296
67. Taub A. A new covid-19 crisis: domestic abuse rises worldwide. *The New York times*. (2020). Available online at: https://www.nytimes.com/2020/04/06/world/coronavirus-domestic-violence.html (accessed May 11, 2021).
68. Istat. *Violenza di Genere al Tempo del Covid-19: Le Chiamate al Numero Verde*. (1522). Roma: Istat (2020).
69. Pope Francis. *Lettera del Santo Padre Con la Quale si Concede l'indulgenza in Occasione del Giubileo Straordinario della Misericordia*. (2015). Available online at:http://www.vatican.va/content/francesco/it/letters/2015/documents/papa-francesco_20150901_lettera-indulgenza-giubileo-misericordia.html.t (accessed May 12, 2021).
70. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol.* (2006) 3:77–101. doi: 10.1191/1478088706qp063oa
71. Camic PM. *Qualitative Research in Psychology: Expanding Perspectives in Methodology and Design.* Washington, DC: American Psychological Association. (2003). doi: 10.1037/10595-000
72. Denzin NK, Lincoln YS, editors. *The SAGE Handbook of Qualitative Research, 5th ed.* Thousand Oaks, CA: SAGE Publications (2017).
73. Guest G, Bunce A. Johnson L. How many interviews are enough?: an experiment with data saturation and variability. *Field Methods.* (2006) 18:59–82. doi: 10.1177/1525822X05279903
74. Marshall C, Rossman GB. *Designing Qualitative Research, 3rd ed*. Newbury Park, CA: Sage Publications, Inc (1999).
75. Smith JA, Osborn M. Interpretative phenomenological analysis. In: *Doing Social Psychology Research*. Oxford, UK: The British

Psychological Society and Blackwell Publishing Ltd; (2008). p. 229–54. doi: 10.1002/9780470776278.ch10
76. Pietkiewicz I, Smith JA. A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Czasop Psychol Psychol J.* (2014) 20:7. doi: 10.14691/CPPJ.20.1.7
77. Smith JA. Beyond the divide between cognition and discourse: using interpretative phenomenological analysis in health psychology. *Psychol Health.* (1996) 11:261–71. doi: 10.1080/08870449608400256
78. Larkin M, Watts S, Clifton E. Giving voice and making sense in interpretative phenomenological analysis. *Qual Res Psychol.* (2006) 3:102–20. doi: 10.1191/1478088706qp062oa
79. Danivas V, Bharmal M, Keenan P, Jones S, Karat SC, Kalyanaraman K, et al. Erratum to: An interpretative phenomenological analysis (IPA) of coercion towards community dwelling older adults with dementia: findings from Mysore studies of natal effects on ageing and health (MYNAH). *Soc Psychiatry Psychiatr Epidemiol.* (2016) 51:1665. doi: 10.1007/s00127-016-1305-5
80. Brooks J, King N, Thompson A. Using interpretative phenomenological analysis in conjunction with the think aloud technique to examine experience of living with disfiguring conditions with a view to developing psychosocial interventions. In: *Applied Qualitative Research in Psychology*. London: Macmillan Education UK (2017). p.115–31. doi: 10.1057/978-1-137-35913-1_7
81. Ferguson N, McAuley JW. Radicalization or reaction: understanding engagement in violent extremism in northern Ireland. *Polit Psychol.* (2020) 41:215–30. doi: 10.1111/pops.12618
82. Braun V, Clarke V. Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. *Couns Psychother Res.* (2021) 21:37–47. doi: 10.1002/capr.12360
83. Muhr, T. ATLAS/ti-A prototype for the support of text interpretation. *Qual Soc.* (1991). 14:349–71. doi: 10.1007/BF00989645
84. Testoni I, Russotto S, Zamperini A, Leo DD. Addiction and religiosity in facing suicide: a qualitative study on meaning of life and death among homeless people. *Ment Illn.* (2018) 10:7420. doi: 10.4081/mi.2018.7420
85. Leo J, Goodwin D. Simulating others' realities: insiders reflect on disability simulations. *Adapt Phys Activ Q.* (2016) 33:156–75. doi: 10.1123/APAQ.2015-0031
86. Rotenberg S, Sternberg S, Maeir A. Where did I put my glasses? The lived experience of older adults seeking medical help for perceived memory problems. *Disabil Rehabil Int Multidiscipl J.* (2020) 42:3606–13. doi: 10.1080/09638288.2019.1602849
87. Testoni I, Zielo A, Schiavo C, Iacona E. The last glance: how aesthetic observation of corpses facilitates detachment in grief work. *Illness Crisis Loss.* (2020) 12:1–13. doi: 10.1177/1054137320933592
88. Aléx L, Hammarström A. Women's experiences in connection with induced abortion - a feminist perspective. *Scand J Caring Sci.* (2004) 18:160–8. doi: 10.1111/j.1471-6712.2004.00257.x
89. Sells TGC. The transition to nonparenthood: a critical feminist autoethnographic approach to understanding the abortion experience. *J Poet Ther.* (2013) 26:169–89. doi: 10.1080/08893675.2013.823314
90. Kero A, Lalos A. Ambivalence–a logical response to legal abortion: a prospective study among women and men. *J Psychosom Obstet Gynaecol.* (2000) 21:81–91. doi: 10.3109/01674820009075613
91. Allanson S. Abortion decision and ambivalence: insights via an abortion decision balance sheet. *Clin Psychol (Aust Psychol Soc).* (2007) 11:50–60. doi: 10.1080/13284200701675767
92. Cacioppo JT, Berntson GG. Relationship between attitudes and evaluative space: a critical review, with emphasis on the separability of positive and negative substrates. *Psychol Bull.* (1994) 115:401–23. doi: 10.1037/0033-2909.115.3.401
93. Craig SC, Kane JG, Martinez MD. Sometimes you feel like a nut, sometimes you don't: Citizens' ambivalence about abortion. *Polit Psychol.* (2002) 23:285–301. doi: 10.1111/0162-895X.00282
94. American Psychological Association. *Report of the Task Force on Mental Health and Abortion*. Washington, DC: American Psychological Association (2008). Available online at: http://www.apa.org/pi/wpo/mental-health-abortion-report.pdf (accessed May 11, 2021).
95. Söderberg H, Janzon L, Sjöberg NO. Emotional distress following induced abortion: a study of its incidence and determinants among abortees in Malmö, Sweden. *Eur J Obstet Gynecol Reprod Biol.* (1998) 79:173–8. doi: 10.1016/S0301-2115(98)00084-0
96. Goodwin P, Ogden J. Women's reflections upon their past abortions: an exploration of how and why emotional reactions change over time. *Psychol Health.* (2007) 22:231–48. doi: 10.1080/14768320600682384
97. Hanschmidt F, Linde K, Hilbert A. Riedel- Heller SG, Kersting A. Abortion stigma: a systematic review: abortion stigma - a systematic review. *Perspect Sex Reprod Health.* (2016) 48:169–77. doi: 10.1363/48e8516
98. Rue VM, Coleman PK, Rue JJ, Reardon DC. Induced abortion and traumatic stress: a preliminary comparison of American and Russian women. *Med Sci Monit.* (2004) 10:SR5–16.
99. Neimeyer RA, editor. *Meaning Reconstruction and the Experience of Loss*. Washington, D.C., DC: American Psychological Association; (2001).
100. Bellet BW, Holland JM, Neimeyer RA. The Social Meaning in Life Events Scale (SMILES): a preliminary psychometric evaluation in a bereaved sample. *Death Stud.* (2019) 43:103–12. doi: 10.1080/07481187.2018.1456008
101. Cantelmi T, Cacace C, Pittino E. *Maternità Interrotte: le Conseguenze Psichiche dell'IVG*. Italia: San Paolo Edizioni. (2011).
102. Testoni I, Sansonetto G, Ronconi L, Rodelli M, Baracco G, Grassi L. Meaning of life, representation of death, and their association with psychological distress. *Palliat Support Care.* (2018) 16:511–9. doi: 10.1017/S1478951517000669
103. Zamperini A, Menegatto M, Mostacchi M, Barbagallo S, Testoni I. Loss of close relationships and loss of religious belonging as cumulative ostracism: from social death to social resurrection. *Behav Sci (Basel).* (2020) 10:99. doi: 10.3390/bs10060099
104. Testoni I, Bingaman K, Gengarelli G, Capriati M, De Vincenzo C, Toniolo A, et al. Self-appropriation between social mourning and individuation: a qualitative study on psychosocial transition among Jehovah's Witnesses. *Pastoral Psychol.* (2019) 68:687–703. doi: 10.1007/s11089-019-00871-8
105. American Psychological Association. *Abortion and Mental Health*. (2018). Available online at: https://www.apa.org/pi/women/programs/abortion (accessed May 11, 2021).
106. National Academies of Sciences, Engineering and Medicine. *The Safety and Quality of Abortion Care in the United States*. Washington, DC: The National Academies Press (2018).
107. Inglehart RF. *Religion's Sudden Decline: What's Causing It, and What Comes Next?* New York, NY: Oxford University Press. (2021). doi: 10.1093/oso/9780197547045.001.0001
108. *World Values Survey Association*. (2020). Available online at: https://www.worldvaluessurvey.org/WVSContents.jsp (accessed May 14, 2021).
109. *World Values Survey Association 7*. (2020). Available online at: https://www.worldvaluessurvey.org/WVSOnline.jsp (accessed May 14, 2021).
110. *World Values Survey Association 5*. (2009). Available online at: https://www.worldvaluessurvey.org/WVSOnline.jsp (accessed May 14, 2021).
111. Eagly AH, Eaton A, Rose SM, Riger S, McHugh MC. Feminism and psychology: analysis of a half-century of research on women and gender. *Am Psychol.* (2012) 67:211–30. doi: 10.1037/a0027260
112. Norris A, Bessett D, Steinberg JR, Kavanaugh ML, De Zordo S, Becker D. Abortion stigma: a reconceptualization of constituents, causes, and consequences. *Womens Health Issues.* (2011) 21(3 Suppl):S49–54. doi: 10.1016/j.whi.2011.02.010
113. Testoni I, Ronconi L, Palazzo L, Galgani M, Stizzi A, Kirk K. Psychodrama and moviemaking in a death education course to work through a case of suicide among high school students in Italy. *Front Psychol.* (2018) 9:441. doi: 10.3389/fpsyg.2018.00441

114. Feniger-Schaal R, Orkibi H. Integrative systematic review of drama therapy intervention research. *Psychol Aesthet Creat Arts.* (2020) 14:68–80. doi: 10.1037/aca0000257
115. Orkibi H, Feniger-Schaal R. Integrative systematic review of psychodrama psychotherapy research: trends and methodological implications. *PLoS ONE.* (2019) 14:e0212575. doi: 10.1371/journal.pone.0212575
116. Shafir T, Orkibi H, Baker FA, Gussak D, Kaimal G. Editorial: The state of the art in creative arts therapies. *Front Psychol.* (2020) 11:68. doi: 10.3389/fpsyg.2020.00068

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frontiers in Psychiatry

ORIGINAL RESEARCH
published: 03 September 2021
doi: 10.3389/fpsyt.2021.643783

Global Financial Crisis, Smart Lockdown Strategies, and the COVID-19 Spillover Impacts: A Global Perspective Implications From Southeast Asia

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This present study primarily emphasizes to seek the COVID-19 adverse impacts posing health challenges and global economic crisis. The pandemic (COVID-19) continues to hit the global economies adversely. Pakistan is the 5th-most-populous nation, and recorded positive cases with the third-highest positivity ratio in South Asia, and 26th-highest deaths toll of 21,450 and 29th number of most COVID-19 positive cases with 933,750 worldwide, as of June 6, 2021. The first wave appeared at the end of May 2020, and mid of June reported its peak, which ended by mid-July 2020. Early November 2020 witnessed the second wave with low intensity reached the climax by mid-December. The COVID-19's third wave severely affected the country during mid-March 2021. It exhibited the highest positivity rate, around 20%. New positive patients and deaths toll commenced to skyrocket and reported peak by April 15, 2021. Then situation gradually improved with effective measures and restrictions. The pandemic coronavirus (COVID-19) has affected 220 territories, regions, and countries and resulted in more than 174.116 million infections, deaths, 3.75 million, and 157.157 million positive cases fully recovered from this infectious disease, as of June 7, 2021. The pandemic has caused a severe crisis of healthcare facilities and economic challenges worldwide. Pakistani economy reported GPD's negative growth (–0.05) for the first time over the last 60 years in 2020, which caused a massive financial crisis. The Government's relief package intervened to reduce public mental stress and improve the quality of their lives. IMF reported that Pakistan's GPD bounced back at 4% growth by June 2021. This article determines that economic instability and health burden happened in Pakistan for a longer time than financial disequilibrium that occurred globally. Pakistan encountered this crisis due to its feeble healthcare systems and fragile economy. This study explores adverse health issues and spillover consequences on the economic crisis in Pakistan with global implications. It recommends smart lockdown restrictions in most affected areas to reopen the economic cycle with strict preventive measures to minimize the COVD-19 adverse consequences.

Keywords: COVID-19, public health, economic crisis, smart lockdown strategy, social factors, spillover impacts

OPEN ACCESS

Edited by:
Marie-José H. E. Gijsberts,
Vrije University Brussel, Belgium

Reviewed by:
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King George's Medical University, India
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *18 December 2020*
Accepted: *09 June 2021*
Published: *03 September 2021*

Citation:
Wang C, Wang D, Abbas J, Duan K and Mubeen R (2021) Global Financial Crisis, Smart Lockdown Strategies, and the COVID-19 Spillover Impacts: A Global Perspective Implications From Southeast Asia. Front. Psychiatry 12:643783. doi: 10.3389/fpsyt.2021.643783

INTRODUCTION

The advent of coronavirus brought the global health emergency caused by the spread of the novel COVID-19 disease, which affected almost all the countries, including the most developed and advanced nations and the weak economies worldwide (1–5). This global economic crisis has had adverse effects on individuals' quality of life and mental health (6–10). The ongoing coronavirus (COVID-19) pandemic appeared in Wuhan (Hubei region, China), and the first case of infection was reported on December 31, 2019, in the region. The outbreak of the COVID-19 epidemic has caused a global health emergency. The pandemic coronavirus (COVID-19) has affected 220 territories, regions, and countries and resulted in more than 174.116 million infections, 3.75 million deaths, and 157.157 million positive cases fully recovered from this infectious disease, as of June 7, 2021. The emergence of a pandemic (COVID-19) has also hugely affected Pakistan's economy (11–14). Pakistan is the fifth most populous nation and recorded positive cases with the third highest positivity ratio in South Asia, and had the 26th highest deaths toll of 21,450 and 29th most COVID-19 positive cases with 933,750 worldwide, as of June 6, 2021. The first wave appeared at the end of May 2020, reported its peak in mid-June, and ended by mid-July 2020. Early November 2020 witnessed the second wave with low intensity, which reached its climax by mid-December. COVID-19's third wave severely affected the country during mid-March 2021. It exhibited its highest positivity rate, around 20%. New positive patients and death tolls commenced to skyrocket and reported a peak by April 15, 2022. Then the situation gradually improved with effective measures and restrictions. It caused enormous health, economic, environmental, and social problems. In Pakistan, health officials reported 564,824 confirmed infected cases, 12,380 indicating a 2.2% case fatality rate and total recoveries of 527,061, as of February 15, 2021 (15). The findings of a previous study reported that 33–42% of the admitted patients facing Middle Eastern respiratory syndrome (MERS) and SARS-CoV, known as severe acute respiratory syndrome, exhibited various health issues. The patients admitted to hospitals showed depressed mood, anxieties, stress, insomnia, mental distress, and impaired memory. Some recovered patients reported adverse effects of the disease after their recoveries. Consequently, virus infection caused various family issues and increased domestic violence and physical and mental health problems worldwide (16).

This virus' (COVID-19) symptoms vary; nevertheless they most commonly include fever (17), headache, cough (18) fatigue, breathing difficulties, a loss of taste, and a loss of sense of smell (19–22). The virus attack can appear from day one to fifteen or even longer after exposure to the infected person or environment. Research indicated that almost 35% of infected people do not show notable symptoms (22–25). People with noticeable disease symptoms are patients of coronavirus (26, 27). Over 4/5 people (81%) develop noticeable mild-to-moderate health issues, such as pneumonia, and 14% of COVID-19 positive people report severe symptoms, including hypoxia and dyspnea. In addition, 5% of people develop acute symptoms of coronavirus, which results in shock, respiratory failure, or other health issues like multiorgan dysfunction (28). Studies reported that older people face a higher risk of virus attack and developing acute symptoms. Some patients have faced a series of health issues several months after a successful recovery from this (Covid-19) disease (29).

For the first time in 60 years, GDP has shown a negative growth, exacerbating the enormous financial crisis and recession. It has affected the quality of life of the public massively. Self-segregation, social alienation, and travel restrictions have forced the labor force to decline in all sectors of the economy, resulting in unemployment. The whole industry is facing a blockade, paralyzing most of the industrial sectors. In response to this COVID-19 outbreak, we summarize the impact of COVID-19 on all aspects of Pakistan's economy (30). Although in terms of mortality, COVID-19 does not have a similar pattern compared with the 2002–2003 severe acute respiratory syndrome (SARS), and its global spread is different from the Spanish Flu pandemic, which appeared in 1918–1919 (31).

The World Health Organization published survey results based on 130 countries in October 2020 to record the adverse influence of the virus (COVID-19) on various mental health issues. Almost 30% of countries encountered difficulties due to a lack of health workers to fight against the ongoing COVID-19 virus. Nearly 19% of member states of the WHO faced mental health issues. Of the member states, 28% had insufficient personal protective and preventive equipment. Conversely, 89% of the WHO member countries initiated protective measures and included psychological and mental support in the national preventive plans to combat the pandemic (32). The WHO report evidenced that monumental effects had monumental impact on global communities' mental health and universal well-being of societies. Visibly, due to insufficient capacity in responding to the COVID-19 outbreak, it is uncertain how this world will deal with the current looming disaster of mental health and global economic crisis. The COVID-19 disease quickly instigated substantial disruption to human societies, health care systems, and economies worldwide. The COVID-19 pandemic has caused global challenges and economic crises that are yet to unfold. This study examines the adverse impacts and strategic retorts on protective measures to combat the consequences of COVID-19 on social, environmental, economic, and health sectors worldwide. This article primarily aims to examine challenges, economic crises, and their effects on business activities, pressure on healthcare systems, and government support to revive society's normal state.

Figure 1 specifies the life cycle and transmission of the virus, which causes the infectious disease COVID-19 (33). The virus transmits through respiratory droplets of coronavirus patients to oral and respiratory mucous membranes cells. Moreover, coronavirus disease possesses the single-stranded RNA genome enfolded in (N) nucleocapsid protein (the capsid together with the nucleic acids of a virus) and three main protein surfaces. These are enveloped (E), membrane (M), and Spike, which replicate and reach the lower airways and potentially cause severe pneumonia (33). **Figure 1** shows the life cycle of the transmissible virus with its potential immune reactions.

The Health Ministry reported a 95.3% recovery rate based on 302,708 cases in Pakistan, with 317,595 total confirmed cases and

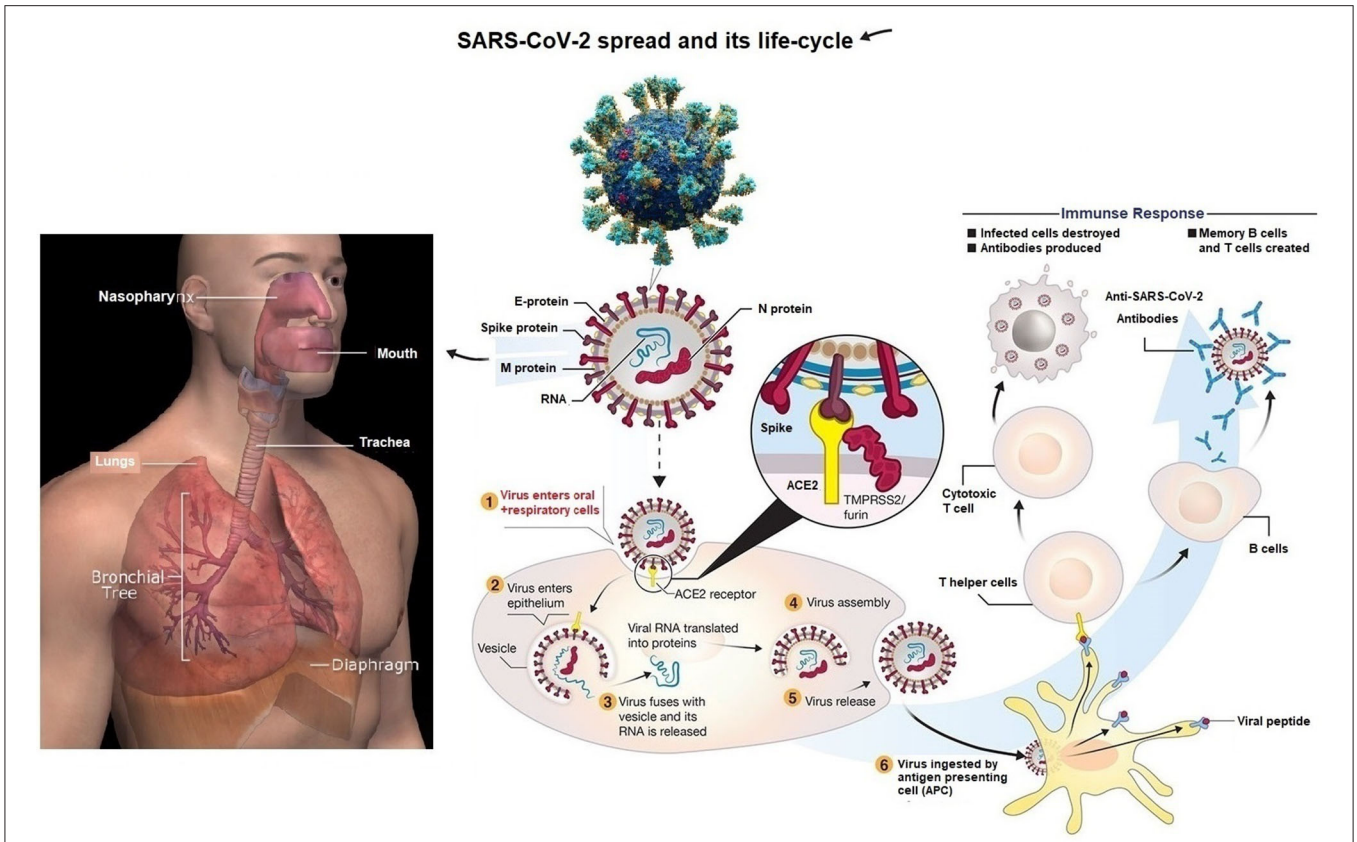

FIGURE 1 | It shows SARS-CoV-2's spread and life-cycle, causing the contagious coronavirus disease. Source: the WHO data related to the COVID-19 pandemic.

TABLE 1 | Global total cases, recoveries.

Sr.	Country	Total cases	Total deaths	Total recoveries	Active cases	Critical cases	Total tests	Total population
	Worldwide	**48,994,297**	**1,238,736**	**34,955,294**	**12,800,267**	**89,961**	**Country**	
1	USA	9,910,354	240,900	6,334,775	3,334,679	18,074	153,384,972	331,679,824
2	India	8,411,034	125,029	7,764,763	521,242	8,944	114,208,384	1,384,715,664
3	Brazil	5,614,258	161,779	5,064,344	388,135	8,318	21,900,000	213,085,794
4	Russia	1,712,858	29,509	1,279,169	404,180	2,300	63,000,000	145,956,429
5	France	1,601,367	39,037	124,278	1,438,052	4,230	17,055,801	65,324,114
6	Spain	1,365,895	38,486	150,970	N/A	2,802	18,072,174	46,761,136
7	Argentina	1,217,028	32,766	1,030,137	154,125	4,713	3,142,837	45,339,899
8	UK	1,123,197	48,120	N/A	N/A	1,191	35,241,533	68,010,512
9	Colombia	1,117,977	32,209	1,011,166	74,602	2,376	5,258,238	51,071,028
10	Mexico	943,630	93,228	697,402	153,000	2,838	2,445,709	129,402,754

Top 10 countries summary, as of November 5, 2020. Source: COVID-19 CSC data, JHU.

6,552 deaths with 2.12% fatality, which is much lower than the global average rate (3.6%). The COVID-19 virus has caused over 36.84 million positive patients and 1,067,560 deaths. There are over 27.70 million patients who had fully recovered from this infectious virus by October 10, 2020 worldwide (34). **Table 1** shows the top 10 countries based on recovery, as of November 05, 2020.

In the current situation, the incubation period of the COVID-19 is prevailing. However, the spread has reached almost every country worldwide. Health professionals have recommended self-isolation and social distancing by restricting social gatherings in cities and remote areas to stop the rapid spread. Smart lockdown measures are helpful to minimize the risk of large-scale infection spread of COVID-19. Avoiding social distancing would overwhelm the healthcare systems, causing massive scale causalities of human lives. However, blockades often choke economic development in numerous ways (35). The lockdown strategy helps control the rapid spread of the COVID-19 infection; however, it leads to adverse financial, health, and social factors. The COVID-19 pandemic

TABLE 2 | COVID-19: case mortality analysis worldwide (February 20, 2021).

	Country	Confirmed	Deaths	Case-fatality	Deaths/100 k pop
	United States	27,896,042	493,082	1.8%	150.71
	India	10,963,394	156,111	1.4%	11.54
	Brazil	10,030,626	243,457	2.4%	116.23
	United Kingdom	4,095,187	119,614	2.9%	179.90
	Russia	4,079,407	80,587	2.0%	55.78
	France	3,596,156	83,542	2.3%	124.71
	Spain	3,121,687	66,704	2.1%	142.76
	Italy	2,765,412	94,887	3.4%	157.02
	Turkey	2,616,600	27,821	1.1%	33.80
	Germany	2,372,209	67,245	2.8%	81.09
	Colombia	2,212,525	58,334	2.6%	117.49
	Argentina	2,046,795	50,857	2.5%	114.30
	Mexico	2,022,662	178,108	8.8%	141.14
	Poland	1,614,446	41,582	2.6%	109.49
	Iran	1,550,142	59,264	3.8%	72.45
	South Africa	1,498,766	48,708	3.2%	84.30
	Ukraine	1,333,332	26,191	2.0%	58.69
	Indonesia	1,252,685	33,969	2.7%	12.69
	Peru	1,252,137	44,308	3.5%	138.51
	Netherlands	1,057,116	15,211	1.4%	88.28
	Pakistan	568,506	12,527	2.2%	5.90

Source: COVID-19 CSC data, JHU.

has created the worst blockade, which has resulted in job losses of 5 million in Pakistan. The crisis of coronavirus (COVID-19) has taken a more massive toll on job losses than previously feared. The jobs and income losses have led to more hunger and had adverse effects on individuals' quality of life. The pandemic has developed to be a severe threat. **Table 2** provides detail.

Table 2 displays COVID-19 positive cases in countries with higher numbers of patients worldwide. **Figure 2** specifies that the US is the most affected country with 25.5% of global cases in terms of confirmed COVID-19 patients (5,566,632), followed by Brazil 15.31% (3,340,197), India 12.14% (2,651,290), and Russia 4.25% (927,745). South Africa has 2.69% (587,345), Peru 2.45% (535,946), and Mexico 2.39% (522,162), Colombia showed 2.14% (468,332), Chile 1.77% (385,946), Spain 1.64% (358,843), Iran 1.57% (343,203), and the United Kingdom 1.46% (318,484). **Table 3** shows countries reporting the highest death toll worldwide, as of February 20, 2021.

Table 3 presents the countries reporting the highest deaths caused by the COVID-19 pandemic worldwide. The US has the highest number of COVID-19 confirmed cases (27,896,042) and deaths (493,082) with a case-fatality ratio of 1.8%. Brazil is the second highest state with established patients of COVID-19 (10,030,626), deaths (243,457), and case-fatality rate (2.4%). Mexico is the third most affected country from the COVID-19 pandemic with high confirmed infected cases (2,022,662), deaths (178,108), and case-fatality ratio (8.8%).

Figure 3 exhibits global CFR (Case-fatality-ratio) of the COVID-19 pandemic. China reported a 4.8% case fatality ratio, Italy 3.4%, Australia 3.1%, the United Kingdom 2.9%, Germany 2.8%, and Africa 2.6%. Similarly, South America reported 2.6%, Brazil 2.4%, Europe 2.4%, North America 2.2%, the world 2.2%, Pakistan 2.2%, the US reported 1.8%, and Asia recorded 1.7% CFR ratio for the COVID-19 virus.

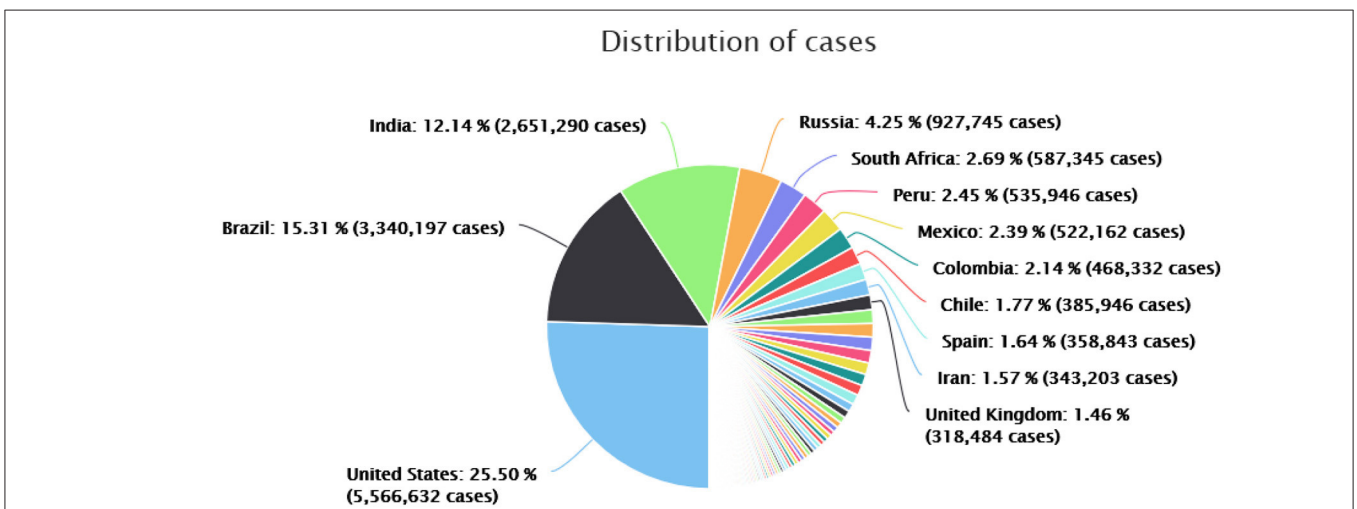

FIGURE 2 | COVID-19: analysis by countries with highest global cases (August 16, 2020). Source: data provided by World Health Organization related to coronavirus (COVID-19).

Figure 4 indicates the overall scenario of the COVID-19 pandemic in Pakistan. **Figure 4** shows the COVID-19 overview with daily new tests and new cases' distribution in Pakistan. The lockdown strategy helps control the rapid spread of the COVID-19 infection; however, it leads to adverse financial, health, and social factors. COVID-19 has created the worst blockade, which has resulted in job losses of 5 million in Pakistan. The crisis of coronavirus (COVID-19) has taken a more massive toll on job losses than previously feared. The jobs and income losses have led to more hunger and left adverse effects on individuals' quality of life. The pandemic has developed to be a severe threat to the lower-income groups of society (36). It is vital to initiate measures to control the spread of the epidemic without destroying economic growth. The financial experts advised to eliminate adverse elements of the COVID-19 on the economy and take measures to revive the industrial process through a smart lockdown strategy (37).

TABLE 3 | COVID-19: case mortality analysis - deaths worldwide (February 19, 2021).

Country	Confirmed	Deaths	Case-Fatality	Deaths/100 k pop.
United States	27,896,042	493,082	1.8%	150.71
Brazil	10,030,626	243,457	2.4%	116.23
Mexico	2,022,662	178,108	8.8%	141.14
India	10,963,394	156,111	1.4%	11.54
United Kingdom	4,095,187	119,614	2.9%	179.90
Italy	2,765,412	94,887	3.4%	157.02
France	3,596,156	83,542	2.3%	124.71
Russia	4,079,407	80,587	2.0%	55.78
Germany	2,372,209	67,245	2.8%	81.09
Spain	3,121,687	66,704	2.1%	142.76
Iran	1,550,142	59,264	3.8%	72.45
Colombia	2,212,525	58,334	2.6%	117.49
Argentina	2,046,795	50,857	2.5%	114.30
South Africa	1,498,766	48,708	3.2%	84.30
Peru	1,252,137	44,308	3.5%	138.51
Poland	1,614,446	41,582	2.6%	109.49
Indonesia	1,252,685	33,969	2.7%	12.69
Turkey	2,616,600	27,821	1.1%	33.80
Ukraine	1,333,332	26,191	2.0%	58.69
Belgium	746,302	21,821	2.9%	191.04
Pakistan	568,506	12,527	2.2%	5.90

Source: COVID-19 CSC data, JHU.

THE NEXUS BETWEEN COVID-19 ARRIVAL, UNEMPLOYMENT, AND DECLINE IN ECONOMY

The economic experts estimated that Pakistan's economy might shrink by 15 billion US dollars in response to the adverse consequences of the COVID-19 pandemic. According to experts' prediction, the 4th quarter can show a 10% decline in Pakistan's GDP growth in the fiscal year of 2020. The government imposed full and smart lockdowns from March to June 2020, which resulted in no actual development of gross domestic product, and it reflected a negative (−2.0% GPD) growth in 2020, which would carry on to the first quarter of 2021. According to the Gallup Pakistan survey's findings, the unemployment rate might surge to a whopping 28%. There would be 6.65 million unemployed people during the fiscal year 2020–21, compared to 5.8 million in the preceeding year of 2020. Experts estimated that there would be a 30% to 40% layoff because of prolonged full or partial lockdowns, which has resulted in losses of 190 billion in the private sector (38). Before the arrival of the COVID-19 pandemic, the interest rate was over 13%. The State Bank of

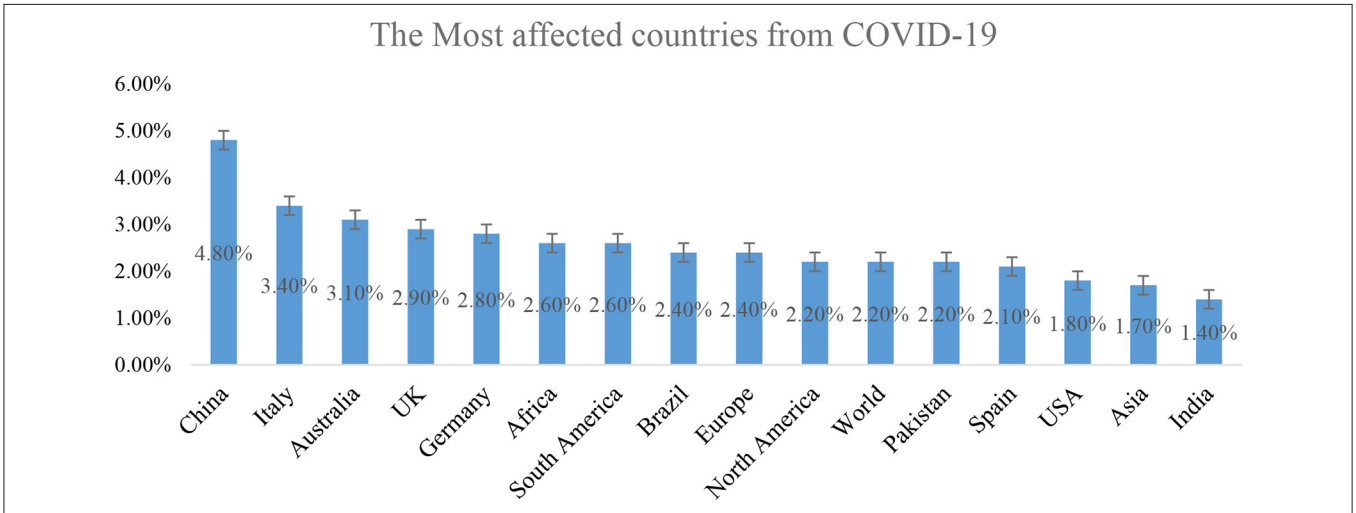

FIGURE 3 | COVID-19 Case-fatality-rate (CFR) worldwide - February 15, 2021.

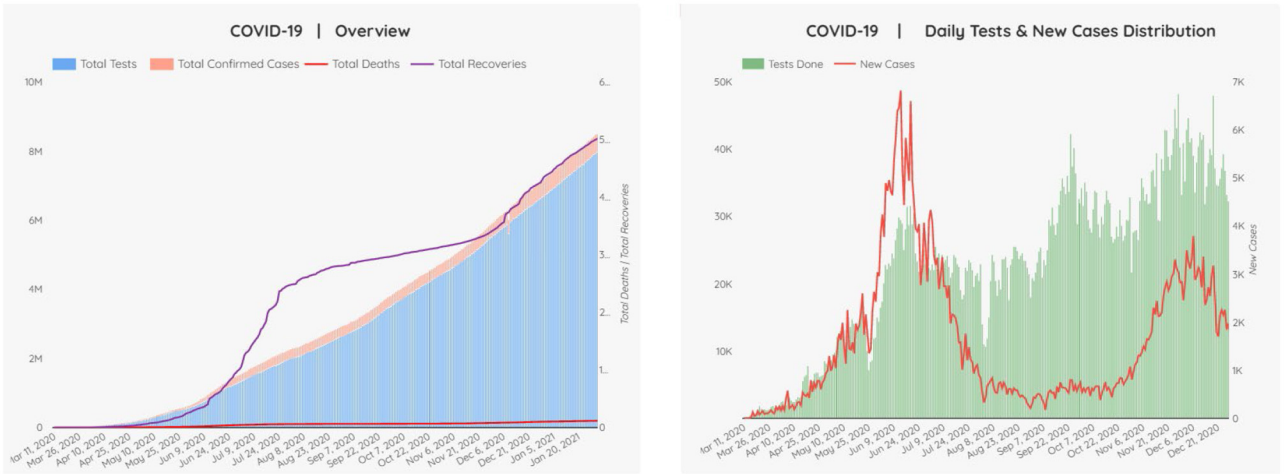

FIGURE 4 | COVID-19 across Pakistan - February 12, 2021. Source: Ministry of Health, Pakistan.

Pakistan dropped the interest rate to 7% on bank deposits in Mid-June 2020 to empower the business industry. However, a lower rate of return on investments in financial institutions has affected ordinary people as they were running their home expenses on the income of their deposits. The lower profit rate on deposits has caused mental stress for people who relied on their financial investments. Price-hike has increased, which resulted in lower spending power. **Table 4** presents GDP, per capita income, and annual percentage change in growth.

TABLE 4 | GDP, Per capita income, and annual %-change in growth.

Year	GDP nominal GDP (billions of US $)	Per capita Per capita (US $)	Growth Annual % change
2015	270.556	1,356.6678	4.731
2016	278.655	1,368.4543	5.527
2017	304.567	1,464.9933	5.554
2018	314.568	1,482.3057	5.836
2019	278.222	1,284.702	0.989
2020	262.000 e	1,200.00 e	−5.000*

*By 2nd Quarter of 2020, e = expected estimation.

ECONOMIC RELIEF PACKAGE FOR IMPROVING QUALITY OF LIFE

The prime minister emphasized improving the quality of life of the public and approved an economic relief package of Rs. 2.1 trillion on March 14, 2020. The Government allocated one hundred fifty billion (Rs.150) for lower-income individuals, mainly laborer classes, and allotted PKR 280 billion (1.76 billion USD) for wheat procurement (27). The government ordered to defer interest payments of loans temporarily to support exporters and released Rs. 100-billion for subsidiaries to the agriculture sector along with small industries. The relief package offered a significant reduction in the prices of petroleum, electricity, and gas bills and postponed payments to pay later in installments, which helped to improve the quality of life of the public (39). Under this relief package, the government increased 50% of the Benazir Income Support Programme (BISP) to enhance the quality of life of the lower-income groups. Besides, 5.2 million beneficiaries through the BISP's ongoing National Socio-Economic Registry (NSER) and officials included more people in the package (40).

The Government also included health professionals in this relief support, as officials stated that doctors or paramedical staff die while treating the patients of COVID-19. The state would regard health professionals as martyrs, and their families would receive the same packages of the martyrs. The federal cabinet members reviewed and approved the economic package on March 13, 2020, to make a better quality of life for ordinary people (25). The Government established the Economic Coordination Committee to approve the relief package and granted supplementary Emergency Relief Fund of Rs. 100-billion to support 12 million low-income families in combating the COVID-19 pandemic. The Government provided cash assistance for 4 months to deserving families as a one-time dispensation after biometric verification and approval of the district administration under the Ehsaas Program. The Government had disbursed Rs. 22.466-billion among 1.77 million people as of April 15, 2020 (41).

China reported this contagious disease (COVID-19) for the first time in Wuhan, which infected people severely; however, the Government effectively controlled the illness within 5 months. Other successful countries, such as Singapore, South Korea, Pakistan, Australia, and New Zealand, also managed the rapid spread of this disease, and the trend of new cases has declined sharply. COVID-19 hit the United States, Spain, Italy, Spain, and France extremely hard at the start and put a heavy burden on their healthcare systems. It has developed to be a global health emergency more disastrous than the Second World War (37).

As the developed countries around the world bear the brunt, the disease has also hit developing and emerging countries massively. Pakistan is on the brink of extinction, with tight ropes in the face of economic weakness. Next year is likely to be the most severe challenge Pakistan will encounter, which requires resilience, competence, and discipline. If the country fails, the other end of the equation is worse than our darkest nightmare (31). By 2019's second half, the world economy entered into a turbulent and challenging recession scenario. However, financial experts hoped economic conditions would improve in 2020 as large emerging economies came forward to lead the global economy back to potential economic growth by 2021. With the devastating effects of the COVID-19 eruption, all bets disappeared and revised all global growth forecasts as this pandemic has changed those growths downwards.

THE COVID-19 PANDEMIC'S ADVERSE IMPACTS ON GLOBAL ECONOMIES

The emergence of COVID-19 has negatively affected the global economy's economic growth beyond anything experienced within the past 100 years. The economic experts estimated that the COVID-19 pandemic could trim 3.0–6.0% off global economic growth by the end of 2020 (42). The experts expect a partial recovery of the global economy in 2021, assuming that there is no second wave of the spread of the pandemic. The spread of the infection has slowed down economies, and as a result, Pakistan is facing an economic, social, and health crisis and trying to revive its economic growth to improve individuals' quality of life. The adverse effects are severe, and GDP has shown negative growth for the first time in the last 60 years. The result is worsening in the current and financial balance, supply chains disruptions, and growing unemployment with job losses of 5 million. In January 2020, WHO professed the spread of the coronavirus as a world health emergency. Since then, the arrival of the pandemic (COVID-19) emergency has led to a global economic, social, and public health crisis, resulting in the loss of 90 trillion USD to global economies. Globally, governments have initiated steps to balance often-competing economic policy objectives to address the social and public health crisis with economic considerations to revive economic growth to stabilize their economies.

THE COVID-19 PANDEMIC INFLUENCE ON GROSS DOMESTIC PRODUCT (GDP OF PAKISTAN)

The fragile economy of Pakistan was already struggling to move toward a stable stage when the pandemic struck. The COVID-19 epidemic struck the economy massively. The financial experts estimated that economic fallout caused by COVID-19 would considerably derail the recovery process of the economy in Pakistan, which has already taken a devastating blow on economic growth (27). The pandemic has struck all the sectors, and the Pakistani economy has shrunken with raised unemployment due to the loss of 12.3 million jobs (11, 12). The growth of GDP was 5.8% in 2018, now GDP is 0.98%, and it is indicating a further decline for the coming years. The country's fiscal deficit is roughly 10.0%, and revenues of Pakistan have plummeted during the past 2 years. These indicators have specified that the appearance of the COVID-19 pandemic will seriously negatively affect the country (43).

COVID-19 AND BURDEN ON PUBLIC HEALTH SYSTEM

The advent of the COVID-19 epidemic affected individuals' lifestyles around the world. Health education and counseling model is helpful to reduce mental stress and hypertensive disease in crisis situations (44). The outbreak has extensively changed healthcare demands and ways medical services are deliver to people, especially in Southeast Asia and Pakistan (45). The region has introduced digitalization in the health care systems. The outbreak of COVID-19 has shifted care from face-to-face physician's consultation to remote consultations through phone and online mediums. The coronavirus pandemic has caused immense challenges to the health care systems, people's lives, and the global economy (25). With the COVID-19 epidemic on the rise, society started to pay more attention to pharmaceutical industries and healthcare systems to provide better medical services, which had both negative and positive impacts across various sub-sectors. In the short-term, the pandemic caused a variety of consequences on the pharmaceutical industry, healthcare institutions, distribution and retail channels of pharmaceutical companies, and health insurance companies worldwide. Concerning the medium-term and long-term impacts, the COVID-19 pandemic effects on pharmaceutical companies and healthcare would be relatively positive (46). The healthcare system was already overstretched before the onset of the outbreak of the COVID-19 epidemic. The Pakistani health care system statistics specified that one doctor is available to treat 963 individuals, and there is one bed for 1,608 people, according to UNDP statistics. Pakistan received a bailout package of six billion US dollars from the IMF to tackle the monetary crisis. The Pakistani economy was progressing toward a stable phase to recover from the economic crisis when COVID-19 struck (47). The pandemic hit caused 12.50 million people to suffer from food security. One-third (35%) of the population was living below the poverty line before the epidemic, and now it is over 50% (48). At present, 66% of the population (150 million) are facing poverty, and they need immediate economic relief to improve their quality of life (**Table 5**).

ECONOMIC INDICATORS UNDER COVID-19 PANDEMIC

Risk analyst expert estimated that Pakistan's economy would shrink by 15 billion US dollars because of the COVID-19 pandemic. According to his prediction, the fourth quarter would indicate a 10% decline in Pakistan's GDP during the fiscal year of 2020. Complete or smart lockdowns would result in no actual growth of gross domestic product, or a negative −2.0% GPD growth in 2020, leading to the first quarter of 2021. Gallup Pakistan conducted research and reported that the

TABLE 5 | COVID-19 cases in selected Asian countries with patients victim by the virus.

Country	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Tot Cases/ 1M pop	Deaths/ 1M pop	Total Tests	Population Country wise
Asia	59, 428, 348	206, 088	852, 867	3, 165	56, 039, 057	2, 536, 424				Country
India	31, 215, 142	42, 123	418, 511	489	30, 383, 001	413, 630	22, 389	300	447, 341, 133	1, 394, 235, 023
Turkey	5, 546, 166	8, 780	50, 650	46	5, 395, 300	100, 216	65, 027	594	65, 300, 191	85, 290, 746
Iran	3, 576, 148	27, 444	87, 624	250	3, 168, 834	319, 690	42, 013	1, 029	24, 892, 912	85, 119, 790
Indonesia	2, 950, 058	38, 325	76, 200	1, 280	2, 323, 666	550, 192	10, 667	276	23, 719, 489	276, 556, 785
Philippines	1, 517, 889	4, 502	26, 842	56	1, 444, 215	46, 832	13, 661	242	16, 086, 481	111, 109, 628
Iraq	1, 510, 517	8, 922	17, 951	59	1, 372, 158	120, 408	36, 693	436	12, 587, 768	41, 166, 304
Bangladesh	1, 128, 889	11, 579	18, 325	200	951, 340	159, 224	6, 784	110	7, 339, 909	166, 410, 269
Pakistan	993, 872	2, 145	22, 848	37	921, 095	49, 929	4, 410	101	15, 484, 282	225, 380, 778
Malaysia	939, 899	12, 366	7, 241	93	798, 955	133, 703	28, 655	221	16, 622, 925	32, 800, 653
Japan	843, 856	2, 171	15, 060	12	801, 337	27, 459	6, 694	119	17, 614, 879	126, 069, 343
Jordan	762, 420	392	9, 916	6	744, 365	8, 139	73, 954	962	8, 265, 981	10, 309, 372
Nepal	670, 953	2, 202	9, 607	25	634, 927	26, 419	22, 602	324	3, 486, 354	29, 685, 410
UAE	664, 027	1, 541	1, 904	4	641, 750	20, 373	66, 299	190	63, 206, 621	10, 015, 675
Saudi Arabia	512, 142	1, 273	8, 103	14	493, 240	10, 799	14, 475	229	23, 936, 986	35, 381, 779
Kazakhstan	499, 111	4, 889	5, 062	65	433, 994	60, 055	26, 252	266	11, 575, 012	19, 012, 164
Thailand	426, 475	11, 305	3, 502	80	296, 208	126, 765	6, 094	50	8, 129, 670	69, 983, 960
Kuwait	387, 912	1, 043	2, 247	9	369, 737	15, 928	89, 448	518	3, 264, 442	4, 336, 739
Sri Lanka	287, 973	1, 554	3, 870	43	262, 828	21, 275	13, 389	180	4, 195, 281	21, 507, 531
Bahrain	268, 027	78	1, 380	2	265, 832	815	152, 009	783	5, 296, 765	1, 763, 227
Qatar	224, 510	108	599	3	222, 362	1, 549	79, 959	213	2, 276, 171	2, 807, 805
S. Korea	180, 481	1, 278	2, 059	1	160, 347	18, 075	3, 517	40	11, 251, 987	51, 315, 548
Afghanistan	142, 800	386	6, 295	29	90, 153	46, 352	3, 584	158	683, 555	39, 845, 072
Uzbekistan	120, 631	658	805	4	115, 514	4, 312	3, 550	24	1, 377, 915	33, 977, 417
China	92, 342	65	4, 636	0	87, 098	608	64	3	160, 000, 000	1, 439, 323, 776
Maldives	76, 188	169	217	1	73, 340	2, 631	138, 395	394	1, 115, 829	550, 511

Source: *COVID-19 CSC data, JHU. Yellow color shows new cases of Covid-19 and RED color indicates new deaths in various countries.*

Table 5 *indicates the situation of the selected Asian countries that have faced the hardest hit of the COVID-19 outbreak as of July 17, 2021.* ***Table 4*** *shows the countries reporting the highest registered patients with deaths caused by the COVID-19 pandemic. India has reported the highest number of patients of the viral disease COVID-19 and reported confirmed cases (31,215,142) and deaths toll (418,511) with a CF (case-fatality) ratio = 1.3%. Turkey is the second most affected country from the pandemic and announces confirmed patients of COVID-19 (5,546,166) and total deaths (50,650) with a CF (case-fatality) ratio = 1.3%. Iran is the third most victim country from this viral disease COVID-19 and declared confirmed patients (3,576,148) and total deaths (87,624) with a CF ratio = 2.5% (case-fatality) as of July 19, 2021. See* ***Figure 3****.*

unemployment rate would surge to a whopping 28%. During the fiscal year 2020–21, estimations indicated that unemployment would increase to 6.65 million, compared to 5.8 million in the preceding year of 2020. Experts also projected a 30–40% layoff in the formal sector because of prolonged complete or partial lockdowns, resulting in an impact of 190 billion in the private sector (38). Before the outbreak of COVID-19, the interest rate was over 13%, and the State Bank of Pakistan cut interest rates to ease borrowers by decreasing 225 basis points (7%) in Mid-June 2020, to empower the business industry. The experts indicated that Pakistan would need financial assistance from the IMF, the World Bank, or its strategic allies, such as China or other countries. Because of limited financial capacity to beat COVID-19, Pakistan would need more assistance to combat the adverse effects of the pandemic. According to the 2019 estimation, the total GDP of Pakistan was $284 billion (nominal), with 3.30% economic growth. However, it showed a negative growth rate of −2.60% after the pandemic. The COVID-19 epidemic caused a 10% decline to GDP with an estimated loss of Rs. 1.10 trillion in 2020. If exports fell by 20%, the Pakistan economy might face a 4.64% decline (49).

The Asian Development Bank stated that the global health emergency had declined growth to 2.20 in Asia, and it would rebound to 6.20 in the fiscal year 2021. In this challenging situation, innovation is crucial to gain inclusive, environmentally sustainable economic growth. Some developing economies in Asia are close to the global innovation frontier, while other countries lag behind. The Asian Development Bank approved a loan of 300 million US dollars to strengthen Pakistan's public health sector to combat the effects of the COVID-19 pandemic. It helped to meet the basic needs of the poor and vulnerable segments of society. ADB initiated the CARES program to help the Pakistan Government deliver social protection programs to vulnerable and lower-income groups of poor segments and expanded the health sector's capabilities. It provided a pro-poor fiscal inducement to boost economic growth and offered jobs to fight the adverse economic effects of COVID-19. AIIB facilitated parallel finance of 500 million US dollars to the CARES program,

and it received another 500 million US dollars from the World Bank to support Pakistan. These measures helped Pakistan to improve the quality of life for the lower-income segments (38).

THE COVID-19 APPEARANCE AND PAKISTAN'S IMPORTS

Pakistan's total imports as of March 2020 were Rs. Five hundred twenty-five (Rs. 525) billion rupees, with a downtrend of −18.7% year-on-year, claimed by Pakistan Bureau of Statistics (PBS). According to the National Bank of Pakistan (SBP), the largest import partners were China, the United Arab Emirates, Singapore, the United States, and Saudi Arabia, accounting for 51% of total imports between July 2019 and February 2020. During that period, China alone contributed 21% to total imports (50, 51). Hence, imports decay indicates the effects of a series of factors, including supply chain disruptions, falling demand in Pakistan, and lower commodity and commodity prices (52). The fall in imports indicated a positive move toward Pakistan's current account deficit. PIDC2 described that Pakistan's 32% of imports determine final products that do not directly influence Pakistan's GDP. Further, raw materials commodities account for 68% of Pakistan's imports, such as intermediate and capital goods that refer to essential goods and raw materials to produce end commodities for domestic consumption and export. As a result, these declines will have a negative impact on investment spending and exports. Because of this, Pakistan may experience a knock-on effect of a decrease in imports, which will affect GDP. Hence, the decline in imports would lead to a negative impact on investment spending as well as exports. Pakistan could experience a chain reaction of falling import volume, which will negatively affect the country's gross domestic production (GDP). The import volume during 2020 was PKR six hundred fourteen thousand nine hundred thirty-four (614,934) million in July 2020, Rs. 611,449 million in June. It remained at Rs. 589,739 million in July 2019, which showed an increase of 0.57% increase in June 2020 and 4.27% in July 2019. The Balance of Trade always remains negative, and the average was Pak Rs. −46,486.18 Million from 1957 to till 2020, which means Pakistani spends more on imported items and earns less from exported commodities. It affects spending on public health to improve the quality of life (53, 54).

THE COVID-19 OUTBREAK AND EXPORTS HURDLES

Pakistan's total exports in March 2020 amounted to PKR 287.70 billion indicating a downward trend of 12.9% from the previous month, according to the Pakistan Bureau of Statistics (PBS). The most prominent export partners of Pakistan are the United States, the United Kingdom, China, Germany, and the Netherlands, which account for about 40% of the total exports, according to the central bank, State Bank of Pakistan (SBP). The outbreak of COVID-19 massively affected all the partner countries, which has adversely affected global trade. Worldwide, business and trade are showing a declining trend, and it will lead to a decrease in global trade activities as the trade demand has decreased since the coronavirus pandemic. Almost every country restricted social set ups and gatherings and imposed complete or a partial/smart lockdown, and closed public transportation in most situations. It has had an extreme effect on industry, and it disrupted the process of commodities' production (53, 54). According to the Pakistan commerce ministry's estimation, exports fall could reach 20% with the strike of the COVID-19 pandemic, and it could lead to a loss of 4 billion US dollars by June 2020 (52). In the post-COVID-19 world order scenario, Pakistan can take advantage of two emerging potential opportunities to reform its economy. The major competitors' economies of India and Bangladesh are squeezing drastically, and import commodities have become cheaper for the time being. Pakistan expects a roughly 20% fall in exports and remittances, and smart economic strategies can help to take commercial benefits by designing global supply chains. Pakistan can also exploit the tense trade situation between China and the United States and tailor strategies to attract foreign investors. The recession and economic crisis worldwide offers economic opportunities for Pakistan due to its important geopolitical location in the region. Pakistan can take up global orders to increase the export volume. It would help Pakistan to spend more on public health systems to improve the quality of life of the people.

REMITTANCES

Remittances from Pakistan were $1.824 billion in February 2020, which indicated a decreasing trend (−4.4%) from the previous month, according to the announcement of State Bank of Pakistan (SBP). The reason for the decline was the spread of the COVID-19 pandemic around the world. The remittances maintained a downward trend in May 2020. Overseas Pakistanis typically send remittances to Pakistan from oil export Gulf Cooperation Council countries. The largest share of remittances in February 2020 came from Saudi Arabia ($422 million), the United Arab Emirates ($387.1 million), and the United States ($333.5 million). According to the World Bank, remittances from 66 countries, particularly emerging and developing countries, accounted for more than 5% of GDP in 2019. In the case of Pakistan, remittances accounted for 7.7% of GDP in the same year. Pakistan received the highest ever remittances worth $2.768 billion with an increase of 12% for a single month in July 2020, as compared with June 2020. The statistics indicated a rise of 36.5% in remittances from July 2019. Analysts' reasons for rising remittances are primarily fewer pilgrims journeying to religious places. Overseas Pakistanis religious workers had higher savings, and travel restrictions and flight cancelation contributed to a rise in remittances. The Government facilitates overseas workers by improving channel efficiency and introduced incentives on foreign money transfers.

The World Bank emphasized that the outbreak of COVID-19 could severely affect remittances due to the closure of major countries. Financial experts have indicated a fall in remittances to Pakistan from major countries, like Saudi Arabia, UAE, and the United States. It is due to lockdown and blockade in

these countries (49). From mid-June to August 2020, oversees Pakistanis contributed a lot to the Government's appeal by sending remittances with banking channels. It was the result of Pakistani schemes to attract overseas Pakistanis, which showed a tremendous positive impact on generating remittances inflows to Pakistan. The State Bank of Pakistan reported that overseas Pakistanis' remittances drastically increased to 50.7%, which reached sn all times best, worth 2.466 billion US dollars, as of June 30, closing the fiscal year 2020, with a closing total of 23.1 billion dollars compared with 1.636 billion US dollars in 2019. The remittances inflows to Pakistan remained steady and stable despite the hit of the COVID-19 epidemic that disrupted the global economy and caused unemployment and a substantial fall in remittances of the workers worldwide. The remittances inflows from July to December 2020 to May 2021 remained over 2 billion dollars with a consecutive 8-month increase in the remittances. Remittance inflow was reported at 2.27 billion in January 2021, which was 19% higher than January 2019 and 24% more than the last fiscal year. Pakistan can utilize these all-time high remittances to revive the economy and spending on public health to improve life quality (55).

LINKAGE OF POVERTY AND UNEMPLOYMENT ON LIFE QUALITY

Pakistan's total workforce is 63.4 million, of which 26.41 million (41.6%) stands vulnerable, according to the Employment Trends reported by the Pakistan Bureau of Statistics in 2018. Vulnerable employment mentions a proportion of self-employed and workers employed domestically in total employment, including the poor class workers relying on daily wages. These workers are likely to be the most affected. They may lose their jobs because of the COVID-19 pandemic in Pakistan (56). The experts have warned of a significant increase in the number of poor and unemployed workers in the coming months in response to complete or partial lockdowns imposed by the Government to control the spread of the pandemic. It has slowed down economic activities, which leads to a high proportion of vulnerable employment in the country. PIDE released a report stating that the Government's modest restrictions could result in unemployment of 12.3 million workers, which represents 46.3% of the entire number of vulnerable employment and 19.4% of the whole employment number in Pakistan (57). According to the experts' estimation, the number of layoffs/job cuts in the retail and wholesale sectors would reach 4.55 million. As a result, Pakistan's poverty rate could rise from 23.40 to 44.20%, which will negatively impact individuals' quality of life (58).

COVID-19 AND TRADE DISRUPTIONS

The emergence of a global health emergency caused by the hit of the COVID-19 epidemic challenged global trade. Globally, enterprises encountered numerous problems with certain levels of economic losses, such as fall in demand, raw materials shortage, and disruptions in trade, transportation, supply chains, and export commodities orders cancelations. The outbreak of COVID-19 massively affected micro as well as small and medium enterprises worldwide. These firms are the backbone and engine of global economies, which generate employment opportunities on a large scale. The Pakistani SMEs' contribution is substantial. They add 40% to national GDP, and 90% of the registered 3.2 million enterprises are SMEs and contribute over 40% of total exports (11, 12, 59). At the domestic level, social distancing measures, mainly the blockade, have caused inconvenience and shortages of supply. Besides, import restrictions and delays/cancellations of export orders have led to a decline in global trade, which has significantly slowed the pace of economic and trade activities. Even if defensive measures have contained the spread of coronavirus, the internal economic functions of the economy are facing disruptions; however, the COVID-19 pandemic has struck countries that are part of the global value chain (VGC) (35, 60). Pakistan imposed social gathering restrictions and ordered to close educational intuitions to minimize the rapid spread of the coronavirus disease through complete and smart lockdowns at various stages, which caused disruptions in economic and trade activities. The five main trading partners of Pakistan who account for 50% of the trade share are China, the United States, the United Kingdom, Japan, and Germany. Four of these partners are also the countries hardest hit by COVID-19. The pandemic of coronavirus has severely affected the international trade flows of these countries, and export volume from China and Japan fell over 15%. The other three countries' exports slowed down by 5% (61–63).

THE COVID-19 PANDEMIC INFLUENCES ON ECONOMY'S CRITICAL SECTORS

The ongoing spread of the coronavirus pandemic affects the global economy. As a result, this epidemic (COVID-19) also hit all sectors of Pakistan economies, which disrupted trade and economic activities in the country. The crisis has affected the real estate market and property valuation and changed customer satisfaction in many industries (64–66). The pandemic is still spreading worldwide, and Pakistan's business community has begun to look for alternative options to purchase raw materials to produce goods. Spectrum Securities Limited released a report and warned that if the pandemic continues to spread for the next few months, it will adversely affect various sectors of the economy (67–70). The report stated that there is a prolonged interruption in the supply chains to receive raw materials. China has restricted transportation and other business activities to mitigate the virus infection. Accordingly, the industrial sector is facing a significant shortage of raw material supplies as they import these items from China. It has slowed down manufacturing activities, and further delays might have disrupted producing goods. This panic situation has caused more inflation and left adverse effects on critical accounts of the economic sectors. However, Pakistan reported an 11.4% upsurge in large-scale manufacturing by December 2020 over the previous year (36).

IMPACT OF COVID-19 OUTBREAK ON THE STEEL INDUSTRY

The competition in the steel industry is very high, and producers tried to meet the global demand of 1,869.9 million tons of crude steel with a rising demand of 5.7%, with 1,341.6 Million tons production in and 3.4% more produced worldwide in 2019. China is the leading global exporter of steel with the highest output in the world. Pakistan imported steel products amounting to 1,390,561 million US dollars, which was 3% of the total steel exports in China in 2019. At the advent of the coronavirus (COVID-19), China's steel industry faced great difficulties due to lockdown and closure of the industry (71). In China and the rest of the world, the long-term effects of the coronavirus pandemic (COVID-19) are still pending. The experts have predicted that this outbreak has adversely struck the global steel industry, at least in the short to medium term. China is the largest producer of steel and its alloys, and it has restricted supplies and transportation. At the same time, India is focusing on increasing its share of steel products and raw materials goods in the global steel market (63, 72).

On the other hand, Pakistan's steel industry significantly relies on raw materials imported from China. Japan and the local industry are under pressure to produce goods because of this blockade from China. The effects of the infection of COVID-19 are still ongoing, and the business community is looking for alternatives at a reasonable cost to produce products to supply orders to carry on manufacturing and construction activities in the country. India is the second-largest steel producer after China, with an annual output of more than 106 million tons. Pakistan has the opportunity to buy raw materials for steel production from India. Over the past few years, excessive tensions between India and Pakistan have limited imports of various industrial raw materials, such as certain raw materials to produce pharmaceutical products. Pharmaceutical firms in Pakistan need to import raw materials to produce medicines to combat COVID-19 and provide relief to the public to improve the quality of life (73).

LINKAGE BETWEEN COVID-19 AND DECLINE IN TOURISM AND TRAVEL INDUSTRY

The advent of the infectious disease COVID-19 has hugely affected the tourism industry by bringing the world to a standstill position. Against a background of heightened uncertainty, reliable and up-to-date information is more imperative than ever before both for the tourism industry and tourists (74). The outbreak of COVID-19 has had a significant effect on tourism due to travel restrictions with a slump in travel demand among tourists worldwide. Several countries and regions have posed travel restrictions and entry bans to contain the spread of COVID-19 infection. The World Tourism Organization of UNO projected that international tourist arrivals would fall by 20–30% in 2020, which will lead to a potential economic loss of 30–50 billion US dollars. The global travelers' planned travel went down by 80–90% due to unilateral and conflicting travel restrictions that have taken place regionally due to the COVID-19 pandemic. The pandemic adversely affected tourist attractions, such as sports venues, amusement parks, museums, and entertainment worldwide. Many countries have restricted entries to main tourism destinations, airlines have restricted flight operations, organizers canceled business meetings and conferences, and hotels canceled room bookings. These measures against the spread of the pandemic have affected the tourism and hotel industry worldwide. Pakistan also posed restrictions on tourism and the hotel industry, and bookings have dropped drastically, which caused a significant loss to the hotel industry (75).

Many workers have lost their employment since March 2020. Numerous hotels received orders to cancel reservations as foreign travelers canceled travel plans, domestic tourists halted travel, and companies' business officials postponed travel activities. Pakistan Hotel Association stated that 200 registered business members with the hotel industry dropped their booking drastically with the advent of the pandemic in Pakistan. The hotel industry recorded a PKR 100 million loss in February 2020 due to a significant fall of guests. The emergence of the epidemic (COVID-19) has also affected the economy of Pakistan severely. There are 317,595 confirmed cases of coronavirus in Pakistan, as of October 9, 2020, and the pandemic has massively affected all sectors of the national economy. By January, the booking rate reached 95%, and it fell to 40% by the first week of March 2020 for the hotel industry (76, 77). With the reduction of outbound tourism, the amount of inbound tourism in Pakistan has also remained significantly reduced. Besides, tourism trends in Pakistan have fallen by 60–70% due to concerns about the coronavirus. The number of travelers leaving Pakistan for overseas travel is minimal, mainly due to the European embargo and the United States travel instructions issued to travelers from different countries. However, summer vacations were once the peak season for tourism in Pakistan. However, most businesses will now cease to close after an early leave announcement in Sindh this year (78).

THE MASSIVE IMPACT OF CORONAVIRUS ON PROPERTY MARKETS

The emergence of the COVID-19 pandemic has massively hit the real estate and energy sectors in unprecedented ways around the world (79–85). The unemployment rate in the United States remains sky high with the advent of the pandemic's lockdown and closure of business activities. The unemployment rate was 13.3% in May although down from 14.70% recorded in April 2020. If the pandemic prolongs, it will cause significant problems and possibly a knock-on effect. The capital value of the real estate's retail properties falls by 20–30%, according to Professor Nori Gerardo Lietz, a real estate investment teacher at Harvard Business School. The unlevered value of enterprises of the real estate assets had decreased by more than 25% in most sectors, particularly in the hotel and leisure sectors (86). The COVID-19 pandemic has hit the real estate sector in Italy, and estimation shown the fall in turnover between €9 and 22 billion

compared with the first quarter of 2019. This result refers to the already rising demand for high-quality properties, which provide a safe, convenient, efficient, and healthy working and living environment. Concerning the real estate industry in Pakistan, it suffered a lot after a change in the government regime in 2018. The Government launched new policies and taxes, which greatly affected this industry and dampened consumers' confidence. The past 2 years immensely changed a large number of property dealers, builders, and investors because of unfavorable economic conditions. The real estate survives mainly on the significant investments by overseas Pakistanis; however, this test seems longer as the COVID-19 pandemic has hugely affected everyone and the real estate market in all major cities, including Lahore, Islamabad, Karachi, and Multan received a massive hit (87, 88). Bahria Town Lahore and Karachi closed all public spaces and closed places in these societies, including the Eiffel Tower, Zoo, Gymnasiums, Parks, and Sports fields. It means that all real estate transactions will stop for an indefinite period until the situation improves. The situation is getting better, and the real estate industry is reviving to reasonable conditions gradually as the Government has recently lifted travel restrictions (65). However, fear still remains. As a precautionary measure, some major builders of societies, including Bahria Town Lahore, Islamabad and Karachi, and DHA projects, have closed offices and facilities to mitigate the spread of the pandemic (87).

THE COVID-19 ADVERSITY AND PHARMACEUTICAL SECTOR

Pakistan's pharmaceutical industry made good growth during recent decades (89–94). There are more than 800 large volume companies of pharmaceutical units, including 25 multinational operated pharma firms in the country (95). The pharma companies import raw materials from abroad to make medicines (91). The primary raw materials come from China, India, and Europe. The pandemic resulted in numerous health challenges (25, 29, 96–98). The Pakistan pharmaceutical industry is self-sufficient and meets more than 90% of the demand of the country. China is a significant producer of low-cost generic medicines and raw materials to make medicines (99). Most of the pharmaceutical companies entirely or partially rely on the pharmaceutical industry of China. Pakistan relies on China to supply active drug ingredients and other chemicals such as paracetamol, penicillin, analgesic ibuprofen, and popular diabetes drugs. However, pharma companies import some semi-APIs from India, Europe, and other countries. Imports from China account for 25% of Pakistan's total chemical and pharmaceutical raw materials to produce final drugs. While this critical figure could affect the country's drug production, it depends on the level of stock maintained by local pharmaceutical companies. Pakistan imports some portion of the medicines from overseas pharmaceutical companies. The advent of COVID-19 has massively affected the production of drugs worldwide. The outbreak of COVID-19 struck Pakistan and disrupted the supply chain of drugs. COVID-19 caused a shortage of raw materials and resulted in massive problems due to restrictions on transportation from China and other global suppliers (100). The crisis caused challenges for the people and affects life quality massively (43). Prices of medicines have risen, and it greatly affected the quality of life of the people (43, 101, 102). It was out of reach for people because of the economic crisis in Pakistan. Social support programs can secure workers health safety, which can increase employees' mental well-being (103–106).

DISCUSSION AND CONCLUSION

The Coronavirus pandemic (COVID-19) emerged as the worst health calamity of the world within the past century. Globally, human societies faced the most thought-provoking health disaster since the catastrophe of World War II. Wuhan city reported this new type of infectious respiratory disease at the end of December 2019. The pandemic spread rapidly worldwide, posing substantial economic, environmental, social, and health challenges and massively disrupting social, economic, and religious communication and interaction worldwide (107). Globally, many countries are working to reduce the rapid spread of this ongoing COVID-19 pandemic through experimental facilities, identifying suspected and infected patients, and restricting social gatherings by implementing lockdown strategies (108). This study focused on identifying the massive effects of the COVID-19 epidemic on various segments of human society. The advent of the COVID-19 pandemic has shaken political, environmental, economic, health, and social factors foundations around the world. The pandemic caused mental stress and individuals used social media platform to seek health-related information. Some people were addicted to Facebook (44). At present, the appearance of the COVID-19 outbreak has most severely affected developing countries, including Pakistan. The pandemic has posed challenges for prioritizing lifestyle based on health promotion to prioritize health needs for students (109, 110). The healthcare systems, economic growth, resources, and governance problems have obstructed remedial action to revive the economy. This study aims to provide some limited prediction work on the economic impact of Covid-19 in the entire core economic field to illustrate the financial danger posed by the coronavirus pandemic to Pakistan. The ongoing spread of the coronavirus epidemic impacted economies. As a result, the (COVID-19) pandemic also hit the Pakistan economy's critical sectors and disrupted social interaction, trade, and economic activities. The government of Pakistan approved economic relief packages to uplift the lower-income segments of Pakistani society and provided financial support to improve their quality of life.

The pandemic spread has massively affected significant factors of the economy, such as imports, exports, remittance, public health, tourism, steel, agriculture, real estate, and pharmaceutical sectors. The adverse effects of the pandemic are still spreading, and business communities are searching for alternative ways to import raw materials for goods productions. Pakistani business firms mostly import raw materials from China, India, and other countries; however, China and other suppliers have posed restrictions on transportation and business activities to

suppress the infection of COVID-19. The industrial sector has encountered a great challenge of raw material supply from China, which delayed the manufacturing process of commodities. The ongoing spread of COVID-19 caused a price hike and higher inflation and affected quality of life. The prices of medicines have risen, and it greatly affected the quality of life of the people. Medicine was out of reach for people because of the economic crisis in Pakistan. The arrival of the COVID-19 pandemic struck the tourism industry adversely and brought the world to a standstill position. Pakistan has reported an almost 11.4% increase in large-scale manufacturing by December 2020 over the previous year. Against a backdrop of heightened uncertainty and a dreaded situation of the coronavirus pandemic, reliable and up-to-date news is imperative for the tourism industry and tourists. Travel restrictions caused by the epidemic have adversely affected tourism and hotel industries with a slump in travel demand around the world. Numerous countries imposed travel restrictions as well as entry bans to control and mitigate infection of the coronavirus. With the blockade of economic activities, the pandemic spread has dramatically affected the quality of life of ordinary people worldwide. Evidently, due to insufficient resources to manage the adverse effects of the COVID-19 pandemic, it is uncertain how the health professionals and world leaders will deal with the present looming global mental health challenges and the COVID-19's spillover impacts on the economic crisis worldwide.

This study results provide a detailed analysis of the critical factors of the economy and health issues with global perspective implications. This article primarily focused on exploring economic consequences on the global economies and discussed Pakistan as a case study. The study contributes to the literature on the COVID-19 crisis. It examined the implications of the pandemic on financial and global health issues by examining America, Asia, Europe, Africa, Australia, and the Middle East. This study reports some limitations as it discussed health challenges and some critical economic factors that caused significant disruptions' with the downward trend of the economic growth. Forthcoming studies can explore other elements due to COVID-19 that posed damage to the economy and mental well-being. Future researches can investigate global health emergencies and disruptions in the mechanism of supply and demand. The effect that the pandemic has had on travel, service, tourism, food, and energy consumption demands can contribute interesting results. The pandemic's upcoming studies can explore the COVID-19 outbreak's socio-economic effects, available treatments, vaccination facilities, and reducing mental health stress to fight against this ongoing infectious disease. The study proposes non-pharmaceutical interventions to formulate smart lockdown strategies to restart economic activities. Work from home, online business, home delivery services, digital currency use, and Government support for health and business support will help progress toward the next normal in society.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

JA conceptualized the idea, contributed to study design, completed the entire article, including introduction, literature, discussion, conclusion, and edited the original manuscript before submission. CW and KD contributed to edited the revised manuscript and contributed to the literature, discussion, and conclusion. DW the study design, analysis, reviewed and approved the final edited version, and supervised this research paper. RM approved the final edited version and contributed to the literature, discussion, and conclusion. All authors contributed to the article and approved the submitted version.

REFERENCES

1. Silva PCL, Batista PVC, Lima HS, Alves MA, Guimarães FG, Silva RCP. COVID-ABS: an agent-based model of COVID-19 epidemic to simulate health and economic effects of social distancing interventions. *Chaos Solit Fract.* (2020) 139:110088. doi: 10.1016/j.chaos.2020.110088
2. Azomahou TT, Ndung'u N, Ouédraogo M. Coping with a dual shock: the economic effects of COVID-19 and oil price crises on African economies. *Resourc Policy.* (2021) 72:102093. doi: 10.1016/j.resourpol.2021.102093
3. Zhang X. Broadband and economic growth in China: an empirical study during the COVID-19 pandemic period. *Telemat Informat.* (2021) 58:101533. doi: 10.1016/j.tele.2020.101533
4. Rose A. COVID-19 economic impacts in perspective: a comparison to recent U.S. Disasters. *Int J Disast Risk Reduct.* (2021) 60:102317. doi: 10.1016/j.ijdrr.2021.102317
5. Chen CL, Lai CC, Luh DL, Chuang SY, Yang KC, Yeh YP, et al. Review of epidemic, containment strategies, clinical management, and economic evaluation of COVID-19 pandemic. *J Formos Med Assoc.* (2021) 120(Suppl. 1):S6–18. doi: 10.1016/j.jfma.2021.05.022
6. Mann FD, Krueger RF, Vohs KD. Personal economic anxiety in response to COVID-19. *Pers Individ Dif.* (2020) 167:110233. doi: 10.1016/j.paid.2020.110233
7. Mtimet N, Wanyoike F, Rich KM, Baltenweck I. Zoonotic diseases and the COVID-19 pandemic: economic impacts on Somaliland's livestock exports to Saudi Arabia. *Global Food Sec.* (2021) 28:100512. doi: 10.1016/j.gfs.2021.100512
8. Nundy S, Ghosh A, Mesloub A, Albaqawy GA, Alnaim MM. Impact of COVID-19 pandemic on socio-economic, energy-environment and transport sector globally and sustainable development goal (SDG). *J Clean Prod.* (2021) 312:127705. doi: 10.1016/j.jclepro.2021.127705
9. Chen S, Prettner K, Kuhn M, Bloom DE. The economic burden of COVID-19 in the United States: Estimates and projections under an infection-based herd immunity approach. *J Econ Ageing.* (2021) 20:100328. doi: 10.1016/j.jeoa.2021.100328
10. Nie D, Shen F, Wang J, Ma X, Li Z, Ge P, et al. Changes of air quality and its associated health and economic burden in 31 provincial capital cities in China during COVID-19 pandemic. *Atmos Res.* (2021) 249:105328. doi: 10.1016/j.atmosres.2020.105328

11. Shafi M, Liu J, Ren W. Impact of COVID-19 pandemic on micro, small, and medium-sized Enterprises operating in Pakistan. *Res Glob.* (2020) 2:100018. doi: 10.1016/j.resglo.2020.100018
12. Abbas J, Raza S, Nurunnabi M, Minai MS, Bano S. The impact of entrepreneurial business networks on firms' performance through a mediating role of dynamic capabilities. *Sustainability.* (2019) 11:3006. doi: 10.3390/su11113006
13. Tisdell CA. Economic, social and political issues raised by the COVID-19 pandemic. *Econ Anal Policy.* (2020) 68:17–28. doi: 10.1016/j.eap.2020.08.002
14. Abdullah M, Ali N, Hussain SA, Aslam AB, Javid MA. Measuring changes in travel behavior pattern due to COVID-19 in a developing country: a case study of Pakistan. *Transport Policy.* (2021) 108:21–33. doi: 10.1016/j.tranpol.2021.04.023
15. Dhahri AA, Iqbal MR, Ali Khan AF. A cross-sectional survey on availability of facilities to healthcare workers in Pakistan during the COVID-19 pandemic. *Ann Med Surg.* (2020) 59:127–30. doi: 10.1016/j.amsu.2020.09.027
16. Gulati G, Kelly BD. Domestic violence against women and the COVID-19 pandemic: what is the role of psychiatry? *Int J Law Psychiatry.* (2020) 71:101594. doi: 10.1016/j.ijlp.2020.101594
17. Islam MA, Kundu S, Alam SS, Hossan T, Kamal MA, Hassan R. Prevalence and characteristics of fever in adult and paediatric patients with coronavirus disease 2019 (COVID-19): a systematic review and meta-analysis of 17515 patients. *PLoS ONE.* (2021) 16:e0249788. doi: 10.1371/journal.pone.0249788
18. Islam MA, Alam SS, Kundu S, Hossan T, Kamal MA, Cavestro C. Prevalence of headache in patients with coronavirus disease 2019 (COVID-19): a systematic review and meta-analysis of 14,275 patients. *Front Neurol.* (2020) 11:562634. doi: 10.3389/fneur.2020.562634
19. Saniasiaya J, Islam MA, Abdullah B. Prevalence of olfactory dysfunction in coronavirus disease 2019 (COVID-19): a meta-analysis of 27,492 patients. *Laryngoscope.* (2021) 131:865–78. doi: 10.1002/lary.29286
20. Saniasiaya J, Islam MA, Abdullah B. Prevalence and characteristics of taste disorders in cases of COVID-19: a meta-analysis of 29,349 patients. *Otolaryngol Head Neck Surg.* (2021) 165:33–42. doi: 10.1177/0194599820981018
21. Su Z, McDonnell D, Cheshmehzangi A, Abbas J, Li X, Cai Y. The promise and perils of unit 731 data to advance COVID-19 research. *BMJ Global Health.* (2021) 6:e004772. doi: 10.1136/bmjgh-2020-004772
22. Oran DP, Topol EJ. The proportion of SARS-CoV-2 infections that are asymptomatic. *Ann Intern Med.* (2021) 174:655–62. doi: 10.7326/M20-6976
23. Su Z, McDonnell D, Wen J, Kozak M, Abbas J, Šegalo S, et al. Mental health consequences of COVID-19 media coverage: the need for effective crisis communication practices. *Global Health.* (2021) 17:4. doi: 10.1186/s12992-020-00654-4
24. NeJhaddadgar N, Ziapour A, Zakkipour G, Abbas J, Abolfathi M, Shabani M. Effectiveness of telephone-based screening and triage during COVID-19 outbreak in the promoted primary healthcare system: a case study in Ardabil province, Iran. *Z Gesundh Wiss.* (2020) 29:1–6. doi: 10.1007/s10389-020-01407-8
25. Shuja KH, Aqeel M, Jaffar A, Ahmed A. COVID-19 pandemic and impending global mental health implications. *Psychiatr Danub.* (2020) 32:32–5. doi: 10.24869/psyd.2020.32
26. Abbas J. Crisis management, transnational healthcare challenges and opportunities: the intersection of COVID-19 pandemic and global mental health. *Res Glob.* (2021) 3:100037. doi: 10.1016/j.resglo.2021.100037
27. Yoosefi Lebni J, Abbas J, Moradi F, Salahshoor MR, Chaboksavar F, Irandoost SF, et al. How the COVID-19 pandemic effected economic, social, political, and cultural factors: a lesson from Iran. *Int J Soc Psychiatry* (2021) 67:298–300. doi: 10.1177/0020764020939984
28. Buitrago-Garcia D, Egli-Gany D, Counotte MJ, Hossmann S, Imeri H, Ipekci AM, et al. Occurrence and transmission potential of asymptomatic and presymptomatic SARS-CoV-2 infections: a living systematic review and meta-analysis. *PLoS Med.* (2020) 17:e1003346. doi: 10.1371/journal.pmed.1003346
29. Shuja KH, Shahidullah, Aqeel M, Khan EA, Abbas J. Letter to highlight the effects of isolation on elderly during COVID-19 outbreak. *Int J Geriatr Psychiatry.* (2020) 35:1477–8. doi: 10.1002/gps.5423
30. Arshad N, Naqi SA, Kumar J. A novel coronavirus transmission from China to Pakistan via different countries; a review. *Prof Med J.* (2020) 27:876–9. doi: 10.29309/TPMJ/2020.27.04.4683
31. Javed B, Sarwer A, Soto EB, Mashwani Z-u-R. Is Pakistan's response to coronavirus (SARS-CoV-2) adequate to prevent an outbreak? *Front Med.* (2020) 7:158. doi: 10.3389/fmed.2020.00158
32. Geng D, Innes J, Wu W, Wang G. Impacts of COVID-19 pandemic on urban park visitation: a global analysis. *J Forest Res.* (2021) 32:553–67. doi: 10.1007/s11676-020-01249-w
33. Funk CD, Laferriere C, Ardakani A. A snapshot of the global race for vaccines targeting SARS-CoV-2 and the COVID-19 pandemic. *Front Pharmacol.* (2020) 11:937. doi: 10.3389/fphar.2020.00937
34. Governemnt-of-Pakistan. *COVID-19 Cases in Pakistan.* (2020). Available online at: http://covid.gov.pk/stats/pakistan (accessed June 7, 2021).
35. Wang Q, Han X. Spillover effects of the United States economic slowdown induced by COVID-19 pandemic on energy, economy, and environment in other countries. *Environ Res.* (2021) 196:110936. doi: 10.1016/j.envres.2021.110936
36. Hawkins RB, Charles EJ, Mehaffey JH. Socio-economic status and COVID-19-related cases and fatalities. *Public Health.* (2020) 189:129–34. doi: 10.1016/j.puhe.2020.09.016
37. Ullah, A, Pinglu C, Ullah S, Abbas HSM, Khan S. The role of E-governance in combating COVID-19 and promoting sustainable development: a comparative study of China and Pakistan. *Chinese Polit Sci Rev.* (2020) 6:86–118. doi: 10.1007/s41111-020-00167-w
38. Kakakhel MA, Wu F, Khan TA, Feng H, Hassan Z, Anwar Z, et al. The first two months epidimiological study of COVID-19, related public health preparedness, and response to the ongoing epidemic in Pakistan. *New Microbes New Infect.* (2020) 37:100734. doi: 10.1016/j.nmni.2020.100734
39. Bilal, Latif F, Bashir MF, Komal B, Tan D. Role of electronic media in mitigating the psychological impacts of novel coronavirus (COVID-19). *Psychiatry Res.* (2020) 289:113041. doi: 10.1016/j.psychres.2020.113041
40. Asghar N, Batool M, Farooq F, Ur Rehman H. COVID-19 pandemic and Pakistan economy: a preliminary survey. *Rev Econ Dev Stud.* (2020) 6:447–59. doi: 10.47067/reads.v6i2.222
41. Waris A, Atta UK, Ali M, Asmat A, Baset A. COVID-19 outbreak: current scenario of Pakistan. *New Microb New Infect.* (2020) 35:100681. doi: 10.1016/j.nmni.2020.100681
42. Verma S, Gustafsson A. Investigating the emerging COVID-19 research trends in the field of business and management: a bibliometric analysis approach. *J Bus Res.* (2020) 118:253–61. doi: 10.1016/j.jbusres.2020.06.057
43. Yoosefi Lebni J, Abbas J, Khorami F, Khosravi B, Jalali A, Ziapour A. Challenges facing women survivors of self-Immolation in the Kurdish Regions of Iran: a qualitative study. *Front Psychiatry.* (2020) 11:778. doi: 10.3389/fpsyt.2020.00778
44. Azadi NA, Ziapour A, Lebni JY, Irandoost SF, Abbas J, Chaboksavar F. The effect of education based on health belief model on promoting preventive behaviors of hypertensive disease in staff of the Iran University of Medical Sciences. *Arch. Public Health*, (2021) 79:69. doi: 10.1186/s13690-021-00594-4
45. Abbas J, Mubeen R, Iorember PT, Raza S, Mamirkulova G. Exploring the impact of COVID-19 on tourism: transformational potential and implications for a sustainable recovery of the travel and leisure industry. *Curr Res Behav Sci.* (2021) 2:100033. doi: 10.1016/j.crbeha.2021.100033
46. Maqbool A, Khan NZ. Analyzing barriers for implementation of public health and social measures to prevent the transmission of COVID-19 disease using DEMATEL method. *Diabetes Metab Syndr Clin Res Rev.* (2020) 14:887–92. doi: 10.1016/j.dsx.2020.06.024
47. Leung TY, Sharma P, Adithipyangkul P, Hosie P. Gender equity and public health outcomes: The COVID-19 experience. *J Bus Res.* (2020) 116:193–8. doi: 10.1016/j.jbusres.2020.05.031
48. Chan Sun M, Lan Cheong Wah CB. Lessons to be learnt from the COVID-19 public health response in Mauritius. *Public Health Pract.* (2020) 1:100023. doi: 10.1016/j.puhip.2020.100023
49. Desk N. *Dun & Bradstreet Shares an Overview of the Impact of COVID-19 on Pakistan's Economy.* (2020). Available online at: https://mettisglobal.

news/dun-bradstreet-shares-an-overview-of-the-impact-of-covid-19-on-pakistans-economy (accessed June 7, 2021).
50. Habib M, Abbas M. Facing the threat of COVID-19 in Pakistan: a Nation's dilemma. *Value Health Reg Issues*. (2021) 24:90–5. doi: 10.1016/j.vhri.2020.10.005
51. Shrestha N, Shad MY, Ulvi O, Khan MH, Karamehic-Muratovic A, Nguyen US, et al. The impact of COVID-19 on globalization. *One Health*. (2020) 11:100180. doi: 10.1016/j.onehlt.2020.100180
52. Tran BX, Nguyen HT, Le HT, Latkin CA, Pham HQ, Vu LG, et al. Impact of COVID-19 on economic well-being and quality of life of the vietnamese during the national social distancing. *Front Psychol*. (2020) 11:565153. doi: 10.3389/fpsyg.2020.565153
53. Anwar J. Analysis of energy security, environmental emission and fuel import costs under energy import reduction targets: a case of Pakistan. *Renew Sustain Energy Rev*. (2016) 65:1065–78. doi: 10.1016/j.rser.2016.07.037
54. Tahir M, Khan I, Shah AM. Foreign remittances, foreign direct investment, foreign imports and economic growth in Pakistan: a time series analysis. *Arab Econ Bus J*. (2015) 10:82–9. doi: 10.1016/j.aebj.2015.06.001
55. Askarov Z, Doucouliagos H. A meta-analysis of the effects of remittances on household education expenditure. *World Dev*. (2020) 129:104860. doi: 10.1016/j.worlddev.2019.104860
56. Blustein DL, Duffy R, Ferreira JA, Cohen-Scali V, Cinamon RG, Allan BA. Unemployment in the time of COVID-19: a research agenda. *J Vocat Behav*. (2020) 119:103436. doi: 10.1016/j.jvb.2020.103436
57. Zomalheto Z, Assogba C, Dossou-yovo H. Impact of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) infection and disease-2019 (COVID-19) on the quality of life of rheumatoid arthritis patients in Benin. *Egypt Rheumatol*. (2021) 43:23–7. doi: 10.1016/j.ejr.2020.07.001
58. Noreen N, Dil S, Niazi SUK, Naveed I, Khan NU, Khan FK, et al. COVID 19 pandemic & Pakistan; limitations and gaps. *Global Biosecur*. (2020) 1:1–11. doi: 10.31646/gbio.63
59. Ikram, M, Sroufe R, Mohsin M, Ahmed Solangi Y, Zulfiqar Ali Shah S, Shahzad F. Does CSR influence firm performance? A longitudinal study of SME sectors of Pakistan. *J Glob Responsibil*. (2020) 11:27–53. doi: 10.1108/jgr-12-2018-0088
60. Abbas J, Aman J, Nurunnabi M, Bano S. The impact of social media on learning behavior for sustainable education: evidence of students from selected universities in Pakistan. *Sustainability*. (2019) 11:1683. doi: 10.3390/su11061683
61. Qazi SH, Saleem A, Pirzada AN, Hamid LR, Dogar SA, Das JK. Challenges to delivering pediatric surgery services in the midst of COVID 19 crisis: experience from a tertiary care hospital of Pakistan. *Pediatr Surg Int*. (2020) 36:1267–73. doi: 10.1007/s00383-020-04721-0
62. Kurbucz MT. A joint dataset of official COVID-19 reports and the governance, trade and competitiveness indicators of World Bank group platforms. *Data Brief*. (2020) 31:105881. doi: 10.1016/j.dib.2020.105881
63. Wang Q, Wang S. Preventing carbon emission retaliatory rebound post-COVID-19 requires expanding free trade and improving energy efficiency. *Sci Total Environ*. (2020) 746:141158. doi: 10.1007/978-981-13-9528-4
64. Hussain T, Abbas J, Wei Z, Ahmad S, Xuehao B, Gaoli Z. Impact of urban village disamenity on neighboring residential properties: empirical evidence from Nanjing through hedonic pricing model appraisal. *J Urban Plann Dev*. (2021) 147:04020055. doi: 10.1061/(ASCE)UP.1943-5444.0000645
65. Hussain T, Abbas J, Wei Z, Nurunnabi M. The effect of sustainable urban planning and slum disamenity on the value of neighboring residential property: application of the hedonic pricing model in rent price appraisal. *Sustainability*. (2019) 11:1144. doi: 10.3390/su11041144
66. Anjum MN, Xiuchun B, Abbas J, Shuguang Z, McMillan D. Analyzing predictors of customer satisfaction and assessment of retail banking problems in Pakistan. *Cogent Bus Manag*. (2017) 4:1338842. doi: 10.1080/23311975.2017.1338842
67. Usman O, Iorember PT, Olanipekun IO. Revisiting the environmental Kuznets curve (EKC) hypothesis in India: the effects of energy consumption and democracy. *Environ Sci Pollut Res Int*. (2019) 26:13390–400. doi: 10.1007/s11356-019-04696-z
68. Tortorella GL, Narayanamurthy G, Vijaya SM, Cauchick-Miguel PA. Operations Management teaching practices and information technologies adoption in emerging economies during COVID-19 outbreak. *Technol Forecast Soc Change*. (2021) 171:120996. doi: 10.1016/j.techfore.2021.120996
69. Rahman T, Taghikhah F, Paul SK, Shukla N, Agarwal R. An agent-based model for supply chain recovery in the wake of the COVID-19 pandemic. *Comp Indust Eng*. (2021) 158:107401. doi: 10.1016/j.cie.2021.107401
70. Barman A, Das R, De PK. Impact of COVID-19 in food supply chain: disruptions and recovery strategy. *Curr Res Behav Sci*. (2021) 2:100017. doi: 10.1016/j.crbeha.2021.100017
71. Goodell JW, Huynh TLD. Did Congress trade ahead? Considering the reaction of US industries to COVID-19. *Finan Res Lett*. (2020) 36:101578. doi: 10.1016/j.frl.2020.101578
72. Norouzi N, Zarazua de Rubens G, Choupanpiesheh S, Enevoldsen P. When pandemics impact economies and climate change: exploring the impacts of COVID-19 on oil and electricity demand in China. *Energy Res Soc Sci*. (2020) 68:101654. doi: 10.1016/j.erss.2020.101654
73. Lu L, Peng J, Wu J, Lu Y. Perceived impact of the Covid-19 crisis on SMEs in different industry sectors: evidence from Sichuan, China. *Int J Disaster Risk Reduct*. (2021) 55:102085. doi: 10.1016/j.ijdrr.2021.102085
74. Azizi MR, Atlasi R, Ziapour A, Abbas J, Naemi R. Innovative human resource management strategies during the COVID-19 pandemic: a systematic narrative review approach. *Heliyon*. (2021) 7:e07233. doi: 10.1016/j.heliyon.2021.e07233
75. Qiu RTR, Park J, Li S, Song H. Social costs of tourism during the COVID-19 pandemic. *Ann Tourism Res*. (2020) 84:102994. doi: 10.1016/j.annals.2020.102994
76. Rasheed R, Rizwan A, Javed H, Sharif F, Zaidi A. Socio-economic and environmental impacts of COVID-19 pandemic in Pakistan-an integrated analysis. *Environ Sci Pollut Res*. (2021) 28:19926–43. doi: 10.1007/s11356-020-12070-7
77. Zenker S, Kock F. The coronavirus pandemic – a critical discussion of a tourism research agenda. *Tourism Manag*. (2020) 81:104164. doi: 10.1016/j.tourman.2020.104164
78. Sigala M. Tourism and COVID-19: impacts and implications for advancing and resetting industry and research. *J Bus Res*. (2020) 117:312–21. doi: 10.1016/j.jbusres.2020.06.015
79. Abbasi KR, Hussain K, Abbas J, Adedoyin FF, Shaikh PA, Yousaf H, et al. Analyzing the role of industrial sector's electricity consumption, prices, and GDP: a modified empirical evidence from Pakistan. *AIMS Energy*. (2021) 9:29–49. doi: 10.3934/energy.2021003
80. Abbasi KR, Abbas J, Tufail M. Revisiting electricity consumption, price, and real GDP: a modified sectoral level analysis from Pakistan. *Energy Policy*. (2021) 149:112087. doi: 10.1016/j.enpol.2020.112087
81. Philip A, Iorember PT. Macroeconomic and household welfare impact of increase in minimum wage in Nigeria: a computable general equilibrium model. *Am J Econ*. (2017) 7:249–58. doi: 10.5923/j.economics.20170705.06
82. Goshit GG, Iorember PT. Measuring the asymmetric pass-through of monetary policy rate to unemployment in Nigeria: evidence from nonlinear ARDL. *Nigerian J Econ Soc Stud*. (2020) 62:369–87. Available online at: https://www.njess.org/journal/njess/articles?id=51
83. Usman O, Olanipekun IO, Iorember PT, Abu-Goodman M. Modelling environmental degradation in South Africa: the effects of energy consumption, democracy, and globalization using innovation accounting tests. *Environ Sci Pollut Res Int*. (2020) 27:8334–49. doi: 10.1007/s11356-019-06687-6
84. Jelilov G, Iorember PT, Usman O, Yua PM. Testing the nexus between stock market returns and inflation in Nigeria: does the effect of COVID-19 pandemic matter? *J Public Aff*. (2020) 20:e2289. doi: 10.1002/pa.2289
85. Iorember PT, Jelilov G, Usman O, Isik A, Celik B. The influence of renewable energy use, human capital, and trade on environmental quality in South Africa: multiple structural breaks cointegration approach. *Environ Sci Pollut Res Int*. (2021) 28:13162–74. doi: 10.1007/s11356-020-11370-2
86. Tanrivermiş H. Possible impacts of COVID-19 outbreak on real estate sector and possible changes to adopt: a situation analysis and general assessment on Turkish perspective. *J Urban Manage*. (2020) 9:263–9. doi: 10.1016/j.jum.2020.08.005

87. UPN. *Coronavirus Impact on Real Estate in Pakistan.* (2020). Available online at: https://www.ourupn.com/covid-19-coronavirus-impact-real-estate-pakistan/ (accessed June 7, 2021).
88. Dutta A, Das D, Jana RK, Vo XV. COVID-19 and oil market crash: revisiting the safe haven property of gold and Bitcoin. *Resour Policy*. (2020) 69:101816. doi: 10.1016/j.resourpol.2020.101816
89. Koster ES, Philbert D, Bouvy ML. Impact of the COVID-19 epidemic on the provision of pharmaceutical care in community pharmacies. *Res Soc Administr Pharm.* (2021) 17:2002–4. doi: 10.1016/j.sapharm.2020.07.001
90. Lin TY, Liao SH, Lai CC, Paci E, Chuang SY. Effectiveness of non-pharmaceutical interventions and vaccine for containing the spread of COVID-19: three illustrations before and after vaccination periods. *J Formos Med Assoc*. (2021) 120(Suppl. 1):S46–56. doi: 10.1016/j.jfma.2021.05.015
91. Song Z, Hu Y, Zheng S, Yang L, Zhao R. Hospital pharmacists' pharmaceutical care for hospitalized patients with COVID-19: recommendations and guidance from clinical experience. *Res Soc Adm Pharm*. (2021) 17:2027–31. doi: 10.1016/j.sapharm.2020.03.027
92. Hua X, Gu M, Zeng F, Hu H, Zhou T, Zhang Y, et al. Pharmacy administration and pharmaceutical care practice in a module hospital during the COVID-19 epidemic. *J Am Pharm Assoc.* (2020) 60:431–8.e431. doi: 10.1016/j.japh.2020.04.006
93. Kurakula M, Rao GSNK. Pharmaceutical assessment of polyvinylpyrrolidone (PVP): as excipient from conventional to controlled delivery systems with a spotlight on COVID-19 inhibition. *J Drug Deliv Sci Technol.* (2020) 60:102046. doi: 10.1016/j.jddst.2020.102046
94. Ashfaq M, Khan KN, Rehman MS, Mustafa G, Nazar MF, Sun Q, et al. Ecological risk assessment of pharmaceuticals in the receiving environment of pharmaceutical wastewater in Pakistan. *Ecotoxicol Environ Saf.* (2017) 136:31–9. doi: 10.1016/j.ecoenv.2016.10.029
95. Mubarik S, Chandran VGR, Devadason ES. Relational capital quality and client loyalty: firm-level evidence from pharmaceuticals, Pakistan. *Learn Organ*. (2016) 23:43–60. doi: 10.1108/tlo-05-2015-0030
96. Aqeel M, Abbas J, Shuja KH, Rehna T, Ziapour A, Yousaf I, et al. The influence of illness perception, anxiety and depression disorders on students mental health during COVID-19 outbreak in Pakistan: a web-based cross-sectional survey. *Int J Hum Rights Healthc*. (2021) 14.
97. Lebni JY, Toghroli R, Abbas J, Kianipour N, NeJhaddadgar N, Salahshoor MR, et al. Nurses' work-related quality of life and its influencing demographic factors at a public hospital in Western Iran: a cross-sectional study. *Int Q Community Health Educ.* (2020) 41:272684X20972838. doi: 10.1177/0272684X20972838
98. Local Burden of Disease HIVC. Mapping subnational HIV mortality in six Latin American countries with incomplete vital registration systems. *BMC Med.* (2021) 19:4. doi: 10.1186/s12916-020-01876-4
99. Alqurshi A. Investigating the impact of COVID-19 lockdown on pharmaceutical education in Saudi Arabia - a call for a remote teaching contingency strategy. *Saudi Pharm J.* (2020) 28:1075–83. doi: 10.1016/j.jsps.2020.07.008
100. Su Z, Wen J, Abbas J, McDonnell D, Cheshmehzangi A, Li X, et al. A race for a better understanding of COVID-19 vaccine non-adopters. *Brain Behav Immun Health.* (2020) 9:100159. doi: 10.1016/j.bbih.2020.100159
101. Abbas J, Aqeel M, Ling J, Ziapour A, Raza MA, Rehna R. Exploring the relationship between intimate partner abuses, resilience, psychological, and physical health problems in Pakistani married couples: a perspective from the collectivistic culture. *Sex Relationsh Ther*. (2020) 35:1–30. doi: 10.1080/14681994.2020.1851673
102. Xiong Y, Gao M, van Duijn B, Choi H, van Horssen F, Wang M. International policies and challenges on the legalization of traditional medicine/herbal medicines in the fight against COVID-19. *Pharmacol Res.* (2021) 166:105472. doi: 10.1016/j.phrs.2021.105472
103. Abbas J, Aqeel M, Abbas J, Shaher B, Jaffar A, Sundas J, et al. The moderating role of social support for marital adjustment, depression, anxiety, and stress: evidence from Pakistani working and nonworking women. *J Affect Disord.* (2019) 244:231–8. doi: 10.1016/j.jad.2018.07.071
104. Murphy L, Markey K, O' Donnell C, Moloney M, Doody O. The impact of the COVID-19 pandemic and its related restrictions on people with pre-existent mental health conditions: a scoping review. *Arch Psychiatr Nurs.* (2021) 35:375–94. doi: 10.1016/j.apnu.2021.05.002
105. Lange KW. Coronavirus disease 2019 (COVID-19) and global mental health. *Global Health J.* (2021) 5:31–6. doi: 10.1016/j.glohj.2021.02.004
106. Kola L, Kohrt BA, Hanlon C, Naslund JA, Sikander S, Balaji M, et al. COVID-19 mental health impact and responses in low-income and middle-income countries: reimagining global mental health. *Lancet Psychiatry*. (2021) 8:535–50. doi: 10.1016/S2215-0366(21)00025-0
107. Su Z, McDonnell D, Li X, Bennett B, Šegalo S, Abbas J, et al. COVID-19 vaccine donations-Vaccine empathy or vaccine diplomacy? A narrative literature review. *Vaccines* (2021) 9.
108. Paulson KR, Kamath AM, Alam T, Bienhoff K, Abady GG, Abbas J, et al. Global, regional, and national progress towards Sustainable Development Goal 3.2 for neonatal and child health: all-cause and cause-specific mortality findings from the Global Burden of Disease Study 2019. *Lancet*. (2021) 1–36. doi: 10.1016/s0140-6736(21)01207-1
109. Fattahi E, Solhi M, Abbas J, Kasmaei P, Rastaghi S, Pouresmaeil M, et al. Prioritization of needs among students of University of Medical Sciences: A needs assessment. *J. Educ. Health Promot*. (2020) 9:57. doi: 10.4103/0445-7706.281641
110. Pouresmaeil M, Abbas J, Solhi M, Ziapour A, Fattahi E. Prioritizing health promotion lifestyle domains in students of Qazvin University of Medical Sciences from the students and professors' perspective. *J. Educ. Health Promot*. (2019) 8:228. doi: 10.4103/jehp.jehp_250_19

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Public Health

ORIGINAL RESEARCH
published: 08 September 2021
doi: 10.3389/fpubh.2021.643991

Challenges and Controversies in COVID-19: Masking the General Population may Attenuate This Pandemic's Outbreak

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SARS-CoV-2, the virus that causes COVID-19, spreads i. a., by respiratory droplets. The use of masks in preventing spread is controversial; masks are considered useless by many, while being mandated in some locations. Here, the effect of masking the general population on a COVID-19-like epidemic is estimated by computer simulation using three separate types of software. The main questions are whether mask use by the general population can limit the spread of SARS-CoV-2 in a country and how to identify opportunities when mask use is cost-effective and safe. To address these questions, the protective effects of different types of masks, the side-effects of masks, and avenues for improvements of masks and masking are addressed. Main results: (i) Any type of mask, even simple home-made ones, may be of value, even if the protective effect of each mask (here dubbed "one mask-protection") is low. Strict adherence to mask use does not appear to be critical but increasing one mask-protection to >50% was found to be advantageous. (ii) Masks do seem to reduce the number of new cases even if introduced at a late stage in an epidemic, but early implementation helps reduce the cumulative and total number of cases. (iii) The simulations suggest that it might be possible to eliminate a COVID-19 outbreak by widespread mask use during a limited period. There is a brief discussion of why the reported effect size of masking varies widely, and is expected to do so, because of different filtration abilities of different masks, differences in compliance and fitting, other routes of transmission, pre-existing immunity, and because a system of interconnected, disease-prone individuals has non-linear properties. A software solution to visualize infection spread is presented. The results from these simulations are encouraging, but do not necessarily represent the real-life situation, so it is suggested that clinical trials of masks are now carried out while continuously monitoring effects and side-effects. As mask use is not without risks and costs, it is suggested that governments and scientists have an important role in advising the public about the sensible use of masks.

Keywords: mask, simulation–computers, visualization, health policies, innovation, COVID-19, side-effects, non-linear systems

OPEN ACCESS

Edited by:
Lydia Gimenez-Llort, Autonomous University of Barcelona, Spain

Reviewed by:
Tolulope Olumide Afolaranmi, University of Jos, Nigeria
Jessica Snowden, University of Arkansas for Medical Sciences, United States

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Specialty section:
This article was submitted to Public Health Policy, a section of the journal Frontiers in Public Health

Received: *19 December 2020*
Accepted: *22 June 2021*
Published: *08 September 2021*

Citation:
Johansson B (2021) Challenges and Controversies in COVID-19: Masking the General Population may Attenuate This Pandemic's Outbreak. Front. Public Health 9:643991. doi: 10.3389/fpubh.2021.643991

INTRODUCTION

Early in the COVID-19 epidemic, the World Health Organization recommended that face masks should only be used by health workers and people with confirmed or suspected coronavirus infection and their carers (1). Certain news items then discouraged the use of face masks (2). However, the WHO quickly changed opinion, and in China, which was reportedly very successful in containing the COVID-19 epidemic, there was widespread use of face masks, including by asymptomatic people (3). Hand hygiene is deemed the cornerstone of infection prevention (4). However, hand hygiene was promoted even before it was definitely known which procedures were active specifically for SARS-CoV-2, as discussed (4). It was noted that definitive claims on the effectiveness of various disinfectants against SARS-CoV-2 could not be made, simply because this is a new virus and the range of disinfectants had never been tested for SARS-CoV-2. Like other respiratory viruses, the new coronavirus spreads from person to person through airborne droplets, but other routes are known or suspected such as surfaces, where it can survive for days (5), so that touching infected surfaces can spread the virus [e.g., (4)].

Simple experiments suggest that masks may be effective against respiratory infections. For example, Johnson and colleagues had participants cough five times onto a Petri dish containing viral transport medium [cited in (6)]. Influenza virus could be detected by RT–PCR from all nine volunteers without a mask; no influenza virus could be detected when participants wore surgical or N95 masks. The same review concluded that there is some evidence to support the wearing of masks or respirators during illness to protect others. Tissue from a surgical mask was found to reduce the risk of COVID-19 transmission in hamsters (7). Hui et al. (8) found that masks can reduce the distance traveled by expelled air during a cough. Tracht and colleagues noticed that people are willing to wear face masks to protect themselves against infection (9). Using mathematical modeling, they concluded that if N95 respirators are 20% effective in reducing susceptibility and infectivity and 10% of the population wear them, the number of H1N1 cases is reduced by 20%.

A variety of masks and related devices exist, designed to protect the wearer or the environment. Medical masks, unfitted and disposable, can be used by infected individuals, healthcare professionals, or laymen to lower the transfer of infectious agents (10). Surgical masks are intended to limit contamination of wounds in surgery. A respirator, a type of mask, is fitted, can be disposable or reusable and protects the wearer against inhalation of harmful material. The National Institute for Occupational Safety and Health (NIOSH) regulates testing and certification of masks and similar respiratory protection equipment (11). In the European Union, similar standards are provided by the European Committee for Standardization. The NIOSH tests requires a minimum filtration efficiency of 95, 99, or 99.97% for an aerosol test (see standards for detailed specifications). The more protective masks may offer noticeable resistance to breathing and related to this, some individuals may find them difficult to wear for extended periods. The N95 respirator is a common mask that nominally filters at least 95% of airborne particles (12). It is indeed possible to obtain very close to 100% protection from respiratory pathogens such as SARS-CoV-2 using a Self-Contained Breathing Apparatus (SCBA). These are costly and require special training (often used by firefighters), see (13). However, an advanced mask, not SCBA, was tested with standardized methods, with influenza, rhinovirus, bacteriophage, *Staphylococcus aureus*, and model pollutants (14), >99.7% efficiency was found for the exclusion of influenza A virus, rhinovirus 14, and *S. aureus,* and >99.3% efficiency for paraffin oil and sodium chloride.

An important consideration that is often not mentioned when masks are discussed is the fact that they enable two barriers to be raised between an infected and an uninfected person. Masks worn simultaneously by infected and uninfected individuals would be expected to compound the reduction of transmission as follows: If the protection of one mask ("one mask-protection") is x, and it is assumed that the size of the protective effect is the same for infected and uninfected persons, the total protection is $(1-(1-x)^2)$, illustrated in **Figure 1** (solid orange line). This would amplify the protection afforded by the masks, and if an infected individual does not wear the mask properly, the masks of uninfected individuals nearby will offer some degree of protection, and vice versa. It should be noted that masks can be worn by infected individuals to protect other people or by uninfected individuals to avoid respiratory pathogens in their surroundings. Publications do not always make clear the distinction between output protection (from the former situation) and input protection (from the latter situation). Output and input protection may differ, and there is evidence that mask on source is often more effective than mask on receiver (15).

Transmission of Respiratory Pathogens Through Masks. Different Ways to Measure Transmission and Protection

The protective ability of a mask can be expressed and measured in different ways, but is not always discussed in a comprehensive manner. The share of virions (the individual virus particles that can be visualized by, e.g., electron microscopy) or other particles that pass through a mask is often termed "penetration" and determined as the ratio between the concentrations inside and outside the mask. The "efficiency" of a mask is a measure of how much of the agent is turned away by the mask and how much has 100% penetration (16).

Notice that at very high concentrations of virions (to the right in **Figure 2**), there is so much excess of virions received that the number of virions received becomes less important and therefore the risk reduction by one or even two masks becomes small. On the other hand, there might be a minimal infectious dose of virions, below which infection does not occur. This could mean that a small reduction in virion count by mask use might completely abolish infection. However, the existence of a minimal infectious dose is under debate, it may be situation-dependent, and for some viruses, the minimal infectious dose may be equal to 1 (17). Of possible relevance here is the curious observation that a high percentage of morphologically identical viral particles

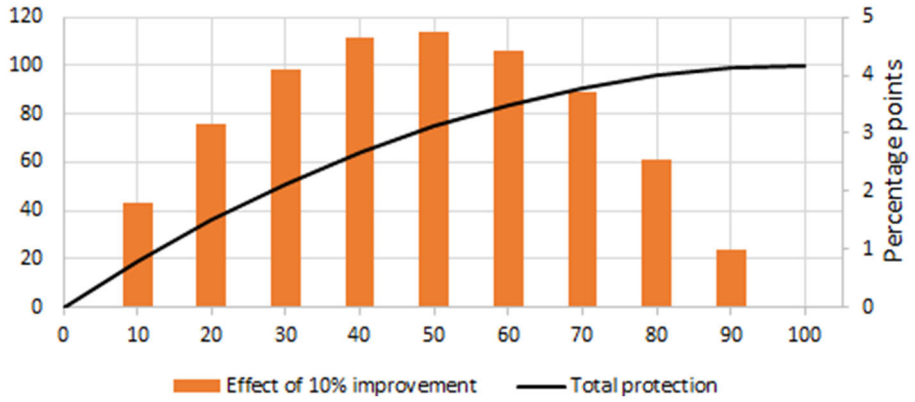

FIGURE 1 | Total protection in % (by masking an infected and a healthy individual who are in contact) (orange line, scale to the left) and marginal utility of increased one mask-protection as a function of one mask-protection. The gray bars with the scale to the right show the effect on total protection (in percentage points) of a 10% increase in one mask-protection.

in a sample, as determined by electron microscopy, will often be non-infectious. This observation may turn out to be of great importance, as it means that virus particles detected by some methods might be non-infectious. To the author, this suggests that there are inefficiencies in virus production and storage that can be exploited, see below. In line with this, infectious penetration through a barrier can be lower than the physical penetration of virus particles, see below. There is evidence for a minimum infectious dose of MERS that is well above 1 (18). If this is the case for SARS-CoV-2, it might work together with the synergistic effect of two masks in series to multiply the number of virions needed to cause disease (**Figure 1**). A dose-response (illness) curve has been published for SARS (19).

Spread of Respiratory Infections: Droplets, Aerosols, and Other Routes

Several routes and modes exist for the transmission of respiratory infectious diseases; droplets may contribute to several of them. The modeling by Stilianakis and colleagues divided droplets into respirable droplets, with droplet diameters $<10\,\mu m$, and inspirable droplets, with diameters in the range $10–100\,\mu m$. According to these authors, droplet dynamics is determined by their size, whereas population dynamics is determined by, i.a., pathogen infectivity and host contact rates. Robinson et al. of the team just mentioned (20) suggested that small droplets ($\sim 0.4\,\mu m$) have too small a viral load to be significantly infectious and that larger droplets ($\sim 4\,\mu m$) are the primary vehicle for infection. For SARS-CoV-2, a recent publication (21) argues from global trends in the number of infected individuals that airborne transmission is the dominant route, among several. Tellier et al. (22) has argued that SARS-CoV and MERS-CoV (viruses that cause SARS and MERS) may have to penetrate directly into the lower respiratory tract before causing disease; these authors also note that terminology in this area is not uniform. Whether an infectious agent is transferred by large droplets or airborne/aerosol may be important to the choice of protective equipment, as there is evidence that a conventional surgical mask is insufficient to protect against aerosol transmission, and that more elaborate masks may be more appropriate. It has been suggested that it can be transferred thorough the eyes [see (23)]. If this is a major route, the effect size of mask intervention would be smaller than filter penetration indicates, but eyewear would optimize protection.

Estimates of the Protection Offered by Masks

A recent literature review found evidence that simple cloth masks reduce virus spread, despite their meshes being larger in size than the virus as well as aerosol droplets (24). It was found that under unfavorable conditions, more than 3% of MS2 virions penetrated through filters of N99 and N95 respirators (25). Wiwanitkit and collaborators (26) found that the size of the pores of the N95 mask is about 300–500 nm in diameter whereas the size of the avian flu virus is about 100 nm (SARS size may be similar), i.e., 3–5 times larger than the virus and there is evidence that SARS can pass through N95s (27). Simple fabrics were reported to have 40–90% instantaneous penetration levels of polydisperse NaCl aerosols, much worse than for N95 respirator filter media. In addition, N95 masks also have about a 10% leakage problem around the mask. The study by Rengasamy et al. (28) suggests that the upper level of efficiency for the common N95 mask may be 85%, i.e., 10% leakage on the side and 5% penetration through the filter. At the velocity of coughing, one team found an about 50% filtration efficiency of ultrafine ($0.02–0.1\,\mu m$) particles by factory-made masks (29).

As most studies on masks have been carried out with other pathogens than SARS-CoV-2, a pertinent question is whether the size of the protection of masks is similar for

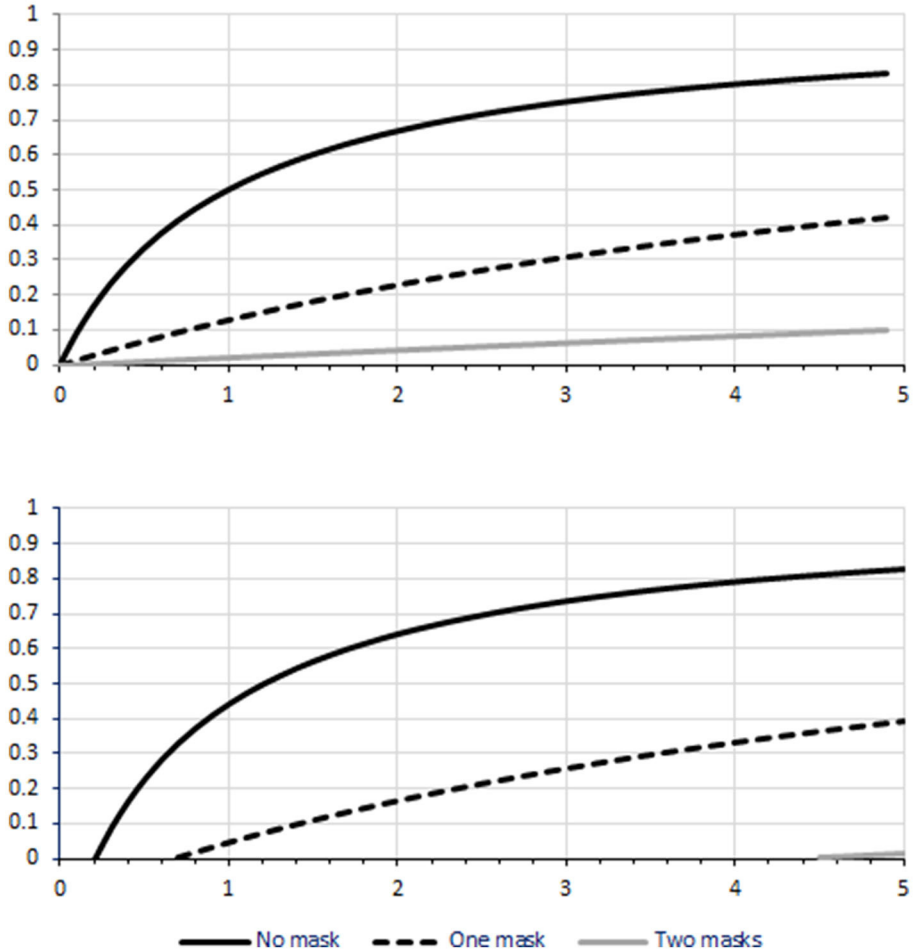

FIGURE 2 | A sketch that attempts to illustrate the transmission of respiratory pathogens through masks worn by infected virus sources and uninfected recipients. The calculations assume a simple bimolecular interaction between the virus and its receptors. The units on the horizontal axis are arbitrary. The vertical axis shows the likelihood of being infected. Notice the short line in the lower right of **(B)**; this figure concerns two mask-protection in case there would be a minimally infectious dose well above 1. **(A)** shows the situation in the absence of a minimal infectious dose.

different respiratory pathogens or not. This is addressed in the work of Zuo et al. (30) which indicates that the efficiencies of masks for excluding different pathogens may be similar. Eninger (31) concluded that studying different masks to measure the penetration of simple NaCl aerosols may generally be appropriate for modeling filter penetration by virions.

Balazy et al. found evidence that different models of the same type of mask can have very different protective properties (25). Zuo et al. (30) found that although physical penetration of adenovirus and influenza virus aerosols through respirators can be substantial, 2–5%, infectivity penetration of adenovirus was much lower. The meta-analysis of Offeddu et al. (32) quantified the protective effect of face masks and respirators against clinical respiratory illness (risk ratio [RR] = 0.59) and influenza-like illness (RR = 0.34). Meta-analysis of observational studies provided evidence of a protective effect of masks (odds ratio OR = 0.13) and respirators (OR = 0.12) against severe acute respiratory syndrome (SARS).

Dbouk and Drikakis (33) presented a fluid dynamics study of the transmission of respiratory droplets through and around a face mask filter during coughing. These authors showed output (mask on infected individual) as well as input (mask on healthy individual) protection but the protection was limited to perhaps 80–90%. The systematic review by Jefferson et al. did not show a clear reduction in respiratory viral infection with the use of medical/surgical masks during seasonal influenza; the selected papers did not allow definite conclusions (34). However, Taiwan reportedly quickly eliminated their COVID-19 outbreak using a combination of interventions that included masking (35). The recent meta-review by Violante and Violante (36) suggests that surgical masks and N95/FFP2 respirators protect equally well-against airborne viral infections. The review just mentioned is also useful in that it summarizes the requirements for different

TABLE 1 | Four cases representing four different levels of protection by mask that have been considered in this study and incorporated into the simulations that use COVID-19 Scenarios.

Case no.	Pathogen removal/risk reduction, one mask	Removal/reduction, two masks	References
1	99.7%	99.9991%	Ref. (14). An advanced mask.
2	85%	97.75%	N95 mask. This is estimated from data in (15), assuming 5% filter penetrance and 10% leakage on the sides.
3	22%	39.16%	Average of input and output protection by a simple home-made mask; based on measurements in (39).
4	5.7%	11%	Based on the 0.89 relative risk reported (40) in a meta-analysis of Hajj pilgrims. Notice that in some segments of the population studied, actual mask use was <50%. The question to be addressed here is whether masks can influence the epidemic even if many do not use their masks properly.

Notice that although most of the numbers in this Table are taken from published papers, they may not be representative for all pathogens or varieties of masks. None of the numbers in the table are derived from a study on COVID-19.

classes of masks including differences between European and US standards, and that it lists some references in the field that are not cited directly in this paper. A German review found only weak evidence for masking being efficient as a hygienic tool to prevent virus spread, but better evidence for close contact scenarios. This review emphasizes potential risks (37). A number of different routes exist for SARS-CoV-2 transmission, some of them involving the eye (23). In the calculations of Sewell et al. (38), the estimated effect of the face mask *mandate* was a reduction in transmissibility (pt) of 23%. The effect of *masking* was presumed to be larger than this, because some individuals wore masks in the absence of a mandate. Cases selected here for closer study are shown in **Table 1**.

Calculations and Simulations to Address Early and Late Interventions

This study attempts to estimate the effect of masking the general population in a COVID-19 outbreak, first using simple considerations about the basic reproduction number of the epidemic and the level of protection from different types of masks. The basic reproduction number (R_0), is an index of the contagiousness of an infection and depends on both the infectious agent and other factors. As R_0 is the expected number of secondary infections produced by an index case in a completely susceptible population, it is often used to predict if an outbreak is expected to continue, as $R_0 > 1$ indicates that it will and $R_0 < 1$ indicates that it will not. However, this is a simplification and the calculations surrounding R_0 can be complex (41, 42). After gathering some published numbers regarding the R_0 of the COVID-19 epidemic and the protection afforded by masks, this study then moves on to simulations of the effect of masking with three separate types of software, one of them a specialized COVID-19 program and another one a simpler program intended for educational purposes.

Then the effect is addressed using computer simulations. Claims are sometimes made that disease-preventive measures must be enacted early in order to be effective. Early intervention has been claimed to be important also regarding COVID-19 [for example (43, 44)]. Both early and late intervention was simulated using the computer software.

Non-linear Systems Often Show Behavior That Is Not a Simple Function of the Size of a Disturbance or an Intervention

Since the initial results of this study were presented in a seminar and preprint form in the spring and summer of 2020, the finding that masks might have a dramatic effect on COVID-19 has sometimes been met with skepticism. A question asked repeatedly by colleagues is "How can the effect of an intervention be larger than the size of the intervention even to the point of eliminating an outbreak?" A related question sometimes asked is "How big an effect of an intervention such as masks is enough?" Spatial aspects have been brought up by suggestions that masking may be unnecessary in less populated areas [e.g., by Noren in a comment to (45)]. The questions just mentioned are now addressed here by considering a system of interconnected individuals. Highly interconnected systems can result in non-linear effects, e.g., in infection spread, as shown by Heesterbeek et al. (46). In the face of such complexity, mathematical models might aid the understanding of patterns of spread. The paper just cited also points to the existence of paradoxical effects, i.e., an intervention can sometimes have opposite effects depending on the state of the system.

In nervous system functioning as well as infection spread, units (neurons or persons) receive inputs (virus loads or synaptic activity) from many other units; when a threshold is attained (e.g., becoming infected or reaching firing threshold), the nodes distribute their activity back to the network of units (neurons/individuals) by releasing virions or neurotransmitters. Thus, a wave or cascade may move through the system, sometimes described mathematically as an avalanche. Systems prone to avalanches are often said to be in a critical state (47), i.e., within a narrow margin between avalanche propagation and extinction (48). A related but distinct concept is bifurcations, which are more applicable than critical points for certain systems but also indicate states at which a small change in one parameter can dramatically change the functioning of the system. Excitation/depression waves in interconnected networks can be very sensitive to parameters and be controlled by weak external forces (49). Varying a parameter such as synaptic strength

(corresponding to transmissibility in infectious epidemiology) can at bifurcations select between dramatically different states of the system (50).

Despite many similarities, a difference between networks of neurons vs. networks of disease-prone humans is that neurons can normally fire nerve impulses many times, whereas a person will often have the same infection only once. This difference between neuronal networks and infectious network is not all-or-none, since neurons can have refractory periods or fatigue during which it is impossible or difficult to elicit a neuronal impulse. On the other hand, it is known that coronaviruses including SARS-CoV-2 can cause re-infection (51).

The programs COVID-19 Scenarios and Epidemix (detalied below in Materials and Methods) do not explicitly model the spatial aspects of infection spread and have turned out to be difficult to understand by some. A third software is therefore introduced in this paper as an attempt at simulate and visualize effects of imperfect interventions such as masks on infection spread in space using network simulation. Unfortunately, computer programs for network simulation that are easy to use are often very limited in scope and those that are flexible may require experience with computer programming and with a particular piece of software. Simbrain 3.0 (52) was chosen for this paper and is a program for the computer simulation of brain circuitry whose graphical user interface speeds the creation of networks. It also allows rather large networks consisting of thousands of components to be built by the writing of scripts. Simbrain can especially visualize the internal states of a network.

Despite seemingly thousands of publications about masks in COVID-19, only a few of them are articles that make use of simulation. Aspects in this paper that are little covered or not at all in previous publications are how mask protection of infected and uninfected wearers and a hypothetical minimal infectious dose combine quantitatively to limit transmission, time effects on effect size, fundamental limits on the impact of masking, and possible routes to improved masks. Of importance in the design of the simulations of this paper is that two existing software programs documented in publications were used with a minimum of modifications to parameters in order to reduce bias.

MATERIALS AND METHODS

Since a commonly expressed opinion in the author's country was that masks in the general population were of little or no value, the author decided early on to use at least two separately developed and widely used pieces of software to arrive at a conclusive result regarding the effect, or lack thereof, of masking. At the time of inception of this study (early 2020), there were (at least) two major software programs for modeling the specific spread of COVID-19, COVASIM (53) and COVID-19 Scenarios (54). Since the web version of COVASIM (when tried by the author) offered less flexibility to input multiple parallel interventions, COVID-19 Scenarios was chosen. Epidemix 2 was used because of its simplicity, use in education in epidemiology, and because it is well-documented in publications. Simbrain 3.0 was used to begin addressing spatial aspects of COVID-19 spread, as there were large regional differences in COVID-19 cases and because it was proposed that masking could break chains of COVID-19 transmission. To avoid bias, software developed by others for computer simulations of a standard population level epidemiological models (such as COVID-19 Scenarios and Epidemix 2) were preferred, and default parameters of the software was used as much as possible.

As described in detail (54), COVID-19 Scenarios simulates a COVID-19 outbreak with a generalized SEIR model with the total population divided into age-strata (because of known age dependence of COVID-19 outcome) compartments of: susceptible (S), exposed (E), infected (I), hospitalized (H), critical (C), ICU overflow (O), dead (D), and recovered (R) individuals. People transition among the different compartments. The model allows researchers to specify individual interventions with start and end dates to model the existing (social distancing, case isolation, and quarantine) as well as additional interventions. COVID-19 Scenarios provides default parameters estimated from real-life statistics, although the authors emphasize the uncertainty behind these estimates. We ran the simulation for the United States. The model had been calibrated by its authors to match its age structure and the observed epidemiological statistics. The simulations did not consider saturation phenomena that might occur at very high virus counts (**Figure 2**), neither a possible minimal infectious dose of virions (**Figure 2**). It was assumed that transmission occurred only through routes that can be blocked by mask use.

Notice that although most of the numbers in **Table 1** are taken from published papers, they need not be representative for all pathogens or varieties of masks. None of the numbers in the table are derived from a study with COVID-19.

The second software used in this paper is Epidemix 2 (55), which is a simplified software for teaching and demonstration purposes. It uses a visual interface to access eight models of epidemics without dealing with the details of mathematical equations and program code. The underlying calculations are done by a set of software packages in the programming language R. All models simulate disease spread through a population, allowing the user to select the model and characteristics of the population, interventions, etc.

Curve-fitting to estimate the slope of the curve of scenarios with different late mask interventions was done using the diagram function in Excel for Microsoft 365.

With the third piece of software, Simbrain 3.0 (52), a model was built of 100 nodes (representing persons or groups of persons) that can infect their nearest neighbors (shown by the oblique lines in **Figure 3**), but not beyond that. There are only excitatory connections. An impulse generator was added that enters activity (corresponding to virus loads) into the network through one of its nodes (in the upper left of the network) at random intervals. During simulations with this model, the effect of an increase in connection strength (i.e., transmissibility) of 10% as well as a 10% decrease in transmissibility is tested. Related work regarding the spread of HIV among interconnected individuals' social networks is described by Delva et al. (56).

TABLE 2 | Parameters used for COVID-19 Scenarios.

Scenario: United States of America (edited)		
Parameters		
Population		
Parameter	**Value (summer 2020)**	**Value (December 2020)**
Age Distribution Name	United States of America	United States of America
Case Counts Name	United States of America	United States of America
Number of hospital beds	798288	798288
icu Beds	49499	49499
Cases imported into community per day	0,1	0,1
Number of cases at the start of the simulation	1	1723495
Population size	327167434	327167434
Seroprevalence		14,95
Epidemiology		
Parameter	**Value**	**Value**
Hospital Stay Days	3	7
icu Stay Days	14	14
Infectious period Days	3	3
Latency Days	3	3
Increase in death rate when ICUs are overcrowded	2	2
Seasonal peak in transmissibility	January	January
RO at the beginning of the outbreak	4.1–5	4.1–5
Seasonal variation in transmissibility	0	0
Mitigation [added to the default values]:	Intervention 1	
Reduction of transmission (mitigation included in default parameters of COVID-19 Scenarios summer 2020)		
Mar 24 2020–Sep 01 2020		73.8–84.2%
Reduction of transmission (mitigation included in default parameters of COVID-19 Scenarios December 2020)		
Jan 07 2020–Feb 12 2020		78.3–87.7%
Feb 12 2020–Mar 04 2020		19.6–22.4%
Mar 04 2020–Mar 26 2020		23.1–26.9%
Mar 26 2020–Apr 23 2020		67.2–78.8%
Apr 23 2020–May 14 2020		70.5–81.5%
May 14 2020–Jun 08 2020		68.3–79.7%
Jun 08 2020–Jul 12 2020		63.1–74.9%
Jul 12 2020–Aug 08 2020		69.4–80.6%
Aug 08 2020–Sep 05 2020		70.5–81.5%
Sep 05 2020–Sep 29 2020		67.2–78.8%
Sep 29 2020–Nov 09 2020		64.1–75.9%
Nov 09 2020–Jan 11 2021		66.2–77.8%
Mitigation [added to the default values]:	Intervention 1	
Reduction of transmission		
Mar 24 2020–Sep 01 2020	73.8–84.2%	

These were the default parameters provided by the software when the simulations were done. Please notice that the defaults in the summer of 2020 included a 73.8–84.2% intervention introduced on March 24, that is included with the software. When mask interventions were included in the simulation, they were introduced on January 1 (i.e., for the whole period of the simulation), July 1, or (for simulations run in December, 2020) on December 1.

RESULTS

A Simple Estimation of the Degree of Protection Afforded by Masks and the Protection Needed to Influence the Epidemic

The transmissibility of a virus is measured by the basic reproduction number (R_0), which measures the average number of new cases generated per typical infectious case. As described by Rahman et al. (57) and references therein, an R_0 of 1.0 is an important threshold value. If the R_0 is equal to 1 or less, this indicates that the number of secondary cases will decrease over time and, eventually, the outbreak will peter out. One review evaluated the mean and median of the R_0 estimated by the 12 articles and they calculated a final mean and median value of the R_0 for COVID-19 of 3.28 and 2.79 (58) in line with a recent review (59). This seemingly provides a rough indication of how much the transmission must be reduced to reverse the epidemic.

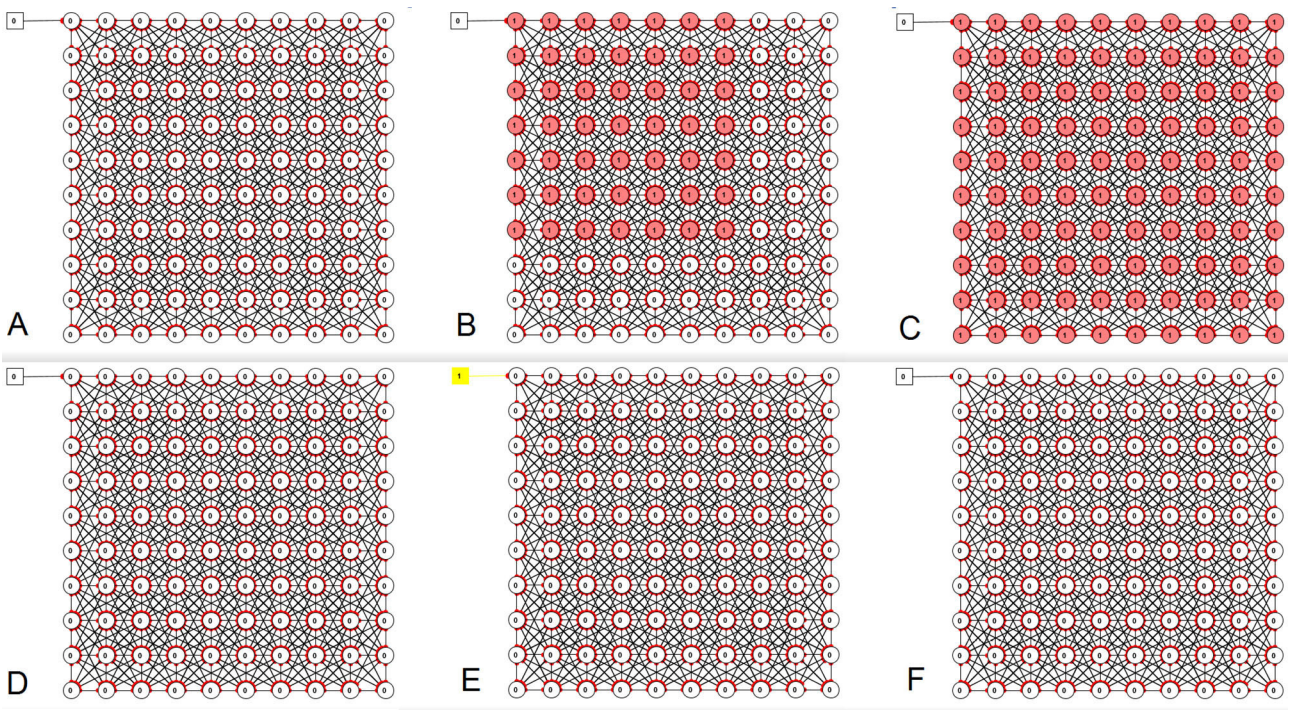

FIGURE 3 | Use of Simbrain 3.0 to simulate infection spread among interconnected individuals. Notice that the current parameters have not been carefully calibrated against any particular real-life situation and should be considered rough first estimates used for illustration purposes. It can be seen that models can easily be found in which a relatively minor change in the transmissibility can have dramatic effects on the system. It can also be demonstrated that for many systems, which could be achieved with masking combined with a set of other interventions, it is impossible or almost so to achieve a wave of infection transmission in the system. Red color shows those nodes that are active (i.e., exhibiting neuronal activity of being infected). Upper row **(A–C)**: Coupling between neurons 10% increased to enable a wave of infections to move through the system. Lower row **(D–F)**: With 10% reduced coupling between individuals, it is very difficult to elicit a wave of infections in the same system, all other parameters are equal. **(A/D)**, **(B/E)**, and **(C/F)** show three sequential time points.

It appears that a reduction of transmission of at least two thirds is necessary. This is within the range of protection of some but not all masks (some 67% efficiency). However, as there would be two barriers between infected and non-infected individuals, the numbers for two serially connected masks should presumably be calculated, as the mask of the uninfected individual will add to the protection from the mask of the infected individual, indicating that many of the available masks might be adequate.

Simulations Using COVID-19 Scenarios Modeling Masks During the Start of an Outbreak

Figure 4 shows the simulated number of confirmed COVID-19 cases in the U.S. vs. date. The vertical axis is a logarithmic scale. The linearity of this graph shows the exponential growth expected early in an epidemic. We ran the simulation for the period ending with August 31, 2020. This was long enough to see the effects of masks on the time course of the epidemic. The default parameter values of COVID-19 Scenarios, used as input to this program, with mask interventions added as indicated in the text, are shown in **Table 2**. We wanted to observe the sensitivity of the outcomes to the time when mask intervention was started, rather than the effects of different mitigations implemented at the same time.

The results from the first runs with COVID-19 Scenarios show that mask use appears to be effective even at low one mask-protection or limited compliance. Even the lowest efficiency scenario reduced the simulated epidemic if applied from its beginning. The two highest protective abilities seem to practically completely abolish the epidemic. There was no indication of any difference between the two masks with the highest protection modeled (scenarios 1 and 2). It appears that even simple masks (e.g., 21% protection, scenario 2) or low-compliance mask-wearing (11% protection, scenario 1) reduces the number of COVID-19 cases within weeks.

Simulations Using a Simplified Model Using Epidemix Version 2

These simulations used the full defaults of Epidemix version 2, i.e., the parameters were not specifically calibrated for SARS-CoV-2 (deterministic homogenous model, infection states S, Is, R, population size: 100, daily number of effective contacts per unit: 0.4, length of infectious period: 10 days; **Figure 5A**). An added intervention with 75% two-mask

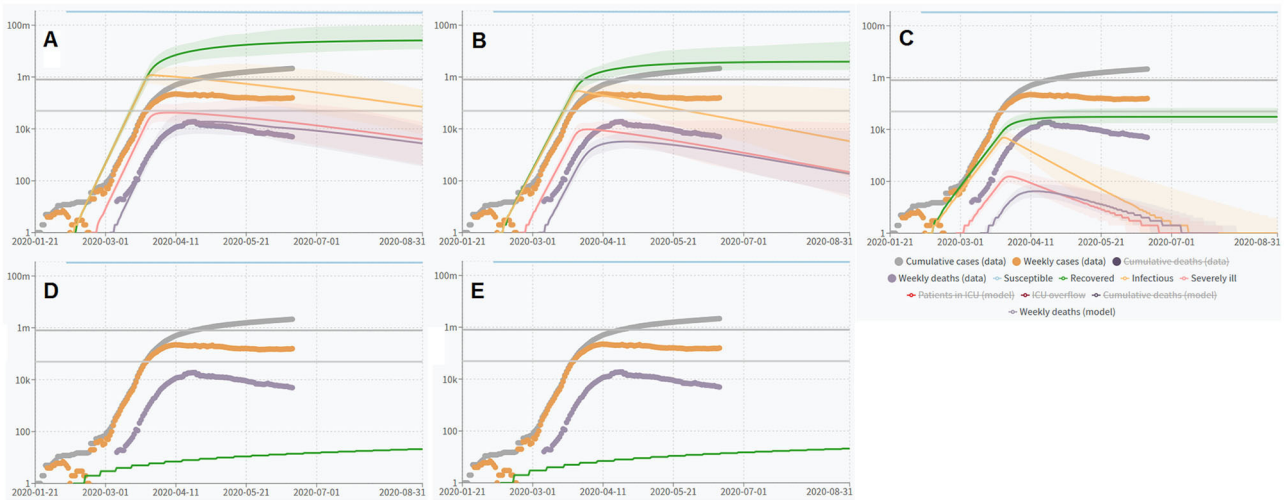

FIGURE 4 | The effect of masking the general public on the COVID-19 epidemic, as estimated using a simulation by COVID-19 Scenarios. **(A)** No mask, **(B)** 11% protection; **(C)** 39% protection, **(D)** 97.75% protection, and **(E)** 99.9991% protection.

protection, corresponding to a simple mask, was tested by reducing transmission by 75% (**Figure 5B**).

As shown in **Figure 5**, the cumulative number of infected individuals during the whole simulation was only half in the mask use scenario as compared to the default scenario, with the effect of masking present throughout the period. The result seemed to corroborate the result from the COVID-19 Scenarios model that masks reduce COVID-19 cases.

Do Interventions Have to Be Applied Early?

From the results in **Figures 6**, **7** that shows curve-fitting of the data in **Figures 6A,B** for July and August 2020 only, it seems that they do not. When they are applied late, the total number of cases is influenced less than active cases, since a mask will not help individuals who have already been infected. However, the number of active cases is reduced in all mask interventions modeled, with some interventions resulting in a dramatic reduction. With case 4, in 11% two-mask protection, the reduction in new cases was about 11% per week. With case 1, reduction was quite dramatic at approximately 88% per week.

An attempt was made to estimate the effect of population-wide masking in a situation when mask use was already high at the end of 2020 (**Figures 6C,D**) by adding an extra intervention of 10% to the defaults using the latest version of C19S. The effect of a virtually ideal intervention such as SCBA was also estimated (**Figure 6E**).

An Attempt at Simulating and Visualizing Effects of Imperfect Interventions Such as Masks on Infection Spread Using Simbrain Version 3.0

Using Simbrain, a network of 100 interconnected nodes was set up, feeding stimulating input (representing virions) to each other (**Figure 3**), originating from an impulse generator (upper left). During simulations with this model, the effect of a small increase in connection strength (i.e., transmissibility) of 10% as well as a 10% decrease in transmissibility was found to produce dramatic differences in the behavior of the interconnected system under some conditions. This shows that an imperfect intervention of about the magnitude of a simple mask, can at times have a dramatic effect on an interconnected system. Videos exemplifying the output of Simbrain are included in the **Supplementary Materials**.

DISCUSSION

The results seem to indicate that it is possible to identify timepoints and situations at which an intervention of limited size, e.g., masking, will have a major effect on a COVID-19 epidemic and situations at which the wearing of masks is of little help, e.g., where there is a big excess of virions. Given the well-known propensity for "bugs" in large computer programs (presumably including those in epidemiology), this author thinks that publishing simulations with multiple software programs and by multiple, independent research teams is necessary. While it may be unrealistic to equip the whole world with SCBA equipment, widespread use of such equipment seems (even in locations with excess virions) likely to clear a circumscribed area of SARS-CoV-2 contagion. Modeling also seems to be of value for education on the spread of infection and the effects of masking. The effect size of masking may vary even more than from the different performance of different masks modeled above, due to differences in compliance and fitting of the mask, other routes of infection, pre-existing immunity but also because a system of interconnected, disease-prone individuals may have non-linear properties. As even the smallest mask intervention had a long-term effect in the simulations, the simplest mask could result in a large reduction in deaths

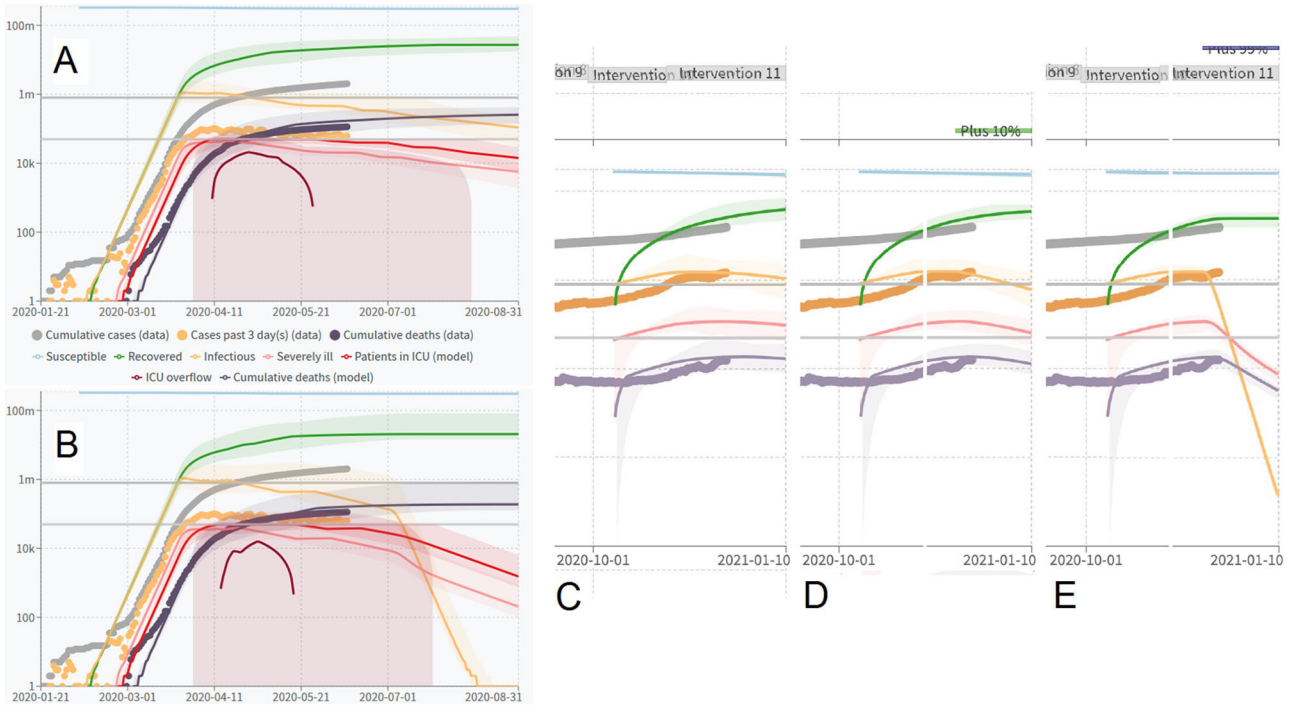

FIGURE 6 | Effects of late mask interventions on the number of active COVID-19 cases. **(A)** Full defaults according to COVID-19 Scenarios. **(B)** Full defaults with late mask intervention using advanced mask (99.9991% two-mask protection). **(C–E)** show the effects of interventions beginning on December 1, 2020: **(C)**, full defaults; **(D)**, the effect of an added 10% protection, and **(E)**, the effect of an added 99% protection intended to approximate the effect of population-wide wearing of SCBA devices.

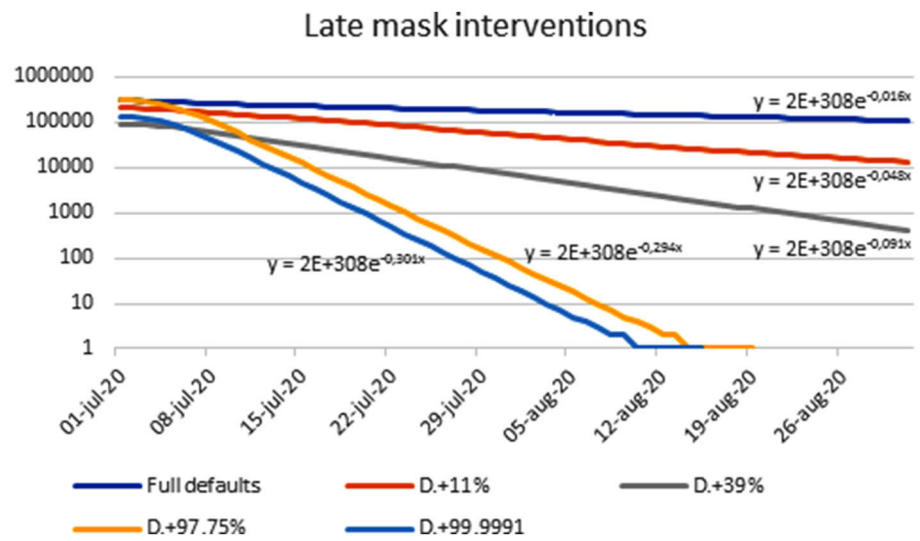

FIGURE 7 | Estimating half-life and weekly reduction from the late use of four different masks (cases 1–4); vertical axis is "infectious" individuals from COVID-19 Scenarios.

pressure from masks have been described during the COVID-19 pandemic, and remedies have been suggested (60). Gefen et al. studied device-related pressure ulcers in the context of COVID-19 (61). Ju et al. reported contact vitiligo from rubber ear loops from a mask (62). Contact dermatitis due to masks and solutions are described by Altobrando (63). Chaiabutre found skin reactions in persons wearing masks during the COVID-19 pandemic (64). Protruding ears in children has been

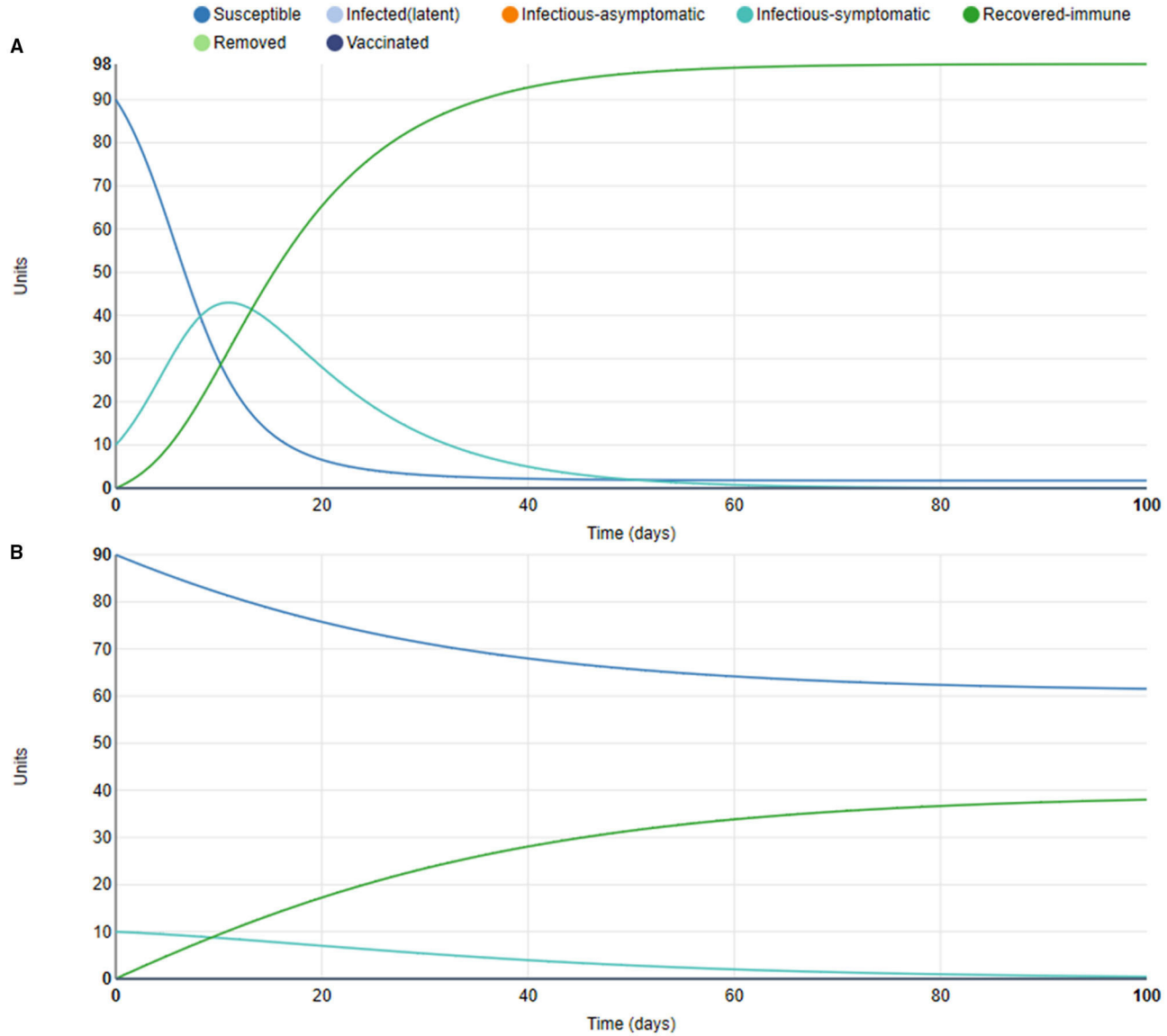

FIGURE 5 | Simulations using Epidemix version 2. **(A)** 10% infected initially, otherwise full defaults of the Epidemix program. **(B)** 10% infected initially, 75% two-mask protection, otherwise full defaults of the Epidemix software.

if intensive care units are working close to capacity. That the effect size was found to compound over time is reminiscent of interest-on-interest in a bank account, when the interest becomes sizable after being applied repeatedly. When mask protection >50% was simulated, the effect on the size of the epidemic was dramatic, from about 1 million to zero fatalities (**Table 3**).

As the calculations illustrated in **Figure 6** and **Table 4** suggest that complete elimination of COVID-19 can be achieved in a closed community with <2 months of intervention with highly protective masks, it would be of interest to identify a community suitable for a clinical trial with such masks. Any such study should be carefully carried out taking local conditions (incl. legislation) into account and use continuous evaluation of infection parameters as well as any side effects of the masks. It should be said that the results above seem to be robust, as the principal results do not seem to depend on the precise model used or its input parameters, as slight variations of some parameters that have been tested have not altered the fundamental results.

Side Effects and Risks of Masks

There may be few comprehensive studies of side effects of masks. A recent systematic review found that side effects of masks were rarely measured in studies of masks against respiratory disease (34). From everyday experience, side effects and risks of mask use are usually limited to minor discomfort. *Skin problems* are among the most common side effects of masks. Pain and

TABLE 3 | Data from COVID-19 Scenarios regarding the number of individuals in the different compartments of the model (simulation performed summer 2020).

Time 2020–08-31	**Cumulative recovered (total) median**	**Cumulative recovered (total) lower bound**	**Cumulative recovered (total) upper bound**	**Cumulative hospitalized (total) median**	**Cumulative hospitalized (total) lower bound**	**Cumulative hospitalized (total) upper bound**	**Cumulative ICU (total) median**	**Cumulative ICU (total) lower bound**	**Cumulative ICU (total) upper bound**	**Cumulative fatality (total) median**	**Cumulative fatality (total) lower bound**	**Cumulative fatality (total) upper bound**
Default	25435572	11699016	100463893	892376	410277	3528347	468735	218699	1754633	224006	97251	996242
Default + mask 11% (scenario 4)	3879172	1071446	10906385	136042	37572	382708	73074	20270	200586	33934	9498	89024
Default + mask 39% (scenario 3)	30719	17446	67805	1078	612	2378	581	330	1282	273	155	600
Default + mask 97.5% (scenario 2)	21	21	21	1	1	1	1	1	1	0	0	0
Default + mask 99.9991% (scenario 1)	21	21	21	1	1	1	1	1	1	0	0	0

mentioned as a possible side effect of masking (65). However, serious *accidents* from some masks may be possible: One of the more serious side effects of mask-wearing seems to be that some masks may cause increased condensation on eyeglasses when worn concurrently (66), potentially obstructing the view of the wearer; however, counteracting devices are known. Heavy respiratory protective equipment used by firefighters can affect the balance of the user (67), potentially increasing the risk of fall accidents. *Effects on breathing and blood gases* have been described: Santos-Silva et al. (68) point to increasing resistance to air intake, lowering airflow into lungs, and causing temporary reduction in breathing rhythm. There may be symptoms related to hypercapnia (69)–breathing and gas exchange (70). A German review found evidence for significant respiratory compromise in patients with severe obstructive pulmonary disease, secondary to development of hypercapnia and possibly lung infections which emphasizes their potential risks (37). Kyung and coworkers (71) found that subjects with COPD found increased dyspnea, breathing frequency, and blood oxygen saturation after N95 use. It was suggested that N95 masks should be used with care in patients with more severe COPD. It was pointed out that lint and fibers from textiles are known to contribute to lung problems when inhaled in large quantities (29); it seems unclear how much this applies to masking during an epidemic. *Psychological effects* have been described: The review by Perna suggests that persons prone to panic attacks might experience discomfort due to increased respiratory physiological burden in RPD wearers' increased breathing resistance, CO_2 rebreathing due to CO_2 accumulation in the RPD cavity, and decreased inhaled O_2 concentration (72). King has suggested that mandatory mask-wearing may give rise to difficulties in emotional communication due to impaired communication of facial expressions (73). Masking has been found to impair identification of faces both by human observers and face recognition computers [(74) and references therein]. One study found that mask reuse and use were associated with depression (75). *Survival and growth of microorganisms and spread of infection* have been reported: Bacteria can survive on surfaces of masks for several days (27). Personal protective equipment was reported to be a source of airborne infections (66). Bamber and Christmas (76) and others have pointed out that discarded masks may be a biohazard and must be discarded of properly. *Reduced physical activity* has been reported during mask-wearing (77). This section does not attempt to be a complete list of possible side effects of masks.

TABLE 4 | Estimates of $T_{1/2}$ of "infectious" individuals with different late mask interventions.

Intervention	Multiplier in exponent estimated from graphs	Half-life	Weekly reduction in active COVID-19 cases (%)	Data in figure
Default values only	−0.016	43.3	11	6A, 6B, 7
Case 4	−0.048	14.4	29	6A, 6B, 7
Case 3	−0.091	7.6	47	6A, 6B, 7
Case 2	−0.294	2.36	87	6A, 6B, 7
Case 1	−0.301	2.30	88	6A, 6B, 7
Default values only (includes some masking)	−0.008	86.6	5	6C-E
10% extra reduction in transmission presumed to result from everyone wearing masks	−0.024	28.9	15	6C-E
99% extra reduction presumed to result from everyone wearing SCBA apparatus	−0.31	2.24	89	6C-E

Possible Avenues for Improved Masks and Masking

There is scope for improvement of masks. It has been shown that it is possible to improve the protection against a certain class of infectious agents (e.g., chemical treatments) or generally (for example, improving the fitting of the masks against the face of the wearer). 3D printing is beginning to be used to compensate for the shortage of personal protective equipment including masks (78), and could be used with existing knowledge about mask fitting [e.g., (79, 80)] to fit masks to individual anatomy. Furthermore, in situations when there is solid evidence for the value of masking, educational activities could educate the public about this value and help with the selection, purchasing, fitting, use, and disposal of masks.

Viruses have unique biophysical properties including elasticity/deformability, brittleness/hardness, material fatigue, and resistance to osmotic stress (81) that might be targets for antiviral interventions, perhaps also to produce better masks. An *antimicrobial surface* contains an antimicrobial agent that inhibits the ability of microorganisms to grow on the surface of a material. For example, it was shown that surfaces that are simultaneously hydrophobic and oleophilic have quicker deactivation of enveloped viruses (82) (which include SARS-CoV-2, although influenza A was studied). Another example is that copper and its alloys destroy a wide range of microorganisms. Technology can permanently introduce copper oxide into polymeric materials that are biocidal. Masks filtered above 99.85% of aerosolized influenza and H9N2 virus, and infectious influenza virus could be recovered from the copper-modified masks (83). Quan and colleagues (84) tested functionalization of a surgical mask with a sodium chloride salt coating that dissolved on exposure to virus aerosol and recrystallized during drying; such filters showed better filtration than conventional masks and all mice survived influenza virus penetration through the rough salt-coated filters. It has been proposed that purposefully engineered materials with nanostructured surfaces can eliminate enveloped viruses such as SARS-CoV-2 i.a., on masks and be self-disinfectant (85). Other ways in which *materials technology* can improve masks is exemplified by a mask under development that lets some

SARS-CoV-2 penetrate the mask, but heat-inactivates it (86). Guha et al. suggest that electret materials (i.e., those with a permanent electric charge) may be advantageous for masks (87). Relatively few studies with aerosols for specific illnesses seem to exist. It should be valuable to conduct such studies before an airborne epidemic hits next time.

Questions for Additional Research

In several studies, leakage on the sides of the mask has been greater than filter penetration of an agent. Therefore, efforts to improve fit or educate the public about proper mask-wearing are likely to be effective. The conclusion is that masks should be evaluated as an important addition to other ways of protection. They may have protective effects on the same order of magnitude as vaccines, but with the added advantages of being effective against a wide range of respiratory pathogens and can be prepared in advance and stored.

Questions that can be addressed in future research on masks include first and foremost a systematic study of side effects and risks associated with masks. Other research on masks would be a cost-benefit analysis to decide what level of protection is best when costs and side effects are considered. The gray bars in **Figure 1** show the marginal improvement in two-mask protection from a 10% improvement in one mask-protection and indicates that the marginal benefit may be biggest from raising protection above 50%, and less benefit may be received from improvements in one mask-protection beyond 90%. It may be valuable to study masks with aerosols for specific illnesses before an airborne epidemic hits next time. Other research on masks would be to evaluate the shelf-life of different materials used in masks to select materials that allow for long-term storage preparation for future epidemics. Procedures for industrial and home manufacturing could be optimized. How to best educate individuals about the value of masks, how to properly wear a mask and perhaps how to make their own mask, and how to increase adherence to mask use are important questions to ask.

Questions that can be addressed regarding interactions with other interventions include do masking and social distancing work synergistically or do they work best on their own? In the simulations above, it implied that masks and other interventions depress SARS-CoV-2 transmission independently, but this is not necessarily the case in real life. Does the introduction of masks reduce people's compliance with other preventive measures, or do masks serve as a reminder of the epidemic, improving compliance with other measures? Can groups with low vaccine response [e.g., possibly those in (88)] be identified and should they wear a mask instead?

Questions that can be addressed in future research on SARS-CoV-2 (and other pathogens) would be to confirm and quantify different ways of transmission. Such information would inform decisions about whether a mask is of any value and in which situation it may be of value.

The results from these simulations are encouraging, but the only way to be sure about the effects of masks is to conduct prospective, controlled studies; perhaps along the lines of Lin et al. (89). Also, masks and related equipment are associated with significant side effects and risks that should be carefully monitored during any implementation. The numbers used here are consistent with the literature but do not represent the whole literature and many numbers are derived from studies of other agents than SARS-CoV-2. The work described here may still be relevant for SARS-CoV-2 as using slightly different input parameters or slightly different models typically did not change the outcome of a simulation much. During the past several months, many publications have come out in favor of mask use by the public [e.g., (21, 90–93)]. Stutt et al. (94) using somewhat different modeling from ours found parameter ranges in which mask compliance and effectiveness could reduce the R0 enough to slow or stop COVID-19 spread.

The use of simulation may help decide whether a small reduction of transmission with a simple mask is sufficient. It may also help identify situations when an advanced protective device is needed such as an advanced mask or even an SCBA device. A major general question is to identify all pathways for COVID-19 transmission and their relative importance. Alternative pathways will reduce the effect size of mask interventions but are likely amenable to interventions parallel to masking. If an alternative pathway is major, its obliteration may be necessary to achieve the "corona washout" suggested above. From the findings of this study, to optimize a mask intervention, it seems necessary for a government to recruit suitable competence in technology, mathematics, human behavior, and risk management, and to consult with community and religious leaders. For life-changing events such as funerals, trials with masking (or perhaps even with advanced equipment such as SCBA) and contact-tracing can be considered, to arrive at a protective equipment that avoids most infections while retaining the aspects of the ceremony as much as possible. Simulation can give a glimpse of what protection can be achieved and help in the design of such trials. If mask measures, as suggested here, are put into action, it will be important to generate hypotheses that can be tested to see if the actions really work and are cost-effective. Here various modeling strategies may be very helpful. For example, the concentration of virus could be measured in public places with and without the use of masks.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

FUNDING

This work was funded in part by internal funds of Stockholm County Council and Karolinska Institutet [Agreement concerning research and education of doctors (ALF) and the Research Funds of Karolinska Institutet].

ACKNOWLEDGMENTS

This paper is not health, medical, legal, or other professional advice. Please see disclaimers also for the software packages used

in this paper. Some early results from this work haven been presented in preprint and seminar form: https://arxiv.org/abs/2006.15626; https://www.youtube.com/watch?v=ixkrqzSzcqQ.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2021.643991/full#supplementary-material

Supplementary Video 1 | Examples of output from Simbrain 3.0 that illustrate that a small change in a parameter can cause dramatic changes in an interconnected system.

Supplementary Video 2 | This output from Simbrain 3.0 shows that when the coupling between nodes is somewhat increased (synaptic strength 0.53, set with the Synaptic adjustment dialog of Simbrain), waves of activation (i.e., infectious individuals) are easily started. However, when the coupling between nodes is somewhat decreased (synaptic strength 0.48), it is practically impossible to set off such waves (as in **Supplementary Video 1**).

REFERENCES

1. World Health Organization. *Advice on the Use of Masks in the Community, During Home Care and in Healthcare Settings in the Context of the Novel Coronavirus (2019-nCoV) Outbreak: Interim Guidance*. Available online at: https://apps.who.int/iris/handle/10665/330987 (accessed March 29, 2020).
2. H D. *Can a Face Mask Protect Me From Coronavirus? Covid-19 Myths Busted*. (2020). Available online at: https://www.theguardian.com/world/2020/apr/11/can-a-face-mask-protect-me-from-coronavirus-covid-19-myths-bustedmaincontent (accessed June 08, 2020).
3. Garcia LP. Use of facemasks to limit COVID-19 transmission. *Epidemiol Serv Saude.* (2020) 29:e2020023. doi: 10.1590/s1679-49742020000400019
4. How we know disinfectants should kill the COVID-19 coronavirus. *C&EN Glob Enterprise*. (2020) 98:7. doi: 10.1021/cen-09811-scicon2
5. van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *N Engl J Med.* (2020) 382:1564–7. doi: 10.1056/NEJMc2004973
6. Cowling BJ, Zhou Y, Ip DK, Leung GM, Aiello AE. Face masks to prevent transmission of influenza virus: a systematic review. *Epidemiol Infect.* (2010) 138:449–56. doi: 10.1017/S0950268809991658
7. Chan JF, Yuan S, Zhang AJ, Poon VK, Chan CC, Lee AC, et al. Surgical mask partition reduces the risk of non-contact transmission in a golden Syrian hamster model for Coronavirus Disease 2019 (COVID-19). *Clin Infect Dis.* (2020) 71:2139–49. doi: 10.1093/cid/ciaa644
8. Hui DS, Chow BK, Chu L, Ng SS, Lee N, Gin T, et al. Exhaled air dispersion during coughing with and without wearing a surgical or N95 mask. *PLoS ONE.* (2012) 7:e50845. doi: 10.1371/journal.pone.0050845
9. Tracht SM, Del Valle SY, Hyman JM. Mathematical modeling of the effectiveness of facemasks in reducing the spread of novel influenza A (H1N1). *PLoS ONE.* (2010) 5:e9018. doi: 10.1371/journal.pone.0009018
10. Seale H, Dwyer DE, Cowling BJ, Wang Q, Yang P, Macintyre CR. A review of medical masks and respirators for use during an influenza pandemic. *Influenza Other Respir Viruses.* (2009) 3:205–6. doi: 10.1111/j.1750-2659.2009.00101.x
11. Respirator Trusted-Source Information. *Section 1: NIOSH-Approved Respirators*. Washington, DC: National Institute for Occupational Safety and Health (2018). Available online at: https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest1.html (accessed May 8, 2020).
12. Control CfD. Available online at: https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/n95list1.html (accessed June 22, 2020).
13. National Institute for Occupational Safety and Health. *Respirator Fact Sheet*. Washington, DC (2020). Available online at: https://www.cdc.gov/niosh/npptl/topics/respirators/factsheets/respfact.html (accessed May 9, 2020).
14. Zhou SS, Lukula S, Chiossone C, Nims RW, Suchmann DB, Ijaz MK. Assessment of a respiratory face mask for capturing air pollutants and pathogens including human influenza and rhinoviruses. *J Thorac Dis.* (2018) 10:2059–69. doi: 10.21037/jtd.2018.03.103
15. Patel RB, Skaria SD, Mansour MM, Smaldone GC. Respiratory source control using a surgical mask: an *in vitro* study. *J Occup Environ Hyg.* (2016) 13:569–76. doi: 10.1080/15459624.2015.1043050
16. Wikipedia. *Respirator Assigned Protection Factors*. San Francisco, CA: Wikipedia (2020).
17. Yezli S, Otter JA. Minimum infective dose of the major human respiratory and enteric viruses transmitted through food and the environment. *Food Environ Virol.* (2011) 3:1–30. doi: 10.1007/s12560-011-9056-7
18. Douglas MG, Kocher JF, Scobey T, Baric RS, Cockrell AS. Adaptive evolution influences the infectious dose of MERS-CoV necessary to achieve severe respiratory disease. *Virology.* (2018) 517:98–107. doi: 10.1016/j.virol.2017.12.006
19. Watanabe T, Bartrand TA, Weir MH, Omura T, Haas CN. Development of a dose-response model for SARS coronavirus. *Risk Anal.* (2010) 30:1129–38. doi: 10.1111/j.1539-6924.2010.01427.x
20. Robinson M, Stilianakis NI, Drossinos Y. Spatial dynamics of airborne infectious diseases. *J Theor Biol.* (2012) 297:116–26. doi: 10.1016/j.jtbi.2011.12.015
21. Zhang R, Li Y, Zhang AL, Wang Y, Molina MJ. Identifying airborne transmission as the dominant route for the spread of COVID-19. *Proc Natl Acad Sci U S A.* (2020) 117:14857–63. doi: 10.1073/pnas.2009637117
22. Tellier R, Li Y, Cowling BJ, Tang JW. Recognition of aerosol transmission of infectious agents: a commentary. *BMC Infect Dis.* (2019) 19:101. doi: 10.1186/s12879-019-3707-y
23. Peng M, Dai J, Sugali CK, Rayana NP, Mao W. The role of the ocular tissue in SARS-CoV-2 transmission. *Clin Ophthalmol.* (2020) 14:3017–24. doi: 10.2147/OPTH.S269868
24. Clase CM, Fu EL, Ashur A, Beale RCL, Clase IA, Dolovich MB, et al. Forgotten Technology in the COVID-19 pandemic: filtration properties of cloth and cloth masks-a narrative review. *Mayo Clin Proc.* (2020) 95:2204–24. doi: 10.1016/j.mayocp.2020.07.020
25. Balazy A, Toivola M, Adhikari A, Sivasubramani SK, Reponen T, Grinshpun SA. Do N95 respirators provide 95% protection level against airborne viruses, and how adequate are surgical masks? *Am J Infect Control.* (2006) 34:51–7. doi: 10.1016/j.ajic.2005.08.018
26. Wiwanitkit V. N-95 face mask for prevention of bird flu virus: an appraisal of nanostructure and implication for infectious control. *Lung.* (2006) 184:373–4. doi: 10.1007/s00408-006-0021-4
27. Brosseau LM, McCullough NV, Vesley D. Recovery and survival of three bacteria on respirator filters and surgical masks. *Adv Filtrat Sep Technol.* (1997) 11:372–6.
28. Rengasamy S, Miller A, Eimer BC. Evaluation of the filtration performance of NIOSH-approved N95 filtering facepiece respirators by photometric and number-based test methods. *J Occup Environ Hyg.* (2011) 8:23–30. doi: 10.1080/15459624.2010.515556
29. O'Kelly E, Pirog S, Ward J, Clarkson PJ. Ability of fabric face mask materials to filter ultrafine particles at coughing velocity. *BMJ Open.* (2020) 10:e039424. doi: 10.1136/bmjopen-2020-039424
30. Zuo Z, Kuehn TH, Pui DY. Performance evaluation of filtering facepiece respirators using virus aerosols. *Am J Infect Control.* (2013) 41:80–2. doi: 10.1016/j.ajic.2012.01.010
31. Eninger RM, Honda T, Adhikari A, Heinonen-Tanski H, Reponen T, Grinshpun SA. Filter performance of n99 and n95 facepiece respirators against viruses and ultrafine particles. *Ann Occup Hyg.* (2008) 52:385–96. doi: 10.1093/annhyg/men019
32. Offeddu V, Yung CF, Low MSF, Tam CC. Effectiveness of masks and respirators against respiratory infections in healthcare workers: a systematic review and meta-analysis. *Clin Infect Dis.* (2017) 65:1934–42. doi: 10.1093/cid/cix681

33. Dbouk T, Drikakis D. On respiratory droplets and face masks. *Phys Fluids*. (2020) 32:063303. doi: 10.1063/5.0015044
34. Jefferson T, Del Mar CB, Dooley L, Ferroni E, Al-Ansary LA, Bawazeer GA, et al. Physical interventions to interrupt or reduce the spread of respiratory viruses. *Cochrane Database Syst Rev*. (2020) 11:Cd006207. doi: 10.1002/14651858.CD006207.pub5
35. Cheng HY, Chueh YN, Chen CM, Jian SW, Lai SK, Liu DP. Taiwan's COVID-19 response: timely case detection and quarantine, January to June 2020. *J Formos Med Assoc*. (2021) 120:1400–4. doi: 10.1016/j.jfma.2020.10.023
36. Violante T, Violante FS. Surgical masks vs respirators for the protection against coronavirus infection: state of the art. *Med Lav*. (2020) 111:365–71. doi: 10.23749/mdl.v111i5.9692
37. Matuschek C, Moll F, Fangerau H, Fischer JC, Zanker K, van Griensven M, et al. Face masks: benefits and risks during the COVID-19 crisis. *Eur J Med Res*. (2020) 25:32. doi: 10.1186/s40001-020-00430-5
38. Sewell DK, Miller A, Program CDCM-H. Simulation-free estimation of an individual-based SEIR model for evaluating nonpharmaceutical interventions with an application to COVID-19 in the District of Columbia. *PLoS ONE*. (2020) 15:e0241949. doi: 10.1371/journal.pone.0241949
39. van der Sande M, Teunis P, Sabel R. Professional and home-made face masks reduce exposure to respiratory infections among the general population. *PLoS One*. (2008) 3:e2618.
40. Barasheed O, Alfelali M, Mushta S, Bokhary H, Alshehri J, Attar AA, et al. Uptake and effectiveness of facemask against respiratory infections at mass gatherings: a systematic review. *Int J Infect Dis*. (2016) 47:105–11.
41. Delamater PL, Street EJ, Leslie TF, Yang YT, Jacobsen KH. Complexity of the basic reproduction number (R(0)). *Emerg Infect Dis*. (2019) 25:1–4. doi: 10.3201/eid2501.171901
42. Volz E, Meyers LA. Epidemic thresholds in dynamic contact networks. *J R Soc Interface*. (2009) 6:233–41. doi: 10.1098/rsif.2008.0218
43. Jordan R. *Stanford-Developed Interactive Model Explores How Different Interventions Affect COVID-19's Spread*. (2020). Available online at: https://news.stanford.edu/2020/03/30/modeling-social-distancings-impact/ (accessed June 22, 2020).
44. Pei S, Kandula S, Shaman J. Differential effects of intervention timing on COVID-19 spread in the United States. *Sci Adv*. (2020) 6:eabd6370. doi: 10.1126/sciadv.abd6370
45. Torén K. Svag evidens för att munskydd minskar smitta hos allmänhet. *Läkartidningen*. (2020) 117:20141. Available online at: https://lakartidningen.se/klinik-och-vetenskap-1/kommentar/2020/08/svag-evidens-for-att-munskydd-minskar-smitta-hos-allmanhet/; https://lakartidningen.se/wp-content/uploads/2020/08/20141.pdf
46. Heesterbeek H, Anderson RM, Andreasen V, Bansal S, De Angelis D, Dye C, et al. Modeling infectious disease dynamics in the complex landscape of global health. *Science*. (2015) 347:aaa4339. doi: 10.1126/science.aaa4339
47. Beggs JM, Plenz D. Neuronal avalanches in neocortical circuits. *J Neurosci*. (2003) 23:11167–77. doi: 10.1523/JNEUROSCI.23-35-11167.2003
48. Ribeiro TL, Copelli M, Caixeta F, Belchior H, Chialvo DR, Nicolelis MA, et al. Spike avalanches exhibit universal dynamics across the sleep-wake cycle. *PLoS ONE*. (2010) 5:e14129. doi: 10.1371/journal.pone.0014129
49. Hanke W, Wiedemann M, de Lima VMF. Control of the excitability of neuronal tissue by weak external forces. *Faraday Discuss*. (2001) 120:237–48. doi: 10.1039/b102706a
50. Kundu A, Das P, Roy AB. Stability, bifurcations and synchronization in a delayed neural network model of n-identical neurons. *Math Comput Simul*. (2016) 121:12–33. doi: 10.1016/j.matcom.2015.07.006
51. Ringlander J, Nilsson S, Westin J, Lindh M, Martner A, Hellstrand K. Low incidence of reinfection with endemic coronaviruses diagnosed by real-time PCR. *J Infect Dis*. (2021) 223:2013–4. doi: 10.1093/infdis/jiaa627
52. Tosi Z, Yoshimi J. Simbrain 3.0: a flexible, visually-oriented neural network simulator. *Neural Netw*. (2016) 83:1–10. doi: 10.1016/j.neunet.2016.07.005
53. Kerr CC, Stuart RM, Mistry D, Abeysuriya RG, Rosenfeld K, Hart GR, et al. Covasim: an agent-based model of COVID-19 dynamics and interventions. *PLoS Comput Biol*. (2021) 17:e1009149. doi: 10.1371/journal.pcbi.1009149
54. Noll NB, Aksamentov I, Druelle V, Badenhorst A, Ronzani B, Jefferies G, et al. COVID-19 Scenarios: an interactive tool to explore the spread and associated morbidity and mortality of SARS-CoV-2. *medRxiv [Preprint]*. doi: 10.1101/2020.05.05.20091363
55. Muellner U, Fournié G, Muellner P, Ahlstrom C, Pfeiffer DU. epidemix—an interactive multi-model application for teaching and visualizing infectious disease transmission. *Epidemics*. (2018) 23:49–54. doi: 10.1016/j.epidem.2017.12.003
56. Delva W, Leventhal GE, Helleringer S. Connecting the dots: network data and models in HIV epidemiology. *AIDS*. (2016) 30:2009–20. doi: 10.1097/QAD.0000000000001184
57. Rahman B, Sadraddin E, Porreca A. The basic reproduction number of SARS-CoV-2 in Wuhan is about to die out, how about the rest of the World? *Rev Med Virol*. 2020:e2111. doi: 10.1002/rmv.2111
58. Liu Y, Gayle AA, Wilder-Smith A, Rocklöv J. The reproductive number of COVID-19 is higher compared to SARS coronavirus. *J Travel Med*. (2020) 27:taaa021. doi: 10.1093/jtm/taaa021
59. Hussein M, Toraih E, Elshazli R, Fawzy M, Houghton A, Tatum D, et al. Meta-analysis on serial intervals and reproductive rates for SARS-CoV-2. *Ann Surg*. (2021) 273:416–23. doi: 10.1097/SLA.0000000000004400
60. Field MH, Rashbrook JP, Rodrigues JN. Hydrocolloid dressing strip over bridge of nose to relieve pain and pressure from Filtered Face Piece (FFP) masks during the coronavirus (COVID-19) pandemic. *Ann R Coll Surg Engl*. (2020) 102:394–6. doi: 10.1308/rcsann.2020.0095
61. Gefen A, Ousey K. Update to device-related pressure ulcers: SECURE prevention. *COVID-19, face masks and skin damage*. *J Wound Care*. (2020) 29:245–59. doi: 10.12968/jowc.2020.29.5.245
62. Ju HJ, Lee JH, Kim GM, Park CJ, Bae JM. Contact vitiligo induced by rubber ear loops from a disposable sanitary mask. *Eur J Dermatol*. (2018) 28:690–1. doi: 10.1684/ejd.2018.3350
63. Di Altobrando A, La Placa M, Neri I, Piraccini BM, Vincenzi C. Contact dermatitis due to masks and respirators during COVID-19 pandemic: what we should know and what we should do. *Dermatol Ther*. (2020) 33:e14528. doi: 10.1111/dth.14528
64. Chaiyabutr C, Sukakul T, Pruksaeakanan C, Thumrongtharadol Waranya Boonchai J. Adverse skin reactions following different types of mask usage during the COVID-19 pandemic. *J Eur Acad Dermatol Venereol*. (2021) 35:e176–78. doi: 10.1111/jdv.17039
65. Zanotti B, Parodi PC, Riccio M, De Francesco F, Zingaretti N. Can the elastic of surgical face masks stimulate ear protrusion in children? *Aesthetic Plast Surg*. (2020) 44:1947–50. doi: 10.1007/s00266-020-01833-9
66. Morishima M, Kishida K. Understanding attitudes toward hygiene mask use in Japanese daily life by using a repeated cross-sectional survey. *Work*. (2018) 61:303–11. doi: 10.3233/WOR-182801
67. Brown MN, Char R, Henry SO, Tanigawa J, Yasui S. The effect of firefighter personal protective equipment on static and dynamic balance. *Ergonomics*. (2019) 62:1193–201. doi: 10.1080/00140139.2019.1623422
68. Santos-Silva PR, Greve JMD, Pedrinelli A. During the coronavirus (Covid-19) pandemic, does wearing a mask improve or worsen physical performance? *Revista Brasileira De Medicina Do Esporte*. (2020) 26:281–4. doi: 10.1590/1517-869220202604esp001
69. Özdemir L, Azizoglu M, Yapici D. Respirators used by healthcare workers due to the COVID-19 outbreak increase end-tidal carbon dioxide and fractional inspired carbon dioxide pressure. *J Clin Anesth*. (2020) 66:109901. doi: 10.1016/j.jclinane.2020.109901
70. Bourassa S, Bouchard PA, Lellouche F. Impact of gas masks on work of breathing, breathing patterns, and gas exchange in healthy subjects. *Respir Care*. (2018) 63:1350–9. doi: 10.4187/respcare.06027
71. Kyung SY, Kim Y, Hwang H, Park JW, Jeong SH. Risks of N95 Face mask use in subjects with COPD. *Respir Care*. (2020) 65:658–64. doi: 10.4187/respcare.06713
72. Perna G, Cuniberti F, Daccò S, Nobile M, Caldirola D. Impact of respiratory protective devices on respiration: implications for panic vulnerability during the COVID-19 pandemic. *J Affect Disord*. (2020) 277:772–8. doi: 10.1016/j.jad.2020.09.015
73. King FM. Covid-19: face masks could foster distrust and blame. *BMJ*. (2020) 369:m2009. doi: 10.1136/bmj.m2009

74. Carragher DJ, Hancock PJB. Surgical face masks impair human face matching performance for familiar and unfamiliar faces. *Cogn Res Princ Implic.* (2020) 5:59. doi: 10.1186/s41235-020-00258-x
75. Bressington DT, Cheung TCC, Lam SC, Suen LKP, Fong TKH, Ho HSW, et al. Association between depression, health beliefs, and face mask use during the COVID-19 pandemic. *Front Psychiatry.* (2020) 11:571179. doi: 10.3389/fpsyt.2020.571179
76. Bamber JH, Christmas T. Covid-19: each discarded face mask is a potential biohazard. (2020) 369:m2012. doi: 10.1136/bmj.m2012
77. Bundgaard H, Bundgaard JS, Raaschou-Pedersen DET, von Buchwald C, Todsen T, Norsk JB, et al. Effectiveness of adding a mask recommendation to other public health measures to prevent SARS-CoV-2 infection in danish mask wearers : a randomized controlled trial. *Ann Intern Med.* (2021) 174:335–43. doi: 10.7326/M20-6817
78. Clifton W, Damon A, Martin AK. Considerations and cautions for three-dimensional-printed personal protective equipment in the COVID-19 crisis. *3D Print Addit Manuf.* (2020) 7:97–9. doi: 10.1089/3dp.2020.0101
79. Golshahi L, Telidetzki K, King B, Shaw D, Finlay WH. A pilot study on the use of geometrically accurate face models to replicate *ex vivo* N95 mask fit. *Am J Infect Control.* (2013) 41:77–9. doi: 10.1016/j.ajic.2012.01.008
80. O'Kelly E, Arora A, Pearson C, Ward J, Clarkson P. (2020). Performing qualitative mask fit testing without a commercial kit: fit testing which can be performed at home and at work. *Disaster Med Public Health Prep*. 1–5. doi: 10.1017/dmp.2020.352
81. Buzon P, Maity S, Roos WH. Physical virology: from virus self-assembly to particle mechanics. *WIREs Nanomed Nanobiotechnol.* (2020) 12:e1613. doi: 10.1002/wnan.1613
82. Mannelli I, Reigada R, Suarez I, Janner D, Carrilero A, Mazumder P, et al. Functionalized surfaces with tailored wettability determine influenza A infectivity. *ACS Appl Mater Interfaces.* (2016) 8:15058–66. doi: 10.1021/acsami.6b02779
83. Borkow G, Zhou SS, Page T, Gabbay J. A novel anti-influenza copper oxide containing respiratory face mask. *PLoS ONE.* (2010) 5:e11295. doi: 10.1371/journal.pone.0011295
84. Quan FS, Rubino I, Lee SH, Koch B, Choi HJ. Universal and reusable virus deactivation system for respiratory protection. *Sci Rep.* (2017) 7:39956. doi: 10.1038/srep39956
85. Toledo GG, Toledo VH, Lanfredi AJC, Escote M, Champi A, Silva M, et al. Promising nanostructured materials against enveloped virus. *An Acad Bras Cienc.* (2020) 92:e20200718. doi: 10.1590/0001-3765202020200718
86. Faucher S, Daniel JL, Liang XA, Jin X, Phillips R, Parviz D, et al. A virucidal face mask based on the reverse-flow reactor concept for thermal inactivation of SARS-CoV-2. *AIChE J.* (2021) 67:e17250. doi: 10.1002/aic.17250
87. Guha S, McCaffrey B, Hariharan P, Myers MR. Quantification of leakage of sub-micron aerosols through surgical masks and facemasks for pediatric use. *J Occup Environ Hyg.* (2017) 14:214–23. doi: 10.1080/15459624.2016.1237029
88. Lopez A, Mariette X, Bachelez H, Belot A, Bonnotte B, Hachulla E, et al. Vaccination recommendations for the adult immunosuppressed patient: a systematic review and comprehensive field synopsis. *J Autoimmun.* (2017) 80:10–27. doi: 10.1016/j.jaut.2017.03.011
89. Lin A, Ercumen A, Benjamin-Chung J, Arnold BF, Das S, Haque R, et al. Effects of water, sanitation, handwashing, and nutritional interventions on child enteric protozoan infections in rural Bangladesh: a cluster-randomized controlled trial. *Clin Infect Dis.* (2018) 67:1515–22. doi: 10.1093/cid/ciy320
90. Clase CM, Fu EL, Joseph M, Beale RCL, Dolovich MB, Jardine M, et al. Cloth masks may prevent transmission of COVID-19: an evidence-based, risk-based approach. *Ann Intern Med.* (2020) 173:489–91. doi: 10.7326/M20-2567
91. Ngonghala CN, Iboi E, Eikenberry S, Scotch M, MacIntyre CR, Bonds MH, et al. Mathematical assessment of the impact of non-pharmaceutical interventions on curtailing the 2019 novel Coronavirus. *Math Biosci.* (2020) 325:108364. doi: 10.1016/j.mbs.2020.108364
92. Walcott DA. *What is the Evidence on Wearing Masks to Stop COVID-19*? (2020). Available online at: https://www.weforum.org/agenda/2020/04/should-we-be-promoting-the-widespread-use-of-masks/ (accessed April 19, 2020).
93. Javid B, Weekes MP, Matheson NJ. Covid-19: should the public wear face masks? (2020) 369:m1442. doi: 10.1136/bmj.m1442
94. Stutt R, Retkute R, Bradley M, Gilligan CA, Colvin J. A modelling framework to assess the likely effectiveness of facemasks in combination with 'lock-down' in managing the COVID-19 pandemic. *Proc Math Phys Eng Sci.* (2020) 476:20200376. doi: 10.1098/rspa.2020.0376

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frontiers in Psychiatry

PERSPECTIVE
published: 29 September 2021
doi: 10.3389/fpsyt.2021.654584

Developmental Understanding of Death and Grief Among Children During COVID-19 Pandemic: Application of Bronfenbrenner's Bioecological Model

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COVID-19 Pandemic has influenced death-related attitudes and understanding during the childhood development leading to a life-long impact. Factors like pandemic-related movement restrictions, school closures, and parents' stay-at-home have exposed children to the phenomenon of grief and death. In that case, children anticipate adverse outcomes and fear while they struggle with unanswered questions. Children may not have coping skills needed to manage their grief in constructive ways to identify, normalize, and express their responses to the loss in their lives. Naming and validating these responses as distinctive aspects of grief process and providing safe space to express their feelings are essential components of a child's coping with loss and grief. This is crucial to consider, as different children react to and are influenced by their environments differently. This article aims to explore the developmental understanding of the process of death and grief by applying the conceptual framework of Bronfenbrenner's theory. Understanding mutual interaction between a child and various ecological systems determines how children perceive death and process grief can facilitate effective communication that has significant implications.

Keywords: death anxiety, developmental perspective, Bronfenbrenner's ecological model, COVID-19 pandemic, child and adolescent mental health

OPEN ACCESS

Edited by:
Sara Invitto,
University of Salento, Italy

Reviewed by:
Ines Testoni,
University of Padua, Italy
Michael Alexander Wieser,
University of Klagenfurt, Austria

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *16 January 2021*
Accepted: *24 August 2021*
Published: *29 September 2021*

Citation:
Chachar AS, Younus S and Ali W (2021) Developmental Understanding of Death and Grief Among Children During COVID-19 Pandemic: Application of Bronfenbrenner's Bioecological Model. Front. Psychiatry 12:654584. doi: 10.3389/fpsyt.2021.654584

INTRODUCTION

During the initial 14 months of the pandemic, more than 1.5 million children lost at least one primary caregiver (parent or grandparent) due to COVID-19-associated deaths (1). As the pandemic resulted in a substantial increase in deaths caused either directly by virus-related complications or indirectly due to limited access to health care services for chronic diseases and medical emergencies, the children's exposure to the phenomenon of death also increased exponentially (2). Children and adults differ in reacting to pandemics (3). Thus, children living through the pandemic can imbibe worries from various sources within their environment. Furthermore, these anxieties can influence each child differently depending on their developmental level of cognition and baseline understanding of death. The trauma of losing a parent or a caregiver can be a devastating life event for a child. These experiences are associated with increases in mental

health conditions, substance use disorders, and chronic health conditions. To prevent further adverse consequences, the need for providing and ensuring access to evidence-based psychosocial support to these grieving children has become essential. It should not be neglected while responding to the pandemic. Thus, in assessing the grief process and children's understanding of death, it is essential to consider child's experiences, their interaction with adults, the broader culture, and exposure to losses. In addition, the child's developmental age, educational status, pre-existing mental health condition, economically underprivileged background, quarantined, and pandemics-related routine changes influence this process (4, 5). The present review uses Bronfenbrenner's bio-ecological model to discuss the contextual factors that shape the cognitive understanding and the psychological impact of death and grief process among children in the COVID-19 pandemic (**Table 1**).

FACTORS AFFECTING CHILD'S UNDERSTANDING OF DEATH AND GRIEF PROCESS

Developmental Understanding of Death

The innate cognitive ability of a child to understand the concept of death expands during the early stages of development. This does not mean that children do not understand the notion of death. Even though their understanding is limited, they still strive to make sense of loss and grief (6). Children's ability to comprehend death and grief depends on their developmental stage, life experiences, individual temperament, parental communication patterns, and support from their environment (7). Earlier perceptions about death evolve progressively with age. Speece and Brent (8) identified these concepts according to children's cognitive representation of death (**Table 2**). According to these theoretical concepts, for a 4-year-old, death is reversible, which means if someone has died, they can come back to life. Children also do not fully conceptualize the fact that they are mortal. Instead, they believe death happens to older people and, in some instances, evil people. By the age of 8–10, children now comprehend personified death as an unavoidable life event.

Death-Related Emotional Responses

Emotional responses to death include uncertainty, fear, and anxiety. These responses depend upon an individual's comprehension and appraisal for threat, meta-cognitive beliefs, intolerance of uncertainty, cognitive biases toward physical symptoms, and existential concerns, including death and dying (9). Uncertainty is an inability to determine and predict the meaning of ongoing events. It can be a result of ambiguity, i.e., conflicting, incomplete, or inadequate information; complexity, i.e., difficult to understand information; and unpredictability, i.e., likelihood or risk of the future outcome of the event (10). When faced with uncertainties, children and families might feel paralyzed and struggle with making urgent or everyday decisions (11). Fear is a powerful emotion that plays an essential role in survival and induces a fight or flight response. Regardless of one's response to fear, it thrives on unfamiliarity and lack of information. It can be spontaneous or deliberate (12). It can also invoke a response to anticipated threats or thoughts about potential dangers, generally manifested as anticipatory anxiety. These emotions in current times can arise due to existential threats, uncertainty about a disease process, available treatments and vaccinations, and loss of meaning and coherence. In some instances, anticipatory fear may precede an actual pandemic. Subsequently, these reasons impact one's behaviors, cognitions, emotions, and interpersonal skills.

Fear of Death, Death Anxiety, and Death-Related Attitudes

Fear of death is a conscious phenomenon specific to dying. Reasons to fear death include loss of self, fear of the unfamiliarity, pain, suffering, and leaving family members in distress (13). In contrast, death anxiety is considered to be unconscious and more generalized in nature. Death anxiety includes avoidance and acceptance. Death avoidance is an attitude toward death is when a person attempts to avoid thinking or talking about death. Note that death avoidance differs from fear of death which results from confrontation with death and the emotions attached to it (13). Whereas, death acceptance is the ending and desirable stage of coping with death itself (14). It is a psychological readiness for the final separation from life that consists of the cognitive awareness of mortality and a positive emotional reaction to that awareness (13, 15). Different attitudes represent death acceptance. The first is neutral acceptance, in which a person perceives and accepts death as an integral part of life. They are not afraid of death but, at the same time, do not welcome it. The second attitude is approach acceptance, in which a person perceives death as a passage to a better afterlife. This attitude is significantly associated with religiosity (16). The third attitude is escaping acceptance, where a person perceives death as an escape from the pain of life, thus, a desirable alternative to life.

The question arises if the fear of death exists in most children who have not developed a fully mature understanding of death. In some instances, fear of death increases in early adolescence (17). This perspective suggests that even when a child achieves a mature understanding of death, additional factors influence fear of death. Developing a mature concept of death could affect children's fear of death in two ways. Either it could provoke it, or it could reduce it; the latter leads to reduction in child's struggle with unanswered questions about their earlier conceptualization of death. It remains unclear if interventions targeted to reduce fear of death would benefit those children who have mastered all five subcomponents of the death concept as some fear remains, even after achieving a mature understanding of death (18). Further research to investigate which possible developmental scenario would prove beneficial has significant implications for clinical and educational practices.

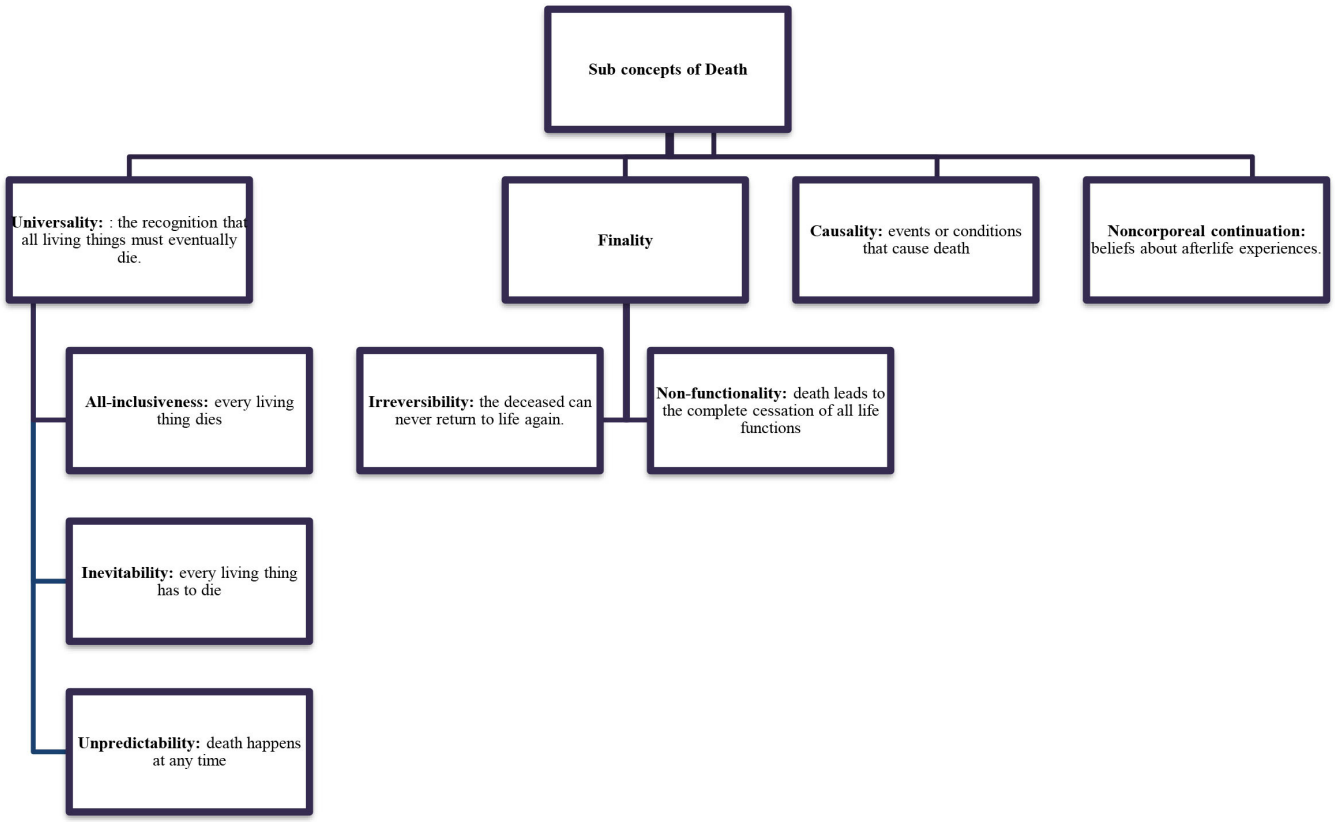
Terror Management Theory

Terror management theory (TMT) proposes that death anxiety drives human behavior (19). TMT reasons that death reminders increase the potential for experiencing existential anxiety, and can increase mental health symptoms (20). Continuing the

TABLE 1 | Factors affecting the process of death and grief among children in the COVID in each system of Bronfenbrenner's bio-ecological model.

Microsystem	Mesosystem	Macrosystem	Exosystem	Chronosystem	Individual characteristics
• Home environment • Parental anxiety • Parental emotional grief reaction • Parental education	• Peer conversation • Teacher's communication • Patterns of communication and support • Family values • Parenting praticesProtecting the child	• Unresponsible journalism • Cultural beliefs • Conspiracy theories • Funeral Practices	• Isolation, contact restrictions, economic shutdown, limited out-of-home leisure time activities • Limited access to healthcare income loss	• COVID pandemic • Travel ban • Changing policies	• Age, gender, temperament, and resilience • Developmental stage, i.e., cognitive, physical, psychological, social, spiritual • Death experience, trauma

TABLE 2 | Developmental stages during childhood and cognitive representation of death.



TMT principle, Morality Salience (MS) theory highlights the importance of innate belief systems to protect oneself from existential anxiety. Situations that demand confrontation to one's mortality, as evident in the current pandemic; there is an increased need to hold on to the existing belief system. Hence, any counter-narrative appears as a threat and any reinforcement of the current belief system provides psychological safety. During a threat to survival and prosperity, humans shift toward the collectivistic mindset (21). These theories suggest that the fear of death drives people to maintain their cultural beliefs at the expense of health related safety. Collective beliefs shared by the community can affect individuals' behavior or emotions when experiencing stress. This is termed "***milling***," described by *Contagion theory* (22). During *milling*, people become incredibly conscious of the crowd's attitudes and respond by adopting them to avoid external ridicule. Independent actions reduce through *milling,* and new behavioral patterns emerge from extreme collective behavior observed during the pandemic. These factors, directly and indirectly, aggravate the anxiety associated with the uncertain pandemic times for children and families.

FIGURE 1 | Bronfenbrenner's bio-ecological systems and their interactions with childhood development.

BRONFENBRENNER'S MODEL OF CHILD DEVELOPMENT DURING COVID-19

Urie Bronfenbrenner's bio-ecological model provides a framework to describe how a child's innate qualities and environments influence growth and development in different settings (23). This model maintains the child at the central core with five encompassing systems, ranging from the most intimate to the broadest (**Figure 1**). These systems and their interactions with childhood development are crucial regardless of pandemic times. Nonetheless, the COVID-19 pandemic has further complicated the interactions between these systems at all levels (**Figure 2**). Thus, it is valuable to apply Bronfenbrenner's bio-ecological model to understand pandemic's impact on grief and death process among children.

The ***microsystem*** is children's immediate environment, including school, day-care, home, friends, and the local community or immediate neighborhood. The interactions between these constructs in the microsystem and the child's reaction toward them directly affect childhood development. The large magnitude of the COVID-19 pandemic has affected children in many ways. Although children appear to have lower mortality rates directly from COVID-19, the indirect impact has resulted in a rise in child mortality rates mainly due to the limited access to health services, immunization, and antenatal care; reversing decades of progress toward eliminating preventable child deaths globally (2, 24). On the other hand, the number of children losing a primary caregiver due to COVID-19 associated deaths is overwhelming (1). Subsequently, as the pandemic evolves, attempts are made to track the number of grieving children for each COVID-19 associated death (25). Sudden parental death secondary to COVID-19 can profoundly affect grieving children, putting them at elevated risk of traumatic grief, mood and anxiety disorders, poor educational outcomes, unintentional death or suicide, and consequences that can persist into adulthood (26).

Children who have not directly experienced the death of their loved ones have also been affected by the pandemic. Whether cohesive or disintegrated, the existing family system is compromised due to changes in routine and the introduction of online teaching. The risk of maltreatment, violence at home, and poor nutrition also increase for many vulnerable children. Children from disadvantaged backgrounds are more prone to being affected by the consequences of the COVID-19 outbreak. They are predisposed to poor health outcomes, lower physical activity levels, suboptimal diet, greater disengagement from school, lower academic performance, and more socio-emotional difficulties (27). Families' reactions to the pandemic-related

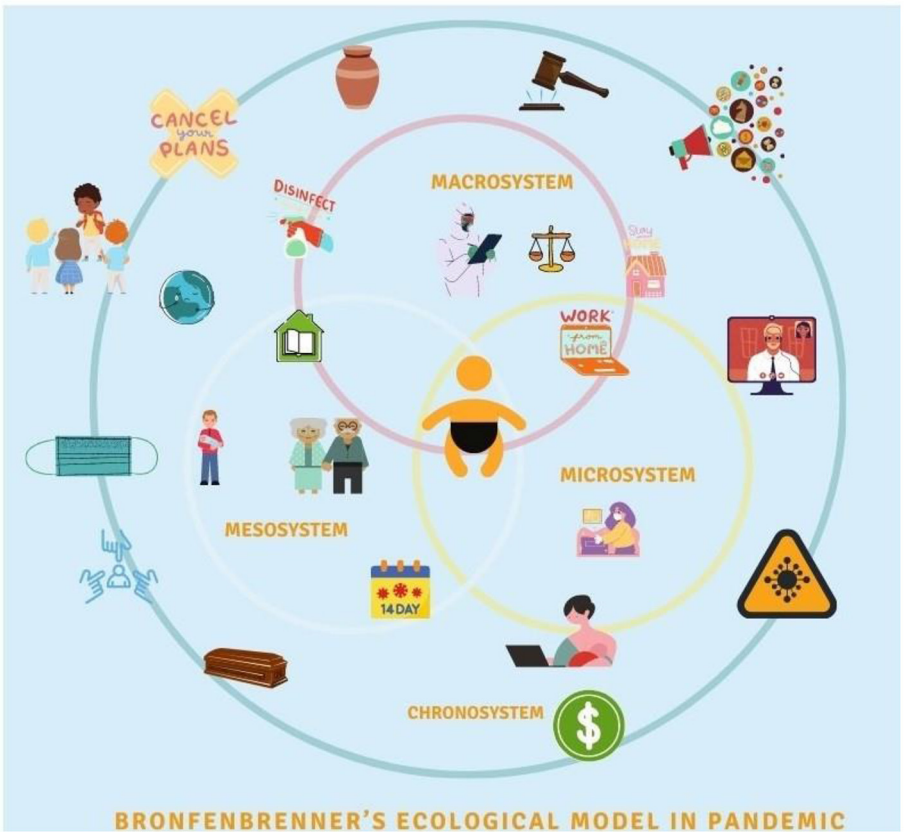


FIGURE 2 | Bronfenbrenner's bio-ecological model; systems and their interactions with childhood development during COVID-19 pandemic.

anxieties range from fear to indifference to fatalism (3, 28). Some families may disregard the risks and fail to engage in recommended health behaviors such as vaccination, hygiene practices, and social distancing. Others may react with intense anxiety or fear. Parents with anxious temperaments are likely to fear contagion and view the world as an existential threat, described in the literature as health anxiety and experience anxiety, respectively (29, 30). However, a moderate level of fear or anxiety encourages people to cope with health threats, but severe distress can be debilitating. This diversity of coping styles among families stems from their unique challenges. During the pandemic, the lack of support for parents from extended family members and other social support systems results in high levels of parental emotional distress (31).

The ***mesosystem*** includes the interaction of different microsystems. For example, it involves the connections between school and home, family and community, and between friends and family. During the pandemic, as children interact within various elements of their microsystem, information exchange during these interactions leads to an alteration of perception and attitude related to death. For instance, household conversations about vulnerability and risk associated with exposure for older family members, limited visitations to grandparents, health communications in schools, and outdoor activities can raise curiosity in children. This curiosity, if addressed, can lead to a better understanding of the situation. However, not addressing it can lead to confusion and invoke fear due to uncertainty. This multidimensional exchange multiplies the extent and impact of unanswered queries. There is uncertainty in the early stages of a pandemic, especially when outbreaks come in waves, with schools and workplaces closing for the while and reopening later in-person or in a hybrid fashion (32). As the curve flattens, a single incident of viral exposure disrupts the entire mesosystem. The cost of each exposure is multilayered. For a child exposed in school, one significant consequence is the cessation of in-person learning that is also emotional in nature. Blaming oneself as a source of illness, anger toward other children for not taking optimal precautions, and guilt associated with being responsible for the morbidity and mortality of someone else are some of the emotional reactions exhibited by children. On the other hand, parents worry about the risk of illness and associated fear of death compounded by stress associated with mobilization of resources for childcare as they manage in-person and online, work, and schooling (31).

The ***exosystem*** refers to the relationship between two or more settings that influences children's development. It includes available health services, employment opportunities, or neighborhood safety. Disruption in the exosystem during

the pandemic adversely affects children as lockdown measures reduce opportunities for children to participate in extracurricular activities, which serves as a coping outlet for many children. Contact with supportive school staff, community members, and access to the justice system and child protection services are also decreased due to policies related to in-person gatherings (28). Children are also indirectly affected by elements of this system as their families are impacted by the economic shutdown leading to unmet basic needs (33).

The healthcare system is one of the most critical elements in this system that significantly impacts children's death-related attitudes. For an overall healthy child, pandemic disrupts annual physical exams, dental visits, eye exams, and routine vaccinations. In addition, emergent or urgent visits to the emergency rooms or clinics are associated with significant anxiety related to fear of exposure to virus during the visit. For children with comorbidities, routine hospital visits are associated with similar anxieties. However, these are magnified by new health care policies during visits, limitations associated with the number of adults accompanying children in health care settings, and contact precautions leading to limited access to resources like screens and toys. For children who require home healthcare services, nursing care is complicated by contact precautions and physical distancing. Despite common fear of shots, doctors' visits, and dental exams, health care settings are generally considered places where one gets help. During a pandemic, the fear of contamination associated with health care providers and health care settings can distort this image. This can be disorienting for children far from the developmental phase of identifying abstract and conflicting ideas.

Media is another crucial component of the exosystem. In the past, movies and TV shows have toned down death by immunizing the masses against its emotional relevance by exposing them to the frightening nature of pandemics in the context of entertainment (34). Nevertheless, to view a past pandemic in a movie is different from viewing live reporting of death tolls from one's lifetime; the latter is broadcasting one's reality which can have adverse outcomes. Moreover, daily exposures to death stats can cause emotional numbness in some, whereas it can trigger anxiety for many. This concern led to a media release by WHO declaring an "infodemic" crisis (35). Media has the potential to impact the development of children in positive ways. As the anxiety associated with health care settings rise in children and families, they also observe the collective effort of first responders and health care providers to provide care for those in need at the cost of their personal safety. On the one hand, as media portrays the deficiencies and incompetence of governmental organizations and highlights the daily surge in cases and deaths, it also showcases the strength of communities in these difficult times. These and many other examples of unity serve as tools used by caregivers to alleviate illness and death-related anxiety.

Macrosystem are "blueprints" for interlocking social forces and their interrelationships in shaping child development. It consists of culture, beliefs, ideas, and the political and economic system. They provide broad ideological and organizational patterns that are not static but might change throughout time due to economic, geopolitical, and technological changes. Children's perception of death-related attitudes are also formed by their cultural values and geographical location. For instance, death experiences for children in a war zone area is related to witnessing daily violence. Their death attitudes differs from those living in peace and prosperity (36). This has a relevance as majority of the children affected by COVID-19 associated deaths are from countries with ongoing political unrest, thus, complicating the grieving process (25).

The political and economic system plays a significant role during the pandemic. As the outbreak spreads globally, each country becomes a key player in its containment and management. As the global political struggles continue to control the spread of the virus, inequities in the allocation of health care funding worsen the economic burden in various countries. Closure of businesses, travel ban, limited financial support and allowances by governments, layoffs from jobs further added to this burden.

COVID-19 pandemic has high morbidity and mortality rate. As the death toll mounts, the compounded weight of pain and loss disrupts the ability to grieve, affecting cultures and faiths worldwide. Communities mourn alone with nationwide lockdowns while taking care of their sick (3). Each culture and religion has a different explanation and response to the pandemic that occurs with collective denial of impermanence and mortality in the background. The attitude toward precautions and treatment varies according to these cultural explanations. In many cultures, people seek help from ancestral spirits and trust their elders and traditional healers, seeing them as the custodians of culture who guide them regarding life's conduct (37). People tend to resort to their culturally prescribed religious practices to cope with the anxiety stemming from the existential threat of the pandemic. Social and physical distancing makes these difficult as most religious practices comprise congregational rituals and ceremonies. The inability to meet with trusted fellow community members and praying together to preserve the sense of cohesiveness during times of uncertainty is distressful especially on religious occasions. Easter, Eid, Thanksgiving, Halloween, Holi, Diwali, Hajj, Christmas, Passover, and Hanukkah are observed unconventionally while adults resort to innovative ways to maintain a sense of cohesiveness. Holidays are vital to create valuable experiences for children, as they benefit from these times by developing social skills, interacting with others, and sharing their values with peers belonging to other faiths and cultures. Unfortunately, the pandemic compromises these practices and their outcomes in different ways.

Pandemic-related conspiracy theories complicated the situation further. For instance, the "Chinese virus" narrative originated from the United States and quickly spread to the entire world. The geopolitical landscape perpetuated racial discrimination against Asians ranging from structural and political to professional and personal levels. This contributed to emotional challenges for children of Asian descent and their peers living across the world. These perceptions arise during uncertainty, especially if the circumstances are threatening and personally relevant (38). Belief in conspiracy theories happens to be a culturally universal phenomenon (39). Believing that it

is a "man-made virus" with bioterrorist intent, and vaccination induced infertility were some of the conspiracy theories that were the highlights of the year 2020.

Chronosystem includes the context and dimension of time, including both change and constancy in the children's physical and social environment such as family, neighborhood, country, culture, and historical time**.** It also includes intangible factors such as values, customs, and ideals.

Among many religions, a widely practiced ritual is washing the dead body with bare hands and spending time with the dead body. Burial practices like these are among the most significant modes of spreading the disease and hence highly discouraged during the pandemic (40). The community's inability to bury the dead according to cultural and religious practices due to shortages of coffins and insufficient funeral staff can result in unresolved grief with hindered death-related closure (41, 42). Managing a loved one's funeral is an emotional time for bereaving families, and abandonment of traditionally prescribed practices can be perceived as dehumanizing at this challenging time (43, 44). As families struggle through the process of grieving and closure, children are impacted by their prolonged and unresolved grief which can manifest as confusion about the death of the family members, questions about the cause and meaning of death, and anxiety associated with their death and the possible death of living caregivers (45–47).

IMPLICATIONS

The exposure to death of a loved one or a threat (perceived or actual) toward their safety can interfere with the child's cognitive understanding of death. Below are the critical implications for various stakeholders keeping the view of Bronfenbrenner's ecological model.

Children's View of Pandemic

Children fear parental safety more than personal safety in the current context. They face uncertainties about being infected, the seriousness of the infection, the optimal type of treatment or protective measures, and whether a pandemic is truly over. Children may also express concern about possible infection, a threat to family integrity, separation from their school friends, and, more importantly, about death. As a result, they manifest anger, restlessness, frustration, and disinterest (48). While adults are busy mitigating the risks and combating the crisis, the message to children translates as, "you are safe as long as you are indoors." Reassurance of this kind does not help the child's fear of parental safety. Instead, this account can also induce feelings of guilt related to being safe in the midst of a crisis. Many adults firmly believe that children are too young to suffer, understand, internalize, and remember traumatic events to which they are exposed. Therefore, they try to protect children from the emotional discomfort that death induces. There is a "general multi-determined tendency in too many adults to encourage children to deny and repress painful effects and threat-perceived real events, often to the child's detriment" (49). The need to mourn effectively and sufficiently is as much a right of children as that of adults. However, this need must match the child's developmental ability and tendency to regulate emotions with parental emotional availability (50). Resilience allows adaptation in the face of adversity and trauma while enduring the pain and distress (51). Practicing strategies like cultivating a positive self-image, maintaining hope, and keeping things in perspective can nurture resilience (52). Children respond well to reassurance and accurate and timely information about the environment's isolation status and expected changes. Empowering children in quarantine and isolation by including them in the decision-making process helps restore dignity and a sense of self-worth in challenging situations (53).

Child's Grief Reactions

Acute grief reactions vary with symptoms unique to the loss experienced, which can be painful and impairing but do not necessarily represent a mental illness (54). Unfortunately, these reactions are not fully understood due to a lack of recognizing secondary stressors integral to the bereavement experience (55). The child not only deals with the loss of the deceased person but also worries about adjustments concerning various aspects of life; adaptation to loss involves restoring coherence to the narrative of the child's life (56).

For adults, grief is typically an unusual and disturbing experience. It is more so for children who may have even less understanding of what is happening or can happen to them. The child's cognitive and emotional development influences these reactions. For some children, grief comes in relatively short bursts over an extended time. This uneven or intermittent course of suffering is one of the most exclusive and typical childhood bereavement features. Some children may experience more intense grief responses. Preschool children, may exhibit clinging and dependent behaviors, phobic reactions, sleep and appetite disturbances, nightmares, loss of bladder and bowel control, temper tantrums, and hyperactivity (57). The younger school-age children may not express psychological suffering but manifest it through play and behavioral symptoms. They often have sleep, appetite, and concentration disturbances, somatic complaints, irritability, hyperactivity, decline in school performance, and sibling rivalry. Older children can express unpleasant internal emotional states verbally. These include anxiety, panic, dysphoria, maladaptive behaviors, such as aggression and interpersonal conflicts. The adolescents may present with depressed mood, social withdrawal, suicidal ideation and behavior, defiance, impulsive behavior, and substance use (57).

Communication

Bereaved children and family members may also experience intense survivor's guilt. Support from a trusted spiritual leader, a therapist, or grief support groups play a therapeutic role and enhance a sense of social connectedness (58). Storybooks are a helpful tool to acquaint children with communication about death and grief (59). Feraco et al. (60) proposed four main approaches for caregivers: Acknowledge, Discuss, Do, and Reflect. A discussion of this kind with the child often helps them express some of their concerns and promotes trust,

understanding, and control over the situation. Key aspects to consider while communicating with children are as follows:

- Clarify the child's knowledge and identify the source of concern while discussing the pandemic.
- Provide repeated opportunities for the child to talk about their worries, questions, and feelings about the pandemic and how it affects them. One may not always need to have an answer, but active listening can go a long way.
- Keep the process as a dialogue rather than a statement.
- Keep the conversation hopeful even when the child knows understands the gravity of the situation.
- Ensure them that the health care providers continue to take measures to combat this situation.
- Communicate the facts and ensure an adult's presence to keep them safe.
- Limit media exposure to prevent overwhelmingly inaccurate information.

School

School refusal may occur at any time but is most common in children ages 5–7 and 11–14 while transitioning to elementary and middle school, respectively. In non-crisis times, school refusal often begins following a period at home when the child becomes closer to the parent, such as a holiday break, long weekend, brief illness, the death of a pet or relative, or change in schools. These children suffer from a paralyzing fear of leaving the safety of their parents and home. Subsequently, prolonged online schooling in the face of pandemic can potentiate school refusal. Therefore, there is also a need for flexible and preventative school-based interventions to enhance children's understanding of loss and address misconceptions about the death and grief process (61). Schools and teachers must aim to provide information about death, offer an appropriate vocabulary; present diverse cultural perspectives; allow the elaboration of eventual losses and offer help to manage grief, demystify media contents and myths; and reflect upon the elements of funeral rites to integrate spiritual and religious perspective (47).

Health Care Professionals

Health care professionals working with bereaved children should consider children's views of death in their communications during clinical encounters. They can help children to rework their understandings of death as they progress developmentally. The main tasks for grieving children include understanding the loss associated with the state, expressing emotions and strong reactions, remembering the deceased, and learning the integration of the loss in one's life (62). This approach provides opportunities for growth and the realization of "good grief" in the context of irreversible loss and unavoidable sadness. In addition, clinicians should consider exploring children's understanding and needs as part of the management process. These could include: gathering adequate information about fears and anxieties, providing reassurance to reduce child's guilt and self-blame, empathetic listening and validation of child's feelings, helping them with overwhelming emotions, involving them in decision making, promoting routine activities, assisting parents in modeling their grief behaviors and giving the child opportunities to remember the deceased one or talk about them. Additionally, the clinical approach must incorporate cultural and contextual factors that may limit the spread of contagion (63). Therefore, it is crucial is to incorporate traditional religious practices and cultural beliefs that can significantly contribute to clinical challenges while managing the pandemic (64).

CONCLUSION

COVID-19 Pandemic would influence death-related fears on childhood development, impacting them for years of their life. A bioecological perspective can help us understand the differences between how children's understanding of death is impacted or influenced by their environments compared to adults. This is crucial to consider, as different children react to and are influenced by their environments differently. Adults must refrain from having a predetermined opinion of how a child must respond to a situation over a given period. Bereaved children and adolescents may not have coping skills needed to manage their grief in constructive ways. Therefore, like all bereaved adults, children need to identify, normalize, and express their responses to the loss in their lives. Naming and validating these responses as distinctive aspects of grief process and providing safe space to express their feelings are essential components of a child's coping with loss and grief. These experiences become overwhelming when children are led to view them that way. Nothing is scarier for a child than their feeling of helplessness and fear of losing a loved one.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

AC and SY: review of literature for the work, critical revision of the work for important intellectual content, design of the work, drafting of the manuscript, final approval of the version to be published, and agreement to be accountable for all aspects of the work. WA: drafting the manuscript, final approval of the version to be published, and agreement to be accountable for all aspects of the work. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

The authors would acknowledge Dr. Ayesha Mian, Dr. Zehra Fadoo, Dr. Naureen Mushtaq, Dr. Sadaf Altaf, and Dr. Shahzadi Resham from Aga Khan University.

REFERENCES

1. Hillis SD, Unwin HJ, Chen Y, Cluver L, Sherr L, Goldman PS, et al. Global minimum estimates of children affected by COVID-19-associated orphanhood and deaths of caregivers: a modelling study. *Lancet.* (2021) 398:391–402. doi: 10.2139/ssrn.3782441
2. Fong MW, Gao H, Wong JY, Xiao J, Shiu EY, Ryu S, et al. Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings-social distancing measures. *Emerg Infect Dis.* (2020) 26:976. doi: 10.3201/eid2605.190995
3. Honigsbaum M. Pandemic. *Lancet.* (2009) 373:1939. doi: 10.1016/S0140-6736(09)61053-9
4. Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information. *Psychiatry Res.* (2020) 293:113429. doi: 10.1016/j.psychres.2020.113429
5. Guimarães AC, Mau LB, Maunsell R. COVID-19 in children: considerations for returning to school★. *Braz J Otorhinolaryngol.* (2020) 86:667–8. doi: 10.1016/j.bjorl.2020.09.005
6. Corr CA, Corr DM. Key elements in a framework for helping grieving children and adolescents. *Illness Crisis Loss.* (1998) 6:142–60. doi: 10.2190/IL6.2.c
7. Kastenbaum R, Costa PT Jr. Psychological perspectives on death. *Annu Rev Psychol.* (1977) 28:225–49. doi: 10.1146/annurev.ps.28.020177.001301
8. Speece MW, Brent SB. Children's understanding of death: a review of three components of a death concept. *Child Dev.* (1984) 55:1671–86. doi: 10.2307/1129915
9. Iverach L, Menzies RG, Menzies RE. Death anxiety and its role in psychopathology: reviewing the status of a transdiagnostic construct. *Clin Psychol Rev.* (2014) 34:580–93. doi: 10.1016/j.cpr.2014.09.002
10. Han PK, Klein WM, Arora NK. Varieties of uncertainty in health care: a conceptual taxonomy. *Med Decis Making.* (2011) 31:828–38. doi: 10.1177/0272989X10393976
11. Birrell J, Meares K, Wilkinson A, Freeston M. Toward a definition of intolerance of uncertainty: a review of factor analytical studies of the Intolerance of Uncertainty Scale. *Clin Psychol Rev.* (2011) 31:1198–208. doi: 10.1016/j.cpr.2011.07.009
12. Van den Bulck J, Custers K. Television exposure is related to fear of avian flu, an ecological study across 23 member states of the European Union. *Eur J Public Health.* (2009) 19:370–4. doi: 10.1093/eurpub/ckp061
13. Wong PT, Reker GT, Gesser G. Death attitude profile-revised: a multidimensional measure of attitudes toward death. *Death Anxiety Handb.* (1994) 121:121–48. doi: 10.1037/t17237-000
14. Corr CA. Elisabeth Kübler-Ross and the "five stages" model in a sampling of recent textbooks published in 10 countries outside the United States. *OMEGA.* (2021) 83:33–63. doi: 10.1177/0030222819840476
15. Neimeyer RA, Wittkowski J, Moser RP. Psychological research on death attitudes: an overview and evaluation. *Death Stud.* (2004) 28:309–40. doi: 10.1080/07481180490432324
16. Kuuppelomäki M. Attitudes of cancer patients, their family members and health professionals toward active euthanasia. *Eur J Cancer Care.* (2000) 9:16–21. doi: 10.1046/j.1365-2354.2000.00184.x
17. Warren SL, Sroufe LA. Developmental issues. In: Ollendick TH, March JS, editors. *Phobic and Anxiety Disorders in Children and Adolescents: A Clinician's Guide to Effective Psychosocial and Pharmacological Interventions*. New York, NY: Oxford University Press (2004). p. 92–115.
18. Gullone E. The development of normal fear: a century of research. *Clin Psychol Rev.* (2000) 20:429–51. doi: 10.1016/S0272-7358(99)00034-3
19. Greenberg J. Terror management theory: from genesis to revelations. In: Shaver PR, Mikulincer M, editors. *Meaning, Mortality, and Choice: The Social Psychology of Existential Concerns*. Washington, DC: American Psychological Association (2012). p. 17–35.
20. Menzies RE, Menzies RG. Death anxiety in the time of COVID-19: theoretical explanations and clinical implications. *Cogn Behav Ther.* (2020) 13:e19. doi: 10.1017/S1754470X20000215
21. Evers NF, Greenfield PM, Evers GW. COVID-19 shifts mortality salience, activities, and values in the United States: big data analysis of online adaptation. *Hum Behav Emerg Technol.* (2021) 3:107–26. doi: 10.1002/hbe2.251
22. Wheeler L. Toward a theory of behavioral contagion. *Psychol Rev.* (1966) 73:179. doi: 10.1037/h0023023
23. Bronfenbrenner U. Contexts of child rearing: problems and prospects. *Am Psychol.* (1979) 34:844. doi: 10.1037/0003-066X.34.10.844
24. Olabi B, Bagaria J, Bhopal SS, Curry GD, Villarroel N, Bhopal R. Population perspective comparing COVID-19 to all and common causes of death during the first wave of the pandemic in seven European countries. *Public Health Pract.* (2021) 2:100077. doi: 10.1016/j.puhip.2021.100077
25. Kidman R, Margolis R, Smith-Greenaway E, Verdery AM. Estimates and projections of COVID-19 and parental death in the US. *JAMA Pediatr.* (2021) 175:745–6. doi: 10.1001/jamapediatrics.2021.0161
26. Bergman AS, Axberg U, Hanson E. When a parent dies-a systematic review of the effects of support programs for parentally bereaved children and their caregivers. *BMC Palliat Care.* (2017) 16:1–5. doi: 10.1186/s12904-017-0223-y
27. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int J Surg.* (2020) 78:185–93. doi: 10.1016/j.ijsu.2020.04.018
28. Thevenon O, Adema W. *Combatting COVID-19's Effect on Children.* Technical Report. OCDE: Paris (2020). Retrieved from: https://www.researchgate.net/publication/341178136_Combatting_COVID_19_effect_on_children (accessed August 24, 2020).
29. Spielberger CD. *Understanding Stress and Anxiety*. London: Harper & Row (1979).
30. Cloninger CR. Temperament and personality. *Curr Opin Neurobiol.* (1994) 4:266–73. doi: 10.1016/0959-4388(94)90083-3
31. Fegert JM, Vitiello B, Plener PL, Clemens V. Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child Adolesc Psychiatry Mental Health.* (2020) 14:1. doi: 10.1186/s13034-020-00329-3
32. Herrera-Valdez MA, Cruz-Aponte M, Castillo-Chavez C. Multiple outbreaks for the same pandemic: local transportation and social distancing explain the different "waves" of A-H1N1pdm cases observed in México during 2009. *Math Biosci Eng.* (2011) 8:21. doi: 10.3934/mbe.2011.8.21
33. Shultz JM, Cooper JL, Baingana F, Oquendo MA, Espinel Z, Althouse BM, et al. The role of fear-related behaviors in the 2013-2016 West Africa Ebola virus disease outbreak. *Curr Psychiatry Rep.* (2016) 18:1–4. doi: 10.1007/s11920-016-0741-y
34. Grof S. The experience of death and dying: psychological, philosophical and spiritual aspects. *Maps Bull.* (2015) 20:9–13. Retrieved from: https://www.spirituality-studies.org/files/1-2-grof.pdf (accessed August 24, 2021).
35. Yoon S, McClean ST, Chawla N, Kim JK, Koopman J, Rosen CC, et al. Working through an "infodemic": the impact of COVID-19 news consumption on employee uncertainty and work behaviors. *J Appl Psychol.* (2021) 106:501. doi: 10.1037/apl0000913
36. Hunter-Jones P, Jeffs A, Smith D. Backpacking your way into crisis: an exploratory study into perceived risk and tourist behaviour amongst young people. *J Travel Tourism Mark.* (2008) 23:237–47. doi: 10.1300/J073v23n02_18
37. Victor GS, Ahmed S. The importance of culture in managing mental health response to pandemics. In: Huremović D, editors. *Psychiatry of Pandemics.* Cham: Springer (2019). p. 55–64
38. Wood MJ, Douglas KM. Conspiracy theory psychology: individual differences, worldviews, and states of mind. In: Uscinski, Joseph E, editors. *Conspiracy Theories and the People Who Believe Them*. New York, NY: Oxford University Press (2018). p. 245–56.
39. van Prooijen JW, Van Vugt M. Conspiracy theories: evolved functions and psychological mechanisms. *Perspect Psychol Sci.* (2018) 13:770–88. doi: 10.1177/1745691618774270
40. Cardoso ÉA, Silva BC, Santos JH, Lotério LD, Accoroni AG, Santos MA. The effect of suppressing funeral rituals during the COVID-19 pandemic on bereaved families. *Rev Lat Am Enfermagem.* (2020) 28:e3361. doi: 10.1590/1518-8345.4519.3361
41. Johnson N. *Britain and the 1918-19 Influenza Pandemic: A Dark Epilogue*. London: Routledge (2006).

42. Ali I. From normal to viral body: death rituals during ordinary and extraordinary COVIDian times in pakistan. *Front Sociol.* (2021) 5:133. doi: 10.3389/fsoc.2020.619913
43. Schoch-Spana M. Lessons from the 1918 pandemic influenza: psychosocial consequences of a catastrophic outbreak of disease. In: Ursano RJ, Norwood AE, Fullerton CS, editors. *Bioterrorism: Psychological and Public Health Interventions*. Cambridge: Cambridge University Press (2004). p. 38–55.
44. Dalton L, Rapa E, Ziebland S, Rochat T, Kelly B, Hanington L, et al. Communication with children and adolescents about the diagnosis of a life-threatening condition in their parent. *Lancet.* (2019) 393:1164–76. doi: 10.1016/S0140-6736(18)33202-1
45. Czeisler MÉ, Marynak K, Clarke KE, Salah Z, Shakya I, Thierry JM, et al. Delay or avoidance of medical care because of COVID-19-related concerns-United States, June 2020. *Morb Mortal Wkly Rep.* (2020) 69:1250. doi: 10.15585/mmwr.mm6936a4
46. Anderson D, De Souza J. The importance and meaning of prayer rituals at the end of life. *Br J Nurs.* (2021) 30:34–9. doi: 10.12968/bjon.2021.30.1.34
47. Testoni I, Zielo A, Schiavo C, Iacona E. The last glance: how aesthetic observation of corpses facilitates detachment in grief work. *Illness Crisis Loss.* (2020). doi: 10.1177/1054137320933592
48. Demaria F, Vicari S. COVID-19 quarantine: psychological impact and support for children and parents. *Ital J Pediatr.* (2021) 47:1–4. doi: 10.1186/s13052-021-01005-8
49. Akhtar SE. *The Wound of Mortality: Fear, Denial, and Acceptance of Death*. New York, NY: Jason Aronson (2010).
50. Kogan I. *The Struggle Against Mourning*. Lanham: Jason Aronson, Incorporated (2007).
51. Huremović D, editor. *Psychiatry of Pandemics: A Mental Health Response to Infection Outbreak*. Manhasset: Springer (2019). doi: 10.1007/978-3-030-15346-5
52. Comas-Díaz L, Hall GN, Neville HA. Racial trauma: theory, research, and healing: Introduction to the special issue. *Am Psychol.* (2019) 74:1. doi: 10.1037/amp0000442
53. Abad C, Fearday A, Safdar N. Adverse effects of isolation in hospitalised patients: a systematic review. *J Hosp Infect.* (2010) 76:97–102. doi: 10.1016/j.jhin.2010.04.027
54. Vahdani B, Javadi SM, Sabzi Khoshnami M, Arian M. Grief process and the COVID-19 pandemic: wise intervention in vulnerable groups and survivors. *Iran J Psychiatry Behav Sci.* (2020) 14:e103855. doi: 10.5812/ijpbs.103855
55. Davies R. New understandings of parental grief: literature review. *J Adv Nurs.* (2004) 46:506–13. doi: 10.1111/j.1365-2648.2004.03024.x
56. Neimeyer RA, Keesee NJ, Fortner BV. Loss and meaning reconstruction: propositions and procedures. In: Malkinson R, Rubin SS, Witztum E, editors. *Traumatic and Nontraumatic Loss and Bereavement: Clinical Theory and Practice*. Madison Connecticut: Psychosocial Press (2000). p. 197–230.
57. Pfefferbaum B, Shaw JA. Practice parameter on disaster preparedness. *J Am Acad Child & Adolesc Psychiatry.* (2013) 52:1224–38. doi: 10.1016/j.jaac.2013.08.014
58. Griffioen AL. Regaining the "Lost Self": a philosophical analysis of survivor's guilt. In: Gerner A, Gonçalves J, editors. *Altered Self and Altered Self-Experience*. Norderstedt: Books on Demand (2014). p. 43–57.
59. Robertson R, Kadmos H. Crossing the shadow line: collaborative creative writing about grief. *New Writing.* (2020) 17:214–25. doi: 10.1080/14790726.2019.1586955
60. Feraco AM, Dussel V, Orellana L, Kang TI, Geyer JR, Rosenberg AR, et al. Tumor Talk and Child Well-Being: perceptions of "good" and "bad" news among parents of children with advanced cancer. *J Pain Symptom Manage.* (2017) 53:833–41. doi: 10.1016/j.jpainsymman.2016.11.013
61. Shatz MA. Teaching thanatology in a foreign country: implications for death educators. *Death Stud.* (2002) 26:425–30. doi: 10.1080/07481180290086754
62. Doka KJ. *Children Mourning, Mourning Children*. New York, NY: Taylor & Francis (2014).
63. Manguvo A, Mafuvadze B. The impact of traditional and religious practices on the spread of Ebola in West Africa: time for a strategic shift. *Pan Afr Med J.* (2015) 22(Suppl. 1):9. doi: 10.11604/pamj.supp.2015.22.1.6190
64. Khaitsa ML, Kaneene JB, Lumutenga NW, Sengendo M. The intersectionality of sociology and health: case studies of the effect of culture on disease. *Pan Afr Med J.* (2017) 27:13. doi: 10.11604/pamj.supp.2017.27.4.12446

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

frontiers in Psychiatry

CONCEPTUAL ANALYSIS
published: 07 February 2022
doi: 10.3389/fpsyt.2021.626134

Social Media Efficacy in Crisis Management: Effectiveness of Non-pharmaceutical Interventions to Manage COVID-19 Challenges

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OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: 04 November 2020
Accepted: 10 September 2021
Published: 07 February 2022

Citation:
Zhou Y, Draghici A, Abbas J, Mubeen R, Boatca ME and Salam MA (2022) Social Media Efficacy in Crisis Management: Effectiveness of Non-pharmaceutical Interventions to Manage COVID-19 Challenges. Front. Psychiatry 12:626134. doi: 10.3389/fpsyt.2021.626134

The new identified virus COVID-19 has become one of the most contagious diseases in human history. The ongoing coronavirus has created severe threats to global mental health, which have resulted in crisis management challenges and international concerns related to health issues. As of September 9, 2021, there were over 223.4 million patients with COVID-19, including 4.6 million deaths and over 200 million recovered patients reported worldwide, which has made the COVID-19 outbreak one of the deadliest pandemics in human history. The aggressive public health implementations endorsed various precautionary safety and preventive strategies to suppress and minimize COVID-19 disease transmission. The second, third, and fourth waves of COVID-19 continue to pose global challenges to crisis management, as its evolution and implications are still unfolding. This study posits that examining the strategic ripostes and pandemic experiences sheds light on combatting this global emergency. This study recommends two model strategies that help reduce the adverse effects of the pandemic on the immune systems of the general population. This present paper recommends NPI interventions (non-pharmaceutical intervention) to combine various measures, such as the suppression strategy (lockdown and restrictions) and mitigation model to decrease the burden on health systems. The current COVID-19 health crisis has influenced all vital economic sectors and developed crisis management problems. The global supply of vaccines is still not sufficient to manage this global health emergency. In this crisis, NPIs are helpful to manage the spillover impacts of the pandemic. It articulates the prominence of resilience and economic and strategic agility to resume economic activities and resolve healthcare issues. This study primarily focuses on the role of social media to tackle challenges and crises posed by COVID-19 on economies, business activities, healthcare burdens, and government support for societies to resume businesses, and implications

for global economic and healthcare provision disruptions. This study suggests that intervention strategies can control the rapid spread of COVID-19 with hands-on crisis management measures, and the healthcare system will resume normal conditions quickly. Global economies will revitalize scientific contributions and collaborations, including social science and business industries, through government support.

Keywords: COVID-19, crisis management, social media use, non-pharmaceutical interventions, health related information

INTRODUCTION

The World Health Organization, China office reported a new strain of SARS infection (severe acute respiratory syndrome) in Wuhan, China, in late December 2019 (1–5). Accordingly, health experts recognized this fatal viral disease as SARS-CoV-2 (6–8). This new strain of the viral disease caused COVID-19, which brought the ongoing worldwide pandemic (9–11). The WHO declared the outbreak as an "International Concern" related to the Public Health Emergency on January 30, 2020. WHO later called it a global pandemic on March 3, 2020 (12–15). The rapid spread of COVID-19 has massively infected people worldwide and caused public anxiety similar to the 1918 H1N1 influenza plague instigated by an "H1N1 Influenza A" viral disease (16–18). The Spanish influenza pandemic persisted from February 1918 to April 1920. This viral disease infected 500 million people. In four successive waves, the H1N1 pandemic infected about one-third (33%) of the worldwide population. The death toll is typically reported to be somewhere between 20 and 100 million and made it the deadliest pandemic in recorded human history (19). Data released by the WHO and John Hopkins University showed that there were over 223,474,638 verified COVID-19 cases, a total of 4,611,342 deaths, and more than 200,010,731 recovered patients as of September 9, 2021, worldwide (20). The advent of the COVID-19 lethal communicable viral disease has resulted in the most dangerous and fatal human health disaster in the current century of human history (21).

Not since World War II has the world faced more significant global health difficulties and economic crisis management, including social, political, environmental, and financial and health emergency issues. This infectious viral disease has massively interrupted social interactions, business activities, global relations, and global economies (22–25). The main feature of COVID-19, similar to that of MERS and SARS, was its rapid spread worldwide through air travel. The 1918 Spanish influenza pandemic took months longer to spread in Europe, Australia, and South America because ship-borne travel took a long time. However, in the modern world, fast air travel permits voyagers to traverse this globe within a day or less. The key reason for the rapid spread of COVID-19 across continents was that screening efforts at airports were relatively costly and unsuccessful (26). The common feature of in-flight transmission of the COVID-19 disease among passengers was also evident during the SARS outbreak (27, 28).

SYMPTOMS OF COVID-19 AND RECOVERY RATIO

The symptoms of the ongoing lethal disease COVID-19 are not static and vary from mild to moderate to severe infection (4). The typical virus infection symptoms include muscular pain, congestion, runny nose, body aches, nausea or vomiting, diarrhea, headache, loss of taste and smell, nasal congestion, cough, rhinorrhea, fever, sore throat, and breathing complications. The general symptoms can be different among sufferers, and their symptoms might change with time. For people without prior throat and nose disorders, loss of smell combined with the loss of taste indicates an association with the COVID-19 infection with a specificity of 95% (29). The literature specified that almost 81% of people present with mild to moderate COVID-19 infection symptoms, including mild pneumonia, and 14% display severe disease symptoms, such as hypoxia, dyspnea, or 50% lung involvement imaging. A minority of the people (5%) face very acute symptoms, including shock, respiratory failures, or multi-organ dysfunction (30). About 33% of COVID-19-infected people do not show observable virus symptoms at any point (31).

Therefore, the asymptomatic carriers of COVID-19 tend not to undergo testing and therefore spread the infectious disease to others (32). Infected people will show symptoms of the infection later, called "pre-symptomatic," or develop mild symptoms and spread the virus (33). It is a common phenomenon of virus infections that an infected person will show symptoms later. The median delay time is 4–5 days for COVID-19 symptoms. After exposure to the virus, most symptomatic patients experience symptoms within the first to the third week. Almost all infected people will experience one sign of the virus within the first 12 days (34, 35). More than 90% of infected people recover from the acute infection phase, depending on their immune system. However, some patients experience the adverse effects of COVID-19 infection for several months after they recover due to damage to organs. Hence, multi-year investigations are underway to further explore the long-term adverse impacts of the COVID-19 disease worldwide (35).

GLOBAL MENTAL HEALTH CHALLENGES AMID THE COVID-19 OUTBREAK

The arrival of COVID-19 posed social, environmental, financial, and mental health challenges worldwide (36). In the first wave,

there were more than 119.7 million declared infected people, with a death toll of more than 2.7 million worldwide. However, almost 97% of patients survived the infection of this lethal disease which indicated that 96.3 million people recovered as of March 12, 2021. The second and third waves became more dangerous and lethal. As of July 18, there were over 191,084,631 cases, more than 4,103,306 deaths, and 174,041,354 recovered cases worldwide (14). COVID-19 has dramatically changed people's health-related behavior and lifestyle (37). Educational institutions, such as schools and universities, have been closed and exams and activities have been postponed (38). Health information services have been limited, socializing with friends and a more comprehensive range of mixing with friends and families has been discouraged. Living in these situations can be difficult for young people's social, physical, and mental health (39). This study analyzed information and resources related to COVID-19 that can support people through these challenging times and inspire them to become leaders in addressing the uncertainties of the COVID-19 pandemic.

Past research identified the relationship between MERS (Middle East respiratory syndrome) and SARS to cause psychiatric and mental health problems (40). The severe MERS and SARS phases resulted in psychiatric symptoms, such as mental distress, depression, mood disorder, confusion, anxiety, psychotic symptoms, panic attacks, stress, and delirium (41–44). A study identified post-illness problems, such as fatigue, PTSD (post-traumatic stress disorder), memory impairment, anxiety, depression, and irritability (43). The COVID-19 outbreak resulted in neurological manifestations, dysomia, parageusia, encephalitis, cerebrovascular disease, and actuate meningitis. It has led to mental health issues worldwide (45, 46). A past study examined the COVID-19-enhanced psychiatric complications in the UK. The altered mental status among people was the second most prevalent problem. It caused brain disorders, such as encephalitis and encephalopathy. Over 50% of the patients facing altered mental status were over 60 years (47). The psychological responses during past infection diseases can offer helpful insights into mental health research (6, 48). The Ebola virus illness epidemic outbreak during 2014–2016 hampered public health efforts to manage fear-related human behaviors and impeded survivors' recovery. Past follow-up research has reported persistent mental health problems among infectious diseases survivors, and over 50% of Ebola disease patients reported various mental disorders, such as depression, anxiety disorder, and post-traumatic stress disorder (49). The survivors of SARS reported levels of mental health problems, such as anxiety disorders, depression, panic attacks, social isolation, irritation, and post-traumatic symptoms (8, 50). In follow-up studies over 8 years, almost 25% of SARS survivors reported mental health problems, such as post-traumatic stress disorder (51, 52).

Evidence from past pandemics and infectious disease arrivals has reported adverse mental health consequences due to social isolation and other restrictions in human society (53–55). Large-scale disease outbreaks, pandemics, and natural and traumatic crises cause higher levels of mental health issues, such as depression, anxiety, domestic violence, child abuse, stress, and substance use disorder (56). Amid the COVID-19 outbreak, physical distancing, restriction on economic activities and social gatherings, and closure of educational institutions increased the prevalence of anxiety, stress, PTSD, antisocial and irritating behaviors, depression, and suicidal thoughts among all age groups (57–59). A nationwide psychological disorders survey based on the Chinese population amid the COVID-19 pandemic identified a series of mental health issues, including depression, anxiety disorders, antisocial behaviors, panic disorders, and PTSD (60). The past research findings indicated an almost 200% increase in depression and anxiety disorders among adults during the quarantine restrictions (61). The COVID-19 outbreak in the UK evidenced higher levels of mental health issue symptoms among the adult population in 2020 (62). The mental health problems' prevalence related to the pandemic indicated the level of mental disorders in the general population. The United States of America, Census Bureau Household Pulse Survey reported a spike in anxiety disorders, antisocial behaviors, depression, and stress in April 2020. Almost 35% of US residents reported the clinical symptoms of depression, mental distress, and anxiety disorders during January, February, and March 2019. The fatal result of the COVID-19 virus has affected the general population's mental health (63, 64). Therapeutic mental health care and timely preventive measures are helpful to address the general population's mental health needs in the COVID-19 outbreak (65). The prompt response to control the adverse effects of the COVID-19 crisis on mental health, psychological education, and timely preventive measures can help decrease infection risks and promote resilience to the influence of social changes necessitated by the COVID-19 outbreak (66).

Figure 1 shows the 10 most affected countries around the world. The US is still the most affected with confirmed COVID-19 patients as of January 31, 2021. The second most affected is India, as indicated in **Figure 1**. Followed by the UK, Italy, Spain, France, and Brazil. Globally, countries have initiated plans to "flatten the COVID-19 pandemic cases curve." Flattening the COVID-19 curve involves minimizing the transmission and reducing new cases of COVID-19 from 1 day to the next day. Reducing new cases of infectious disease helps prevent healthcare systems from becoming overwhelmed. When fewer COVID-19 positive patients emerge today than were reported on the previous day, it is a sign that the state/country is flattening the curve. A flattened curve shows a downward trend of recording new positive cases of the coronavirus. The 7-day moving average analysis visualizes recent COVID-19 cases, and this method reflects the rate of change. This research helps manage healthcare systems to provide medical treatment to the patients, and it is helpful to lower the burden on healthcare systems around the world.

WHO facts and figures about COVID-19 stipulate that the United States has the highest number of confirmed coronavirus patients. It reported 29,300,000 patients, with 532,400 deaths and a case mortality rate of 1.80%, the highest number of any nation and the 10th highest in terms of per capita income. Recently, India has reported the most significant number of infected patients in Asia. India has the second largest number of coronavirus patients in the world. There have been 11,308,846

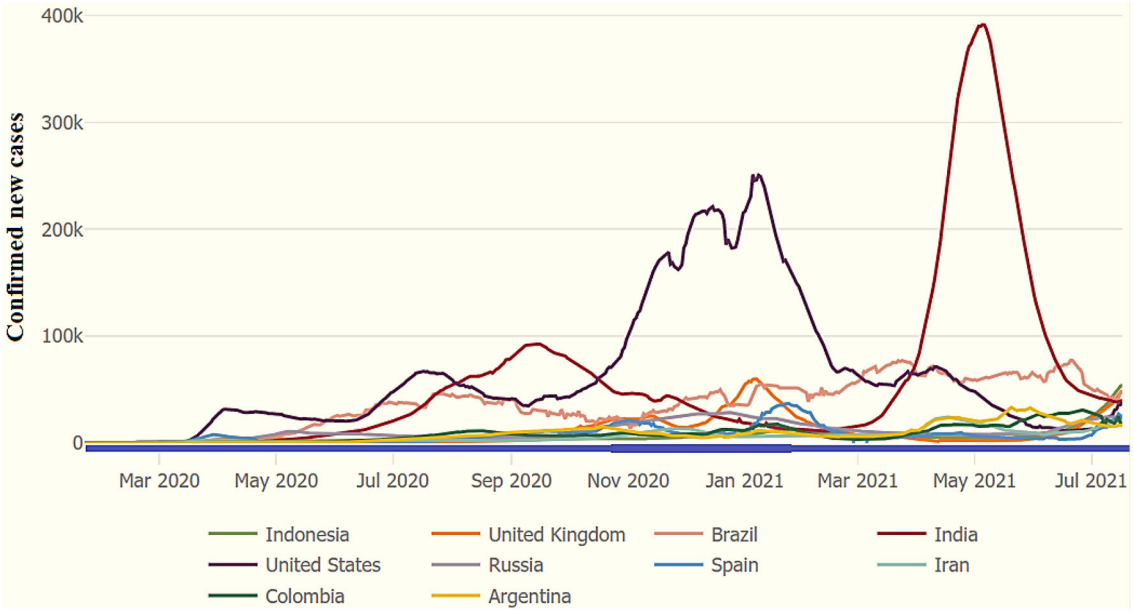

FIGURE 1 | COVID-19: Top 10 most affected countries (7-day moving average), as of July 18, 2021. Source: WHO and JHU COVID-19 datasets.

total testified cases, 158,306 deaths, and a case mortality rate of 1.40%. Brazil has the third highest COVID-19 case rate globally and declared 11,277,717 confirmed cases, with a death toll of 272,889 and a case mortality ratio of 2.405. Health experts first identified a patient with the coronavirus in Russia on January 31, 2020. Since then, Russia has confirmed 4,311,893 COVID-19-positive patients, with a death toll of 89,224 and a CFR (case fatality ratio) of 2.10%. Similarly, the United Kingdom has reported 4,254,714 confirmed coronavirus cases, with 125,403 deaths and a corresponding mortality rate of 2.90%, as of March 12, 2021. As of July 18, there were over 191.1 million verified coronavirus cases, more than 4.1 million deaths, and 174.0 million recovered patients.

Table 1 shows the COVID-19 positive cases, deaths, and mortality rate by considering the top 20 affected countries, as of July 18, 2021. According to JHU and the WHO's statistics, the USA remains the highest affected country and reported 34,067,912 positive COVID-19 cases, with 608,884 total deaths and a case-fatality ratio (CFR) of 1.80%. India is the second most affected country with 31,106,065 declared cases, 413,609 deaths, and a CFR of 1.30%. Brazil remains the third highest affected country with 19,342,448 positive cases, 541,266 deaths, and a CFR of 2.80% as of July 18, 2021. See **Figure 1** for more details.

Figure 2 specifies the most affected countries worldwide. The US is still the most affected country with the most newly confirmed COVID-19 patients as of March 12, 2021. The second most affected nation is India, as indicated in **Figure 2**. The UK, Italy, Spain, France, and Brazil face a burden on health care systems. Many countries are incorporating preventive strategies to "flatten the COVID-19 cases curve." Flattening the COVID-19 curve minimizes the quick spread of the disease and reduces new virus cases from 1 day to the next day. Reducing new COVID-19 cases helps prevent burdens on hospitals. When fewer COVID-19-positive cases emerge today than reported on the previous day, it shows that the country is successfully

TABLE 1 | COVID-19 verified cases and rate of mortality in the top 20 affected countries (July 18, 2021).

Country	Confirmed cases	Deaths	Case-fatality (%)	Deaths/100k pop.
United States	34,067,912	608,884	1.80	185.5
India	31,106,065	413,609	1.30	30.27
Brazil	19,342,448	541,266	2.80	256.46
France	5,917,397	111,657	1.90	166.5
Russia	5,860,113	145,222	2.50	100.59
Turkey	5,522,039	50,488	0.90	60.52
United Kingdom	5,407,428	128,960	2.40	192.95
Argentina	4,749,443	101,434	2.10	225.72
Colombia	4,621,260	115,831	2.50	230.1
Italy	4,284,332	127,864	3.00	212.06
Spain	4,100,222	81,096	2.00	172.26
Germany	3,751,253	91,369	2.40	109.91
Iran	3,501,079	86,966	2.50	104.89
Poland	2,881,355	75,212	2.60	198.08
Indonesia	2,832,755	72,489	2.60	26.79
Mexico	2,654,699	236,240	8.90	185.18
Ukraine	2,317,198	55,151	2.40	124.26
South Africa	2,283,880	66,676	2.90	113.86
Peru	2,092,125	195,047	9.30	599.95
Netherlands	1,816,689	18,060	1.00	104.2

Source: WHO and JHU COVID-19 statistic. JUH, John Hopkins University.

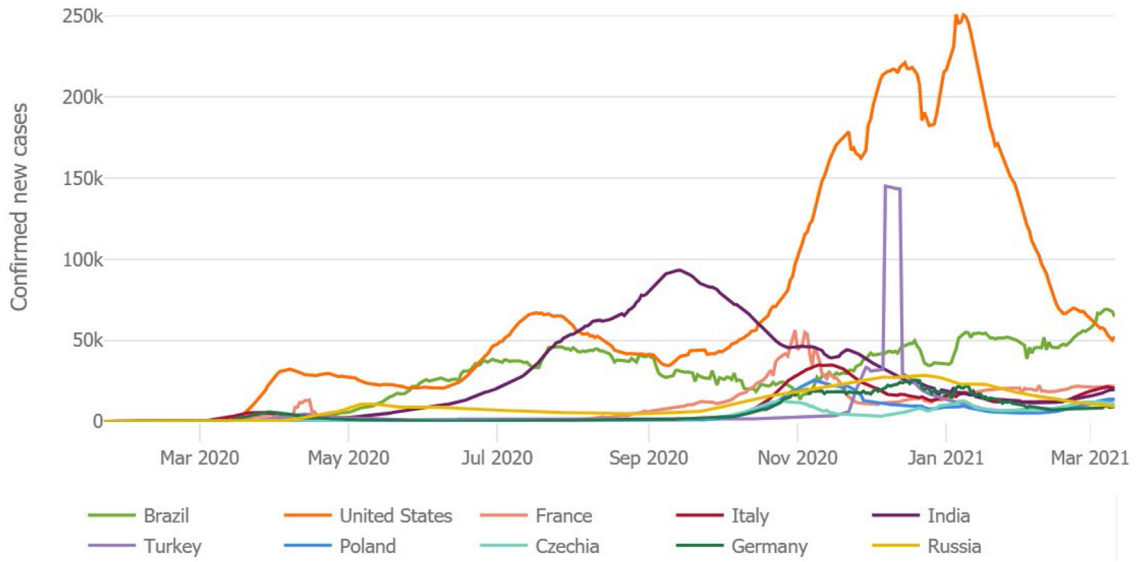

FIGURE 2 | COVID-19: new confirmed positive cases (7-Day Moving Average) by March 12, 2021. Source: WHO and JHU COVID-19 information.

flattening the curve. A flattened curve shows a downward trend of recording new positive cases of the coronavirus. The 7-day moving average analysis visualizes recent COVID-19 cases, and this method reflects the rate of change. This study helps in offering valuable suggestions for the healthcare system to provide medical treatment to the patients, and it is helpful to lower the burden on healthcare systems around the world.

Table 2 indicates the COVID-19 verified positive cases in different countries around the globe. The WHO data reported that the USA remained the most affected country with 34,067,912 positive patients, 608,884 deaths, and 11,166,500 recovered patients. India was the second most affected country, with 10,746,183 confirmed patients, 154,274 total deaths, and 10,423,125 recoveries. Brazil reported 9,204,731 infected cases, 224,534 deaths, and 8,027,042 recoveries, as of February 1, 2021. There were 3,817,176 confirmed cases in the United Kingdom with 106,158 deaths, and France reported 3,197,114 patients with 76,057 deaths, Spain recorded 2,743,119 COVID-19-confirmed patients with 58,319 deaths. Italy declared 2,553,032 cases with 88,516 deaths, and the total number of recovered patients was 2,010,548 (see **Table 3**).

Table 3 shows the reported COVID-19 cases concerning case fatality rates in the leading and most affected countries globally. The WHO statistics showed that Yemen had the highest rate of case fatality, CFR = 19.60%, followed by Peru, CFR = 9.30% and Mexico = 8.90% as of July 19, 2021. Before this, the USA remained the most affected country. India declared the second highest positive cases of the coronavirus. Brazil reported 19,342,448 infected cases, 541,266 deaths, and a case fatality rate of 2.8%, as of July 18, 2021. There were 5,917,397 confirmed cases, over 111,657 deaths, and a case fatality rate of 1.9% in France. Russia acknowledged 5,860,113 established COVID-19 patients, 145,222 total deaths, and a case fatality rate of 2.5%. Turkey reported over 5,522,039 confirmed cases, a death toll of 50,488, and a case fatality rate of 0.90%. Similarly, the United Kingdom professed 5,407,428 total positive cases with 128,960 total deaths. Argentina reported a total of 4,749,443 cases of the coronavirus with a death toll of 101,434 and a case fatality ratio of 2.10%. Italy declared 4,284,332 cases with 127,864 deaths and a CFR of 3.00% as of July 18, 2021.

The world is suffering from the damages of the new Delta variant, originating from B.1.617.2 lineage, a novel variant of SARS-CoV-2, which results in rapid transmission of the COVID-19 viral disease. Health experts first detected this new virus in India during the last quarter of 2020. Health experts investigated this new variant, WHO named it B.1.617, and then called it the Delta variant, on May 31, 2021. Public Health England (PHE) recorded a second attack ratio that remained 51–67% higher than the Alpha variant. The Delta variant is fatal and doubles the hospitalization cases of COVID-19 patients. The Delta variant has affected more than 80 countries as of July 12, 2021. The Delta variant massively struck India and brought a second wave at the beginning of February 2021. It resulted in the third wave in the United Kingdom (UK), Fiji, and South Africa. According to the WHO warning in July 2021, the Delta variant can bring new waves of COVID-19 in Africa, Asia, and Europe (67). The Center for Disease Control and Prevention (CDC) acknowledged Delta as a variant of international concern (68–71) (see **Figure 3**).

Virus transmission is still increasing in the US, Brazil, and India based on new tested and verified coronavirus infections cases on a 7-day average basis. The reported new cases of the viral disease have shown a rising trend in some countries, while some have declared a steep decline in new cases. For instance, the US has registered a decline in the number of new COVID-19 virus cases after January 2021. Likewise, Germany, France, and Czechia have reported an increasing trend of

TABLE 2 | The COVID-19 global cases in various affected countries as of July 18, 2021.

Worldwide/country wise	Global cases	Global deaths	Global recoveries
COVID-19 cases: February 1, 2021	102,964,429	2,227,900	57,049,238
COVID-19 cases: July 19, 2021	191,230,672	4,105,847	174,183,183
Country-wise cases	**Confirmed**	**Deaths**	**Case-fatality rate (%)**
United States	34,067,912	608,884	1.80
Brazil	19,342,448	541,266	2.80
India	31,106,065	413,609	1.30
Mexico	2,654,699	236,240	8.90
Peru	2,092,125	195,047	9.30
Russia	5,860,113	145,222	2.50
United Kingdom	5,407,428	128,960	2.40
Italy	4,284,332	127,864	3.00
Colombia	4,621,260	115,831	2.50
France	5,917,397	111,657	1.90
Argentina	4,749,443	101,434	2.10
Germany	3,751,253	91,369	2.40
Iran	3,501,079	86,966	2.50
Spain	4,100,222	81,096	2.00
Poland	2,881,355	75,212	2.60
Indonesia	2,832,755	72,489	2.60
South Africa	2,283,880	66,676	2.90
Ukraine	2,317,198	55,151	2.40
Turkey	5,522,039	50,488	0.90
Chile	1,598,481	34,403	2.20
Romania	1,081,588	34,252	3.20
Czechia	1,670,823	30,336	1.80
Hungary	808,725	30,015	3.70
Philippines	1,502,359	26,598	1.80
Pakistan	989,275	22,781	2.30

Source: WHO and JHU CSSE COVID-19 Datasets.

TABLE 3 | COVID-19 cases and mortality of the most affected countries, as of July 18, 2021.

Country	Confirmed cases	Deaths	Case-fatality (%)	Deaths/100k pop.
Yemen	6,977	1,368	19.60	4.69
Peru	2,092,125	195,047	9.30	599.95
Mexico	2,654,699	236,240	8.90	185.18
Sudan	36,986	2,776	7.50	6.48
Syria	25,827	1,904	7.40	11.15
Egypt	283,636	16,439	5.80	16.38
Somalia	15,085	781	5.20	5.06
Taiwan	15,390	764	5.00	3.21
Bosnia and Herze*	205,285	9,666	4.70	292.82
China	104,257	4,848	4.70	0.35
Ecuador	475,215	21,933	4.60	126.24
Bulgaria	422,930	18,169	4.30	260.46
Afghanistan	137,853	5,983	4.30	15.73
Tanzania	509	21	4.10	0.04
Bolivia	461,714	17,443	3.80	151.51
Hungary	808,725	30,015	3.70	307.22
Comoros	4,009	147	3.70	17.28
Mali	14,509	530	3.70	2.7
North Macedonia	155,901	5,487	3.50	263.36
Chad	4,964	174	3.50	1.09
Niger	5,573	194	3.50	0.83
Eswatini	21,062	703	3.30	61.23
Antigua and Barbuda	1,268	42	3.30	43.25
Slovakia	392,034	12,524	3.20	229.63
Paraguay	444,427	14,230	3.20	202

*Source: WHO and JHU CSSE COVID-19 Datasets; * Bosnia and Herzegovina.*

newly infected people, and Italy has announced an upsurge in new infections in February 2021. Many countries face new waves, such as first, second, third, and fourth waves, resulting from the ongoing pandemic COVID-19 worldwide. Europe has become the epicenter, and there were around 38 million cases of the virus as of March 2021. Brazil is also still very much part of the pandemic. Brazil confirmed the arrival of the disease on February 25, 2020. Since November 2020, Brazil has reported an increasing trend of new cases of COVID-19. By January 15, 2021, confirmed positive cases in Brazil exceeded 8,000,000, with a death toll exceeding 200,000. COVID-19 hit hardest in Brazil and made it the worst affected country in the world. Since then, Brazil has reported 11.4 million cases and more than 275,000 deaths. The USA reported the first confirmed case on January 22, 2020, and since then, the US has declared 29,347,338 cases, with a death toll of 532,590. There is a rising trend of the disease in India. The country has confirmed 11,333,728 COVID-19-positive patients and a death toll of 158,446 as of March 12, 2021. Yemen reported the highest case fatality (CFR = 25%) ratio, Mexico was the second highest (CFR = 9%), Syria reported a CFR of 6.7%, Sudan announced a CFR of 6.35), and Egypt reported a CFR of 5.9% as of March 12, 2021.

The WHO and JHU datasets specified that Yemen had the highest CFR, 25%, in March 12, 2021. They reported 2,667 infected patients with 667 deaths, and a death rate/100K population of 2.34. Mexico remained the second highest with verified patients, and a CFR of 9%. Mexico reported 2,150,955 confirmed infected patients with a total death number of 193,152/100K population. Syria reported a CFR of 6.7%, and Sudan declared a 6.3% CFR. **Table 4** displays the results for total cases per million vs. case doubling time. **Figure 4** shows cases of COVID-19/million population vs. doubling the time of virus-infected patients in different regions across the world. **Figure 4** stipulates the time of doubling patients from 0 to 50, 50 to 100, 100 to 150, 150 to 200, and 250 to 300 days in the countries and territories.

Figure 5 reports on COVID-19 identified cases vs. deaths due to the coronavirus in the top seven regions, as of January

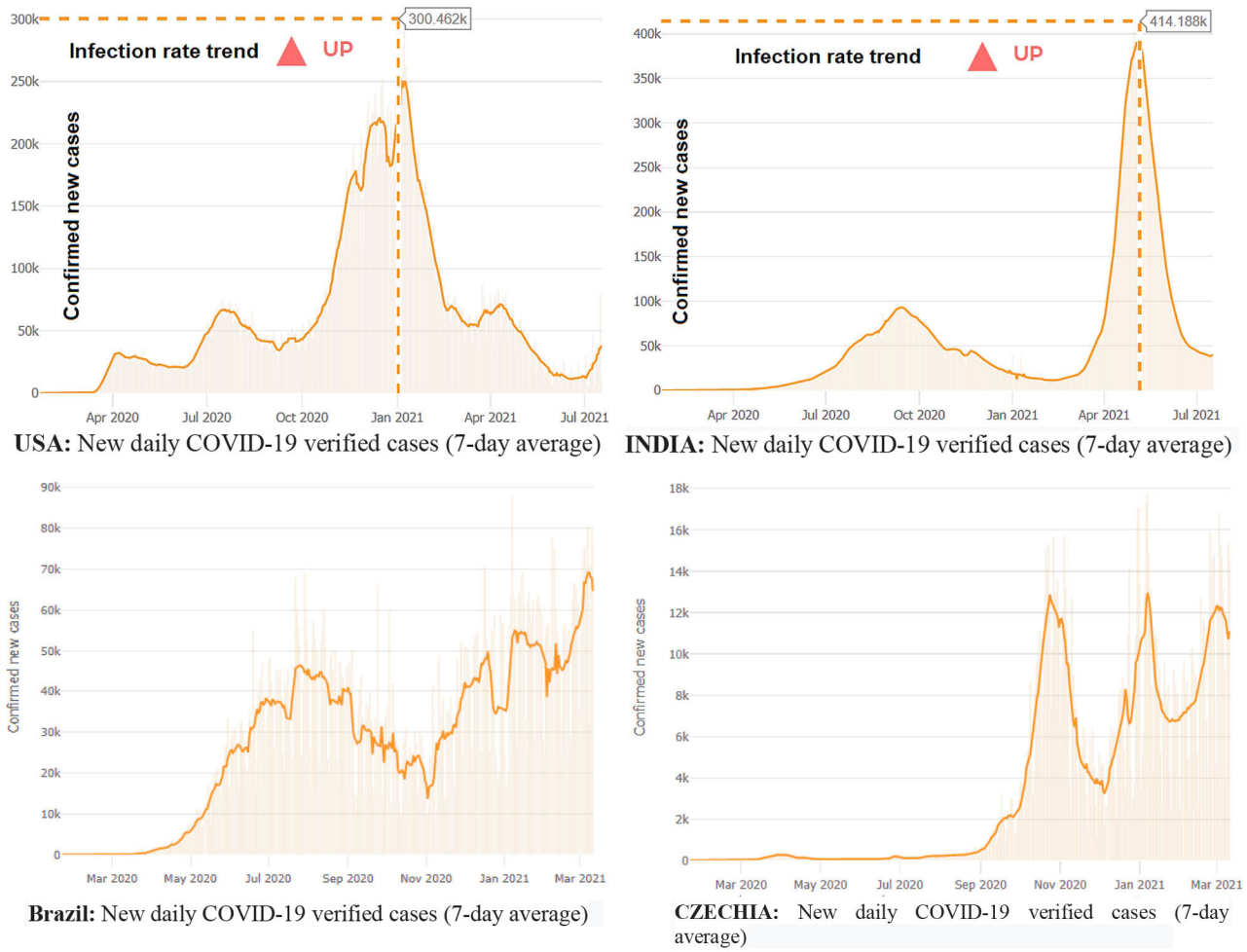

FIGURE 3 | COVID-19 waves, positive cases in the USA, Brazil, India, and Czechia, July 18, 2021. Source: WHO and JHU CSSE data on COVID-19 disease.

TABLE 4 | COVID-19 global cases in the most affected countries, as of September 10, 2021.

Country other	Total cases	New cases	Total deaths	New deaths	Total recovered	New recovered	Deaths/1M pop	Total tests	Population
World	**222,783,507**	**539,809**	**4,599,186**	**8,604**	**199,279,326**	**591,567**	**590**	**-**	**-**
USA	41,239,828	115,776	669,483	919	31,544,460	83,240	2,009	597,328,264	333,304,877
India	33,095,450	38,130	441,443	368	32,256,552	39,090	316	533,189,348	1,396,087,038
Brazil	20,913,578	13,645	584,208	342	19,932,646	37,986	2,725	57,095,219	214,351,247
UK	7,055,262	37,148	133,483	209	5,667,508	30,695	1,954	277,951,515	68,309,023
Russia	7,047,880	17,425	188,785	795	6,302,250	17,243	1,293	181,500,000	146,008,739
France	6,854,028	14,534	115,159	152	6,418,376	28,303	1,760	129,298,105	65,444,916
Turkey	6,542,654	23,638	58,651	274	5,994,394	34,402	687	78,518,387	85,414,656
Argentina	5,211,801	4,106	112,851	178	4,909,453	3,610	2,470	22,648,977	45,687,431
Iran	5,184,124	27,138	111,892	635	4,422,740	28,657	1,312	29,227,907	85,266,654
Colombia	4,921,410	1,637	125,378	47	4,756,976	2,321	2,433	24,493,353	51,525,677
Spain	4,892,640	5,246	85,066	138	4,503,204	21,561	1,819	60,618,810	46,776,274
Italy	4,579,500	4,718	129,638	71	4,316,077	6,877	2,148	85,973,261	60,356,270
Indonesia	4,140,634	7,201	137,156	683	3,864,848	14,159	495	33,641,037	276,951,672
Germany	4,029,849	9,276	92,949	47	3,783,800	8,300	1,105	70,379,237	84,101,825
Mexico	3,433,511	5,127	263,470	330	2,782,729	13,783	2,018	9,971,374	130,538,296

Source: WHO and JHU CSSE COVID-19 Data. Yellow highlight shows new cases, red highlight new deaths, and green highlight specifies new recovered cases in selected countries.

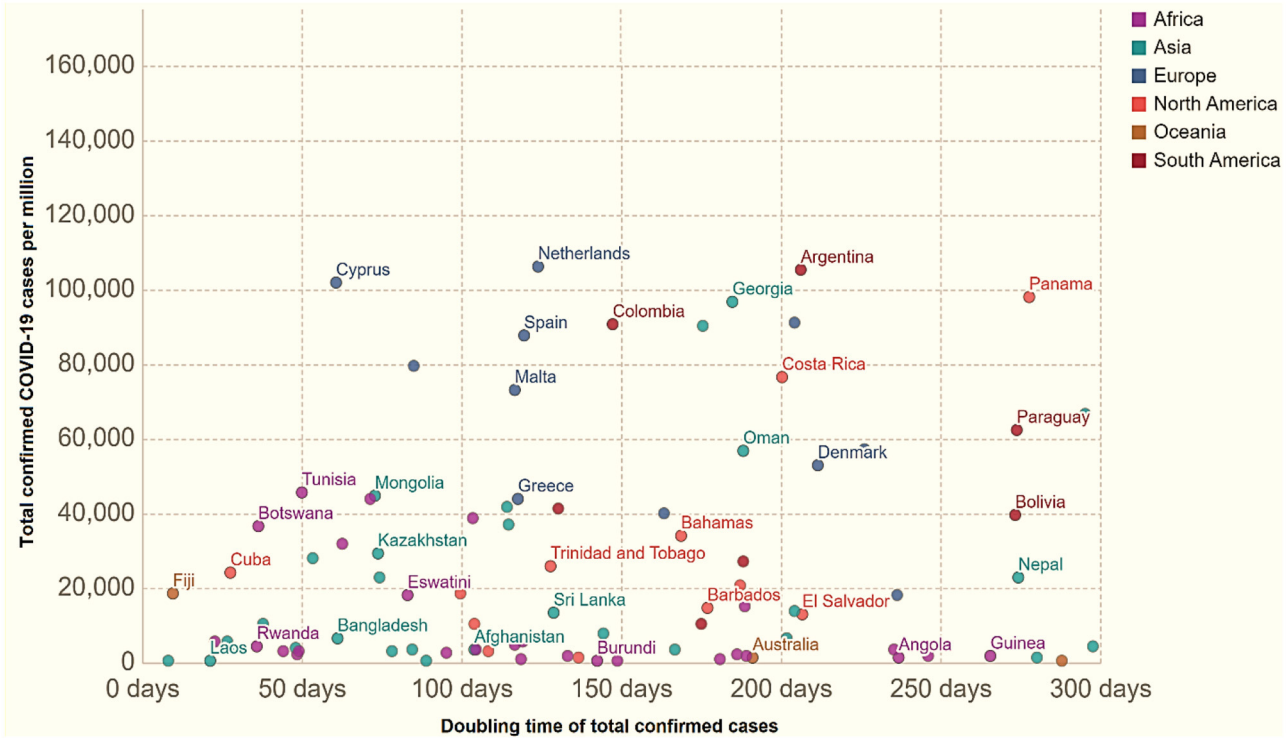

FIGURE 4 | Total recorded COVID-19 cases/million vs. how quickly these figures double as of July 18, 2021.

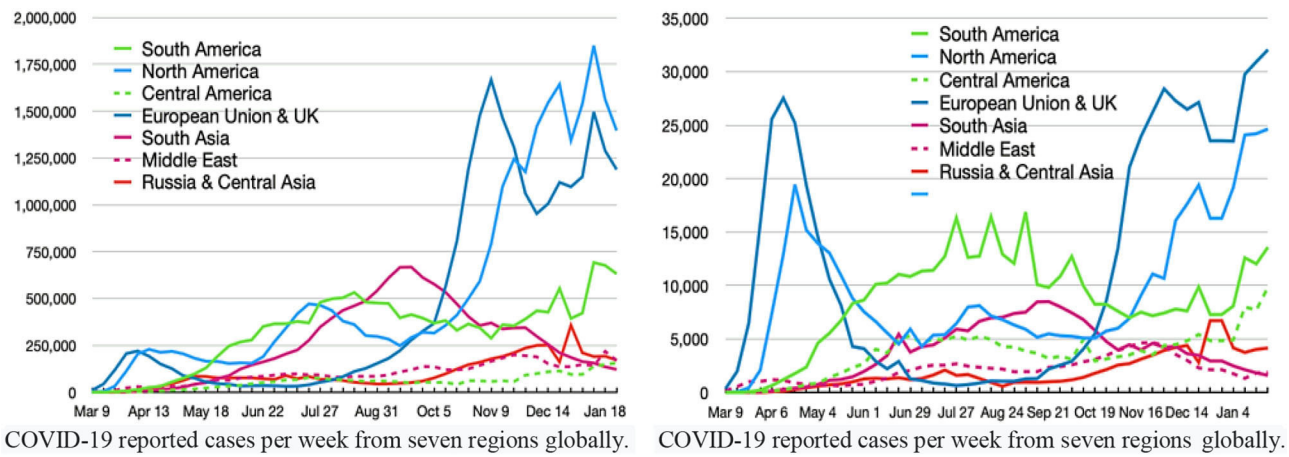

FIGURE 5 | COVID-19 identified cases vs. deaths due to coronavirus in the top seven regions, globally. Source: JHU and WHO dashboard.

23, 2020, worldwide. The arrival of the pandemic has also immensely affected Pakistan's economy (72, 73). The pandemic influenced all the key factors and damaged economic activities. As of September 9, 2021, there were 1,194,198 verified patients, 26,497 total deaths (2.2%), and 1,076,112 recoveries in Pakistan. The pandemic posed enormous economic, health, social and political, and environmental issues in society. The pandemic's second, third, and fourth waves in Pakistan were potent and fatal, resulting in thousands of deaths. Pakistan reported 920,066 verified COVID-19 patients, a death toll of 22,811 (2.3%), and the recovery rate remained 92.8% as of July 19, 2021. As of March 12, 2021, China had a 4.8% case fatality rate, followed by Australia: 3.1%, the United Kingdom: 2.6%, Africa: 2.6%, Europe: 2.4%, the whole world: 2.2%, Asia: 1.7%, and the United States of America: 1.7%.

Facts stipulate that the European Union and the United Kingdom reported 27,385,890 total infected cases, 53,137 cases per million, with a death toll of 680,930, and deaths

per million of 1,321. North America declared 29,880,184 total cases, 81,018 cases per million, 542,230 deaths, and 1,470 deaths per million. Similarly, South America recorded 12,809,782 COVID-19 cases, 43,396 cases per million, 482,707 deaths, and 1,123 deaths per million. South Asia reported 12,809,782 total positive cases, 6,900 cases per million, 186,009 deaths, and 100 deaths per million. Central America recorded 3,115,633 infected cases, 17,341 cases per million, a death toll of 212,838, and 1,185 deaths per million. The Middle East declared 5,712,789 total cases, 21,889 cases per million, a total death toll of 105,482, and 404 fatalities per million.

Table 4 shows the number of global infected patients, total deaths, total recoveries, and new cases and deaths as of September 10, 2021. It shows a detailed analysis of the COVID-19 global spread, infections, recoveries, deaths, and critical patients.

Table 5 presents the global scenario of COVID-19 transmission and infected patients, total cases, total deaths, total recoveries, and new cases and deaths worldwide. It shows a detailed analysis of the COVID-19 global spread, infections, recoveries, deaths, and critical patients in the world as of July 19, 2021. The pandemic has posed global, regional, and domestic-level health challenges worldwide (5, 74–79). **Figure 6** shows the most affected countries that reported the highest number of verified and tested patients of COVID-19. See **Table 4** and **Figure 6** on the global health crisis and number of infected people worldwide.

Figure 6 demonstrates the confirmed infected patients of COVID-19 in different countries worldwide. The WHO statistics reported the confirmed total cases and death toll, cases/million, number of deaths/million, total population by different regions, absolute facts and figures, and ratio per million inhabitants. US patients make up 18.29% (34,960,760) of the global infected cases (191,324,829). India reports 16.29%, a total of 31,143,595 as of July 19, 2021. There were over 223.475 million COVID-19 cases, 4.611 million deaths, and more than 200.0111 million recovered patients globally, as of September 9, 2021.

SOCIAL MEDIA USE AND HEALTH BEHAVIOR

The coronavirus has affected all spheres of society, leading to reshaping human attitudes toward life (5, 78–81). The coronavirus outbreak has influenced human behaviors, leading to people relying on updates through social media platforms and other reliable sources. Social media tools help provide the latest news and health-related updates amid the COVID-19 crisis (82). The different waves of the current pandemic have created a massive burden and caused health risks for human beings, leading to an increase in the usage of social media applications as people seek the latest news about preventive measures against the COVID-19 disease. People look for precise and correct information related to their health, which has led to more use of platforms of media technologies to stay connected with family members, peers, and friends (83–86). People seek accurate information related to viral disease, and social media use has helped people find public communication to follow preventive measures (87). The coronavirus crisis has dramatically influenced human preventive behaviors and life patterns to safeguard themselves against the COVID-19 virus globally (88). The global COVID-19 health crisis has promoted health behaviors, and people have adopted preventive measures such as social distancing, avoiding social gatherings, washing hands, and using face masks (89, 90). Humans health behavior theories help describe the health behaviors change model (91). The HBM (health behavior model) helps understand the supportive interventions and strategies for promoting healthy behaviors. For instance, adherence and following SOPs and medical treatment to combat this fatal viral disease (92). Thus, the health behavior measuring model provides valuable information. It interprets that humans are involved in health-related behaviors when they perceive vulnerability to a fatal and contagious viral illness that can lead to dangerous health-related adverse results. This type of preventive health-related measure help people to combat viral infectious disease, and it helps to overcome the barriers (93). The health crisis of COVID-19 has influenced individuals' emotions and their life patterns' quality (94). Health experts need managerial skills to handle health emergencies in a crisis (95).

This present paper primarily focuses on examining the crucial effects of social media and web-based technological applications in the crisis of the current pandemic. The study investigates how social media can help in the COVID-19 crisis in providing accurate information related to this viral disease to allow people to remain safe by following preventive measures. Social media technology is vital for responding to and adopting practical actions to manage COVID-19 damages and health crises. The public receives updated, reliable, and credible health-related material by using social media tools. Accordingly, social media has greatly helped all spheres of life in society get back to the next normal. Business activities have become possible with work from home policies. Universities and educational institutions have adopted online learning methods in response to restrictions on face-to-face learning imposed by the governments to minimize the damage of the COVID-19 outbreak (96). The online and virtual learning methods helped reduce student and teacher stress and offered them relief in the stressful situation of the COVID-19 crisis. This study examines how social media technological applications have helped people respond to the crisis environment and minimize the damage of COVID-19 that has resulted in mental health issues worldwide. Social media applications can improve social interaction and harness contacts and social support (97). The pandemic has changed socialization patterns, and people use online tools and social media for communication with friends and relatives via video calls, telephone, and other social media apps. Interventions help combat the transmission of COVID-19, and social media technology tools are effective in changing perception and behavior amid the COVID-19 health crisis (28).

ENVIRONMENTAL IMPACTS

According to expert estimations, shutdowns of transportation and economic activities in this pandemic will lower global

TABLE 5 | Worldwide COVID-19 cases and the top 30 most affected countries, as of July 19, 2021.

Worldwide countries	Total cases	New cases	Total deaths	New deaths	Total recovered	Active cases	Serious, critical	Total cases/1M pop	Deaths/1M pop	Total tests	Population of country
Worldwide cases	**192,209,053**	**491,794**	**4,124,198**	**8,010**	**174,910,919**	**13,173,936**	**81,774**	**24,659**	**529.1**	**N/A**	**7,880,702,437**
USA	35,077,689	41,098	625,244	220	29,434,213	5,018,232	6,283	105,326	1,877	518,717,489	333,040,210
India	31,215,142	42,123	418,511	489	30,383,001	413,630	8,944	22,389	300	447,341,133	1,394,235,023
Brazil	19,419,741	27,896	544,302	1,425	18,124,621	750,818	8,318	90,685	2,542	54,786,381	214,145,148
Russia	6,006,536	23,770	149,922	784	5,382,213	474,401	2,300	41,141	1,027	159,900,000	146,000,220
France	5,890,062	18,181	111,525	33	*5,663,809*	114,728	876	90,027	1,705	99,504,244	65,425,241
Turkey	5,546,166	8,780	50,650	46	5,395,300	100,216	543	65,027	594	65,300,191	85,290,746
UK	5,519,602	46,558	128,823	96	4,411,839	978,940	611	80,861	1,887	234,640,904	68,260,406
Argentina	4,784,219	15,077	102,381	426	4,420,995	260,843	4,643	104,846	2,244	18,420,915	45,630,830
Colombia	4,668,750	12,829	117,131	378	4,422,866	128,753	8,155	90,741	2,277	21,744,142	51,451,630
Italy	4,293,083	3,558	127,884	10	4,115,889	49,310	165	71,115	2,118	75,100,357	60,368,368
Spain	4,189,136	27,286	81,148	29	3,676,323	431,665	1,116	89,562	1,735	55,184,196	46,773,809
Germany	3,754,828	1,626	91,938	30	3,641,000	21,890	361	44,666	1,094	65,845,568	84,065,322
Iran	3,576,148	27,444	87,624	250	3,168,834	319,690	4,422	42,013	1,029	24,892,912	85,119,790
Indonesia	2,950,058	38,325	76,200	1,280	2,323,666	550,192	13,550	10,667	276	23,719,489	276,556,785
Poland	2,881,594	104	75,219	4	2,653,034	153,341	60	76,227	1,990	18,138,390	37,803,040
Mexico	2,664,444	5,307	236,469	138	2,095,953	332,022	4,798	20,440	1,814	7,960,939	130,353,354
South Africa	2,311,232	8,928	67,676	596	2,085,119	158,437	546	38,461	1,126	14,310,166	60,092,502
Netherlands	1,814,143	6,699	17,783	5	*1,661,205*	135,155	95	105,629	1,035	15,472,423	17,174,700
Philippines	1,517,903	4,516	26,844	58	1,444,253	46,806	2,031	13,661	242	16,042,300	111,109,628
Iraq	1,510,517	8,922	17,951	59	1,372,158	120,408	720	36,693	436	12,587,768	41,166,304
Canada	1,424,220	342	26,508	4	1,393,117	4,595	264	37,392	696	37,947,701	38,089,322
Belgium	1,107,208	1,330	25,213	2	1,051,372	30,623	88	95,100	2,166	16,330,887	11,642,587
Romania	1,081,773	95	34,258	3	1,046,881	634	36	56,629	1,793	10,257,994	19,102,669
Pakistan	993,872	2,145	22,848	37	921,095	49,929	2,697	4,410	101	15,484,282	225,380,778
Malaysia	939,899	12,366	7,241	93	798,955	133,703	924	28,655	221	16,622,925	32,800,653

Source: WHO and JHU CSSE COVID-19 Data. Yellow highlight shows new cases and red highlight new deaths.

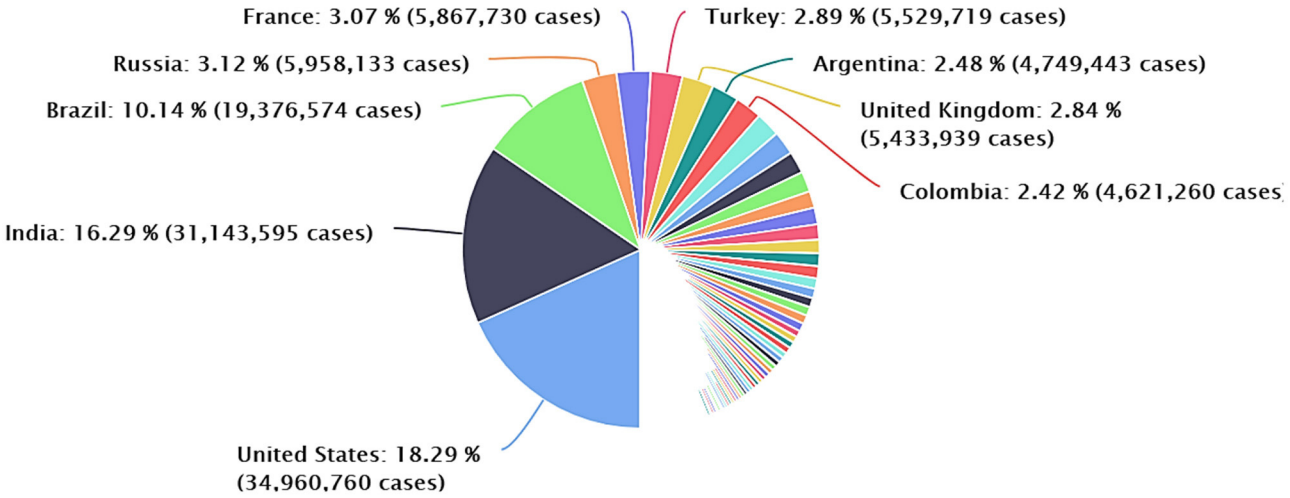

FIGURE 6 | Distribution of the cases in various countries worldwide (July 18, 2021). Source: Data provided by World Health Organization related to the coronavirus (COVID-19).

emissions for the first time since the world financial crisis of 2008 (84, 98–101). The pandemic has affected demand for renewable energy consumption, trade on environmental quality, and human capital (102–104). The pandemic has affected global and regional progress and disrupted economic activities on micro and macro levels (105–108). Carbon Brief analysis specifies that the emergence of the ongoing COVID-19 outbreak might decrease carbon dioxide emissions by up to 1,600 million tons during the year 2020 and onwards. This decrease in emission equals 5.50% of 2019's total emissions worldwide. It equals removing 3.47 billion passengers from the highways and roads for 1 year, according to the Greenhouse Gas Equivalence Calculator (GGEC) measurement, which is assessed by the Environmental Protection Agency (EPA). The decline in air pollution has resulted in substantial health benefits; however, it has not alleviated the catastrophic consequences of the COVID-19 pandemic. It has resulted in over 191.085 million confirmed COVID-19 patients. As of July 18, there were over 191,084,631 verified coronavirus patients, more than 4,103,306 deaths and 174,041,354 recovered patients worldwide (109).

CRISIS MANAGEMENT AND HEALTHCARE SYSTEMS

Besides, the emergence of this transmittable disease speedily instigated significant disruption to societies, healthcare systems, and global economies. The COVID-19 outbreak posed global challenges and problems of economic crisis management, which are still unfolding. This article explores the effects and strategic retorts on the protective actions for combating the viral disease COVID-19 and its adverse consequences on social, environmental, economic, and health factors. The study primarily focused on challenges and crises on the economy, business activity, healthcare burden, and government support for society. This research suggests that intervention strategies control the rapid spread of COVID-19 through a hands-on crisis management system, and the healthcare system will quickly resume normalcy. Through government support, the global economy will revive through scientific contributions and collaborations, including social science and the business industry (110). Health crisis management is a challenging and complex subject. Global economic crises necessitate institutional, organizational, and individual responses at large-scale with an effective direction by linking various approaches based on interdisciplinary and multidisciplinary tactics to handle this vital issue. Each crisis indicates a positive aspect inheritance to perceive and respond to a challenge or a crisis. Resilience helps deal with a challenge or a crisis effectively. Economic crisis management in a challenging situation provides opportunities to capitalize on new openings and economic horizons. Organizations, business managers, and financial experts need adequate and innovative organizational skills, innovative business plans, and entrepreneurship.

NPIs (NON-PHARMACEUTICAL INTERVENTIONS) IN THE ABSENCE OF COVID-19 VACCINES

Non-pharmaceutical interventions are the methods to combat the ongoing COVID-19 pandemic's adverse impact, apart from taking medicines, or getting vaccinated, which communities and ordinary people can take as preventive measures to help minimize the rapid spread of the infectious disease. The past studies on the Spanish influenza 1918 (H1N1) pandemic showed that close settings, army barracks, college and university dormitories, early patients' identification, and isolation of the

infected patients did not stop the infection transmission (18). However, it was helpful to decrease rapid spread, especially with restrictions on social gatherings and travel bans to and from the adjacent communities (111). Health experts take NPIs as the mitigation strategies of communities to slow and reduce the pandemic's quick transmission. When a novel virus rapidly spread in communities and infects people, causing contagious diseases worldwide, it becomes a pandemic flu as per the declaration of the WHO. The ongoing virus is a novel disease, and human populations have little or no strong immunity against the pandemic. It has massively infected global communities.

This new virus, COVID-19, quickly spreads among people and infects people who make close contact with infected patients. In this panic situation, the WHO and health professionals have declared NPIs among the best possible preventive strategies for controlling the quick transmission of the pandemic when effective medications and vaccines are not yet available to general populations at large scale. The literature documented that NPIs are significantly practical and helpful to reduce the quick transmission of the deadliest diseases. Implementing the social distancing strategy is incredibly effective and beneficial, more so than other NPIs, to contain the rapid spread of the coronavirus. Two or more synchronous NPIs are more productive and useful than a single NPI strategy. The literature indicated that NPIs help contains the rapid spread of the COVID-19 transmission significantly. Based on the above debate, social distancing and implementing two or more NPI strategies can significantly contain the quick spread among people. These strategies should be the priority in the ongoing panic situation of COVID-19.

This study has proposed two viable, practical rudimentary strategies: (1) a mitigation strategy which principally focuses on preventive measures through social distancing and lockdown to control and minimize COVID-19's rapid transmission in human society. However, it is not considered helpful in preventing the spread of the epidemic. This strategy is useful in sustaining or reducing the peak burdens on healthcare systems. (2) The suppression model intended to reverse the epidemic's development by lowering infections from higher or lower ratios or permanently maintaining the suppression policy. Each approach has the challenge to gain positive results. This article explains that the best possible and useful mitigation strategy is combining quarantine for suspected patients and maintaining social distancing/separation of aged people and individuals facing higher risks of COVID-19. It helps reduce the peak burdens on healthcare systems by two-thirds (67%), and it decreases the rate of deaths (50%) by half (112). On the contrary, the mitigation policy can lower the pressure on the healthcare systems to facilitate the patients. It helps minimize the rate of casualties, as the mitigation strategy reduces the probability of rapid spread of the disease. Many countries have opted for these strategies to control the rapid spread of contagious diseases, and they have achieved their goals by minimizing infections in the general population (113).

In the current global situation, suppression recommends social distancing to minimize the spread of the COVID-19 disease. Isolation for suspected individuals and household quarantining is helpful for the relatives of the alleged cases of COVID-19. It helps to prioritize health needs among people (114–118). There could be a recommendation for the closure of universities, colleges, and schools worldwide. However, such a restricted and upset environment might create deleterious impacts on individuals' mental health because of social distance and the absence of face-to-face interactions (119–123). This article describes the implications of resilience, economic crisis management, global health, and economic challenges in combatting the adverse effects of the pandemic. This study focuses on global challenges with a case study of Pakistan. This study aims to discuss the negative impacts of the ongoing COVID-19 outbreak on global economies, business industries, and how governments support societies and business sectors to minimize the disruptions through implications for global economic and healthcare provision disruptions. This study suggests that intervention strategies control the rapid spread of COVID-19 with hands-on crisis management measures, and the healthcare system will resume normal conditions quickly. Global economies will revitalize scientific contributions and collaborations, including social science and business industries, through government support.

CONCLUSION

The world has encountered the massive shock of the ongoing waves of the pandemic, and it still continues to affect people worldwide. Experience documented in the 1918 Spanish influenza (H1N1) pandemic showed that timely patient identification and isolation, including restrictions on social ties and travel bans from adjacent communities, did not stop disease transmission but helped decrease the virus spread. Lessons from past pandemics have showed us that public health interventions such implementing closure of educational institutes (schools, colleges, and universities), swimming pools, restaurants, and other public places, canceling sports events, and disinfecting buses, taxis, and public areas are very beneficial. The majority of the individuals and communities strictly followed preventive measures, used masks in public places, and washed hands frequently. A high percentage of people avoided unnecessary social gatherings and mixing among people. Social distancing dramatically decreased virus transmission among communities.

The World Health Organization suggested preventive measures be taken in conjunction with this global health emergency to combat COVID-19. The general relaxation of social distancing and lockdown policies has led to a higher number of recorded incidents, infections, and more deaths worldwide. Remarkably, the second wave has been more potent and lethal in Europe, and the USA and governments are under pressure to provide health care facilities to patients. This pandemic has already posed significant impacts on societies, individuals, healthcare systems, and human well-being. Since the advent of the epidemic, a wide range of challenges and economic crisis management issues have developed for everybody worldwide. Thus, the coronavirus crisis will have massive adverse effects that

are not yet visible in the long run. The practical solutions, knowledge, and various studies will provide insights to limit and counter the adverse consequences of COVID-19. However, each crisis offers some aspects to capitalize on learning and seeking knowledge based on positive and negative experiences.

This study explains that non-pharmaceutical interventions are useful in responding to the COVID-19 challenges and economic crisis to manage the spillover impacts on global mental health disasters and financial emergencies. The various combinations of NPIs help to drastically decrease the virus attacks and quick transmission of the contagious disease among healthy communities worldwide. The suppression model introduced in China has been helpful to minimize the rapid spread of COVID-19, as the Government of China strictly implemented restrictions on social gatherings. Pakistan applied a mixed method of NPIs and gained very productive results. Initially, Pakistan implemented both lockdown and mitigation strategies and later implemented a smart lockdown, which identified highly infected communities and areas. The WHO appreciated the smart lockdown strategy, as it helped to resume life to standard settings gradually. In the absence of effective vaccines, NPIs help combat the COVID-19 health crisis worldwide.

AUTHOR CONTRIBUTIONS

JA and RM contributed to study design. YZ, AD, MEB, MAS, and JA had edited the original manuscript before submission and editing and approving the final edited manuscript. JA contributed to idea conceptualization, project administration, supervision, contributed to writing the study abstract, discussion, implications, and review. RM contributed to methodology. YZ, AD, MEB, and MAS contributed to study cost, literature, checked writing, substantially revised, and critically reviewed the article. AD critically reviewed the manuscript and contributed to APC. All authors did significant changes introduced at the proofing stage, contributed to the paper, and approved the submitted version for publication.

FUNDING

The publication of this study was partially funded by Politehnica University of Timisoara (UPT), Romania. This work was funded by the Deanship of Scientific Research (DSR), King Abdulaziz University Jeddah under Grant (No. DF-689-120-1441). The authors acknowledged the Deanship of Scientific Research and the Politehnica University of Timisoara with thanks for their technical and financial support.

REFERENCES

1. Tosato M, Carfi A, Martis I, Pais C, Ciciarello F, Rota E, et al. Prevalence and predictors of persistence of COVID-19 symptoms in older adults: a single-center study. *J Am Med Dir Assoc.* (2021) 22:1840–4. doi: 10.1016/j.jamda.2021.07.003
2. Demichev V, Tober-Lau P, Lemke O, Nazarenko T, Thibeault C, Whitwell H, et al. A time-resolved proteomic and prognostic map of COVID-19. *Cell Syst.* (2021) 12:780–94. doi: 10.1016/j.cels.2021.05.005
3. Andraus M, Thorpe J, Tai XY, Ashby S, Hallab A, Ding D, et al. Impact of the COVID-19 pandemic on people with epilepsy: findings from the Brazilian arm of the COV-E study. *Epilepsy Behav.* (2021) 123:108261. doi: 10.1016/j.yebeh.2021.108261
4. Grant MC, Geoghegan L, Arbyn M, Mohammed Z, McGuinness L, Clarke EL, et al. The prevalence of symptoms in 24,410 adults infected by the novel coronavirus (SARS-CoV-2; COVID-19): a systematic review and meta-analysis of 148 studies from 9 countries. *PLoS ONE.* (2020) 15:e0234765. doi: 10.1371/journal.pone.0234765
5. Wang C, Wang D, Abbas J, Duan K, Mubeen R. Global financial crisis, smart lockdown strategies, and the COVID-19 spillover impacts: a global perspective implications from Southeast Asia. *Front Psychiatry.* (2021) 12:643783. doi: 10.3389/fpsyt.2021.643783
6. Ainsworth M, Andersson M, Auckland K, Baillie JK, Barnes E, Beer S, et al. Performance characteristics of five immunoassays for SARS-CoV-2: a head-to-head benchmark comparison. *Lancet Infect Dis.* (2020) 20:1390–400. doi: 10.1016/S1473-3099(20)30634-4
7. Santander-Gordon D, Iturralde GA, Freire-Paspuel B, Zambrano-Mila MS, Morales-Jadan D, Vallejo-Janeta PA, et al. Crucial contribution of the universities to SARS-CoV-2 surveillance in Ecuador: lessons for developing countries. *One Health.* (2021) 13:100267. doi: 10.1016/j.onehlt.2021.100267
8. Liu Z, Skowron K, Grudlewska-Buda K, Wiktorczyk-Kapischke N. The existence, spread, and strategies for environmental monitoring and control of SARS-CoV-2 in environmental media. *Sci Tot Environ.* (2021) 795:148949. doi: 10.1016/j.scitotenv.2021.148949
9. Gorbalenya AE, Baker SC, Baric RS, de Groot RJ, Drosten C, Gulyaeva AA, et al. The species Severe acute respiratory syndrome- related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol.* (2020) 5:536–44. doi: 10.1038/s41564-020-0695-z
10. Gan ES, Syenina A, Linster M, Ng B, Zhang SL, Watanabe S, et al. A mouse model of lethal respiratory dysfunction for SARS-CoV-2 infection. *Antiviral Res.* (2021) 193:105138. doi: 10.1016/j.antiviral.2021.105138
11. Wang L, Didelot X, Bi Y, Gao GF. Assessing the extent of community spread caused by mink-derived SARS-CoV-2 variants. *Innovation.* (2021) 2:100128. doi: 10.1016/j.xinn.2021.100128
12. Kanbur N, Barral R, Efevbera Y, Kelley MA, Svetaz MV, Miller E, et al. Call to action against femicide: illuminating a shadow pandemic as a global public health emergency. *J Adolesc Health.* (2021) 68:443–6. doi: 10.1016/j.jadohealth.2020.11.022
13. Li C, Sotomayor-Castillo C, Nahidi S, Kuznetsov S, Considine J, Curtis K, et al. Emergency clinicians' knowledge, preparedness and experiences of managing COVID-19 during the 2020 global pandemic in Australian healthcare settings. *Australas Emerg Care.* (2021) 24: 186–196. doi: 10.1016/j.auec.2021.03.008
14. Akintunde TY, Musa TH, Musa HH, Musa IH, Chen S, Ibrahim E, et al. Bibliometric analysis of global scientific literature on effects of COVID-19 pandemic on mental health. *Asian J Psychiatr.* (2021) 63:102753. doi: 10.1016/j.ajp.2021.102753
15. Ji Y, Shao J, Tao B, Song H, Li Z, Wang J. Are we ready to deal with a global COVID-19 pandemic? Rethinking countries' capacity based on the Global Health Security Index. *Int J Infect Dis.* (2021) 106:289–94. doi: 10.1016/j.ijid.2021.03.089
16. Van Hout MC, Wells JSG. The right to health, public health, and COVID-19: a discourse on the importance of the enforcement of humanitarian and human rights law in conflict settings for the future management of zoonotic pandemic diseases. *Public Health.* (2021) 192:3–7. doi: 10.1016/j.puhe.2021.01.001
17. van Schalkwyk MC, Maani N, McKee M. Public health emergency or opportunity to profit? The two faces of the COVID-19 pandemic. *Lancet Diabetes Endocrinol.* (2021) 9:61–3. doi: 10.1016/S2213-8587(21)00001-2
18. Lau K, Dorigatti I, Miraldo M, Hauck K. SARIMA-modelled greater severity and mortality during the 2010/11 post-pandemic influenza season compared

to the (2009). H1N1 pandemic in English hospitals. *Int J Infect Dis.* (2021) 105:161–71. doi: 10.1016/j.ijid.2021.01.070
19. Spreeuwenberg P, Kroneman M, Paget J. Reassessing the Global Mortality Burden of the 1918. Influenza pandemic. *Am J Epidemiol.* (2018) 187:2561–7. doi: 10.1093/aje/kwy191
20. Thorlund K, Dron L, Park J, Hsu G, Forrest JI, Mills EJ. A real-time dashboard of clinical trials for COVID-19. *Lancet Digit Health.* (2020) 2:e286–7. doi: 10.1016/S2589-7500(20)30086-8
21. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real- time. *Lancet Infect Dis.* (2020) 20:533–4. doi: 10.1016/S1473-3099(20)30120-1
22. Sanchez Turet M, Gonzalez Sastre F, Sabater Tobella J. [Effects of early malnutrition on the maturity of the nervous system. IV. Changes in the morphological and neurological development]. *Arch Neurobiol.* (1978) 41:177–88.
23. Su Z, McDonnell D, Cheshmehzangi A, Abbas J, Li X, Cai Y. The promise and perils of Unit 731 data to advance COVID-19 research. *BMJ Global Health.* (2021) 6:e004772. doi: 10.1136/bmjgh-2020-004772
24. NeJhaddadgar N, Ziapour A, Zakkipour G, Abbas J, Abolfathi M, Shabani M. Effectiveness of telephone-based screening and triage during COVID-19 outbreak in the promoted primary healthcare system: a case study in Ardabil province, Iran. *Z Gesundh Wiss.* (2020) 29:1–6. doi: 10.1007/s10389-020-01407-8
25. Lebni JY, Toghroli R, Abbas J, Kianipour N, NeJhaddadgar N, Salahshoor MR, et al. Nurses' work-related quality of life and its influencing demographic factors at a public hospital in Western Iran: a cross-sectional study. *Int Q Community Health Educ.* (2021) 42:37–45. doi: 10.1177/0272684X20972838
26. Selvey LA, Antao C, Hall R. Entry screening for infectious diseases in humans. *Emerg Infect Dis.* (2015) 21:197–201. doi: 10.3201/eid2102.131610
27. Lee A. Wuhan novel coronavirus (COVID-19): why global control is challenging? *Public Health.* (2020) 179:A1–2. doi: 10.1016/j.puhe.2020.02.001
28. Thornicroft G, Mehta N, Clement S, Evans-Lacko S, Doherty M, Rose D, et al. Evidence for effective interventions to reduce mental-health-related stigma and discrimination. *Lancet.* (2016) 387:1123–32. doi: 10.1016/S0140-6736(15)00298-6
29. Bénézit F, Le Turnier P, Declerck C, Paillé C, Revest M, Dubée V, et al. Utility of hyposmia and hypogeusia for the diagnosis of COVID-19. *Lancet Infect Dis.* (2020) 20:1014–5. doi: 10.1016/S1473-3099(20)30297-8
30. Khosravani V, Aardema F, Samimi Ardestani SM, Sharifi Bastan F. The impact of the coronavirus pandemic on specific symptom dimensions and severity in OCD: a comparison before and during COVID-19 in the context of stress responses. *J Obsessive Compuls Relat Disord.* (2021) 29:100626. doi: 10.1016/j.jocrd.2021.100626
31. Nogrady B. What does the data say about asymptomatic COVID infections. *Nature.* (2020) 587:534–5. doi: 10.1038/d41586-020-03141-3
32. Gao Z, Xu Y, Sun C, Wang X, Guo Y, Qiu S, et al. A systematic review of asymptomatic infections with COVID-19. *J Microbiol Immunol Infect.* (2020) 54:12–6. doi: 10.1016/j.jmii.2020.05.001
33. Furukawa NW, Brooks JT, Sobel J. Evidence supporting transmission of severe acute respiratory syndrome coronavirus 2 while presymptomatic or asymptomatic. *Emerg Infect Dis.* (2020) 26:e201595. doi: 10.3201/eid2607.201595
34. Gandhi RT, Lynch JB, Del Rio C. Mild or moderate covid-19. *N Engl J Med.* (2020) 383:1757–66. doi: 10.1056/NEJMcp2009249
35. Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC. Pathophysiology, transmission, diagnosis, and treatment of coronavirus disease 2019. (COVID-19): a review. *JAMA.* (2020 324:782–93. doi: 10.1001/jama.2020.12839
36. Zhang Y, Lange KW. Coronavirus disease (2019). (COVID-19) and global mental health. *Global Health J.* (2021) 5:31–6. doi: 10.1016/j.glohj.2021.02.004
37. Hamer M, Kivimaki M, Gale CR, Batty GD. Lifestyle risk factors, inflammatory mechanisms, and COVID-19 hospitalization: a community-based cohort study of 387,109 adults in the UK. *Brain Behav Immun.* (2020) 87:184–7. doi: 10.1016/j.bbi.2020.05.059
38. Maqsood A, Abbas J, Rehman G, Mubeen R. The paradigm shift for educational system continuance in the advent of COVID-19 pandemic: mental health challenges and reflections. *Curr Res Behav Sci.* (2021) 2:100011. doi: 10.1016/j.crbeha.2020.100011
39. John A, Ali K, Marsh H, Reddy PH. Can a healthy lifestyle reduce the disease progression of Alzheimer's during a global pandemic of COVID-19? *Ageing Res Rev.* (2021) 70:101406. doi: 10.1016/j.arr.2021.101406
40. Chik AHS, Glier MB, Servos M, Mangat CS, Pang X-L, Qiu Y, et al. Comparison of approaches to quantify SARS-CoV- 2 in wastewater using RT-qPCR: results and implications from a collaborative inter- laboratory study in Canada. *J Environ Sci.* (2021) 107:218–29. doi: 10.1016/j.jes.2021.01.029
41. Liu TB, Chen XY, Miao GD. Recommendations on diagnostic criteria and prevention of SARS-related mental disorders. *J Clin Psychol Med.* (2003) 13:188–191.
42. Maunder R, Hunter J, Vincent L, Bennett J, Peladeau N, Leszcz M, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ.* (2003) 168:1245–51. Available online at: https://www.cmaj.ca/content/168/10/1245.short
43. Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, Fusar-Poli P, et al. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatry.* (2020) 7:611–27. doi: 10.1016/S2215-0366(20)30203-0
44. Garcia-Salido A, Anton J, Martinez-Pajares JD, Giralt Garcia G, Gomez Cortes B, Tagarro A, et al. [Spanish consensus document on diagnosis, stabilization, and treatment of pediatric multisystem inflammatory syndrome related to SARS-CoV-2 (SIM-PedS)]. *An Pediatr.* (2021) 94:116. doi: 10.1016/j.anpede.2020.09.005
45. Ahmed MU, Hanif M, Ali MJ, Haider MA, Kherani D, Memon GM, et al. Neurological manifestations of COVID-19 (SARS- CoV-2): a review. *Front Neurol.* (2020) 11:518. doi: 10.3389/fneur.2020.00518
46. Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, et al. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. *JAMA Neurol.* (2020) 77:683–90. doi: 10.1001/jamaneurol.2020.1127
47. Varatharaj A, Thomas N, Ellul MA, Davies NWS, Pollak TA, Tenorio EL, et al. Neurological and neuropsychiatric complications of COVID-19 in 153 patients: a UK-wide surveillance study. *Lancet Psychiatry.* (2020) 7:875–82. doi: 10.1016/S2215-0366(20)30287-X
48. Shultz JM, Baingana F, Neria Y. The 2014 Ebola outbreak and mental health: current status and recommended response. *JAMA.* (2015) 313:567–8. doi: 10.1001/jama.2014.17934
49. Kamara S, Walder A, Duncan J, Kabbedijk A, Hughes P, Muana A. Mental health care during the Ebola virus disease outbreak in Sierra Leone. *Bull World Health Organ.* (2017) 95:842–7. doi: 10.2471/BLT.16.190470
50. Cendejas-Bueno E, Romero-Gomez MP, Escosa-Garcia L, Jimenez-Rodriguez S, Mingorance J, Garcia-Rodriguez J, et al. Lower nasopharyngeal viral loads in the pediatric population. The missing piece to understanding SARS-CoV-2 infection in children? *J Infect.* (2021) 83:e18–e19. doi: 10.1016/j.jinf.2021.06.009
51. Lee AM, Wong JG, McAlonan GM, Cheung V, Cheung C, Sham PC, et al. Stress and psychological distress among SARS survivors 1 year after the outbreak. *Can J Psychiatry.* (2007) 52:233–40. doi: 10.1177/070674370705200405
52. Kapfhammer HP, Rothenhausler HB, Krauseneck T, Stoll C, Schelling G. Posttraumatic stress disorder and health-related quality of life in long-term survivors of acute respiratory distress syndrome. *Am J Psychiatry.* (2004) 161:45–52. doi: 10.1176/appi.ajp.161.1.45
53. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis.* (2004) 10:1206–12. doi: 10.3201/eid1007.030703
54. Gerst-Emerson K, Jayawardhana J. Loneliness as a public health issue: the impact of loneliness on health care utilization among older adults. *Am J Public Health.* (2015) 105:1013–9. doi: 10.2105/AJPH.2014.302427
55. Lin CC, Chen TY, Cheng PY, Liu YP. Early life social experience affects adulthood fear extinction deficit and associated dopamine profile abnormalities in a rat model of PTSD. *Prog Neuropsychopharmacol*

Biol Psychiatry. (2020) 101:109914. doi: 10.1016/j.pnpbp.2020.109914
56. Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: a systematic review. *Psychol Med.* (2008) 38:467–80. doi: 10.1017/S0033291707001353
57. Santini ZI, Jose PE, York Cornwell E, Koyanagi A, Nielsen L, Hinrichsen C, et al. Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. *Lancet Public Health.* (2020) 5:e62–70. doi: 10.1016/S2468-2667(19)30230-0
58. Burns A, Leavey G, Ward M, O'Sullivan R. The impact of loneliness on healthcare use in older people: evidence from a nationally representative cohort. *J Public Health.* (2020) 29:1–10. doi: 10.1007/s10389-020-01338-4
59. Haderlein TP, Wong MS, Yuan A, Llorente MD, Washington DL. Association of PTSD with COVID-19 testing and infection in the Veterans Health Administration. *J Psychiatr Res.* (2020) 144:1–4. doi: 10.1016/j.jpsychires.2020.11.033
60. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Gen Psychiatr.* (2020) 33:e100213. doi: 10.1136/gpsych-2020-100213
61. Lei L, Huang X, Zhang S, Yang J, Yang L, Xu M. Comparison of prevalence and associated factors of anxiety and depression among people affected by versus people unaffected by quarantine during the COVID-19 epidemic in Southwestern China. *Med Sci Monit.* (2020) 26:e924609. doi: 10.12659/MSM.924609
62. McGinty EE, Presskreischer R, Han H, Barry CL. Psychological distress and loneliness reported by US adults in 2018 and April (2020). *JAMA*. (2020) 324:93–94. doi: 10.1001/jama.2020.9740
63. Steinman MA, Perry L, Perissinotto CM. Meeting the care needs of older adults isolated at home during the COVID-19 pandemic. *JAMA Internal Med.* (2020) 180:819–20. doi: 10.1001/jamainternmed.2020.1661
64. Daly M, Robinson E. Anxiety reported by US adults in 2019 and during the 2020 COVID- 19 pandemic: population-based evidence from two nationally representative samples. *J Affect Disord.* (2021) 286:296–300. doi: 10.1016/j.jad.2021.02.054
65. Xiang Y-T, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry.* (2020) 7:228–9. doi: 10.1016/S2215-0366(20)30046-8
66. Cenat JM, Mukunzi JN, Noorishad PG, Rousseau C, Derivois D, Bukaka J. A systematic review of mental health programs among populations affected by the Ebola virus disease. *J Psychosom Res.* (2020) 131:109966. doi: 10.1016/j.jpsychores.2020.109966
67. Su Z, McDonnell D, Abbas J, Shi L, Cai Y, Yang L. Secondhand smoke exposure of expectant mothers in China: factoring in the role of culture in data collection. *JMIR Cancer*. (2021) 7:e24984. doi: 10.2196/24984
68. Callaway E. Delta coronavirus variant: scientists brace for impact. *Nature.* (2021) 595:17–8. doi: 10.1038/d41586-021-01696-3
69. Di Giacomo S, Mercatelli D, Rakhimov A, Giorgi FM. Preliminary report on severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) Spike mutation T478K. *J Med Virol.* (2021) 93:5638–43. doi: 10.1002/jmv.27062
70. Burki TK. Lifting of COVID-19 restrictions in the UK and the Delta variant. *Lancet Respir Med.* (2021) 9:e85. doi: 10.1016/S2213-2600(21)00328-3
71. Moona AA, Daria S, Asaduzzaman M, Islam MR. Bangladesh reported delta variant of coronavirus among its citizen: actionable items to tackle the potential massive third wave. *Infect Prevent Pract.* (2021) 3:100159. doi: 10.1016/j.infpip.2021.100159
72. Shafi M, Liu J, Ren W. Impact of COVID-19 pandemic on micro, small, and medium- sized enterprises operating in Pakistan. *Res Global.* (2020) 2:100018. doi: 10.1016/j.resglo.2020.100018
73. Abbas J, Raza S, Nurunnabi M, Minai MS, Bano S. The impact of entrepreneurial business networks on firms' performance through a mediating role of dynamic capabilities. *Sustainability.* (2019) 11:3006. doi: 10.3390/su11113006
74. Local Burden of Disease HIVC. Mapping subnational HIV mortality in six Latin American countries with incomplete vital registration systems. *BMC Med.* (2021) 19:4. doi: 10.1186/s12916-020-01876-4
75. Paulson KR, Kamath AM, Alam T, Bienhoff K, Abady GG, Abbas J, et al. Global, regional, and national progress towards sustainable development goal 3.2 for neonatal and child health: all-cause and cause- specific mortality findings from the Global Burden of Disease Study 2019. *Lancet.* (2021) 398:870–905. doi: 10.1016/s0140-6736(21)01207-1
76. Aqeel M, Abbas J, Shuja KH, Rehna T, Ziapour A, Yousaf I, et al. The influence of illness perception, anxiety and depression disorders on students mental health during COVID-19 outbreak in Pakistan: a Web-based cross-sectional survey. *Int J Hum Rights Healthcare.* (2021) 14:1–14. doi: 10.1108/IJHRH-10-2020-0095
77. Soroush A, Ziapour A, Abbas J, Jahanbin I, Andayeshgar B, Moradi F, et al. Effects of group logotherapy training on self- esteem, communication skills, and impact of event scale-revised (IES-R) in older adults. *Ageing Int.* (2021) 46:1–14. doi: 10.1007/s12126-021-09458-2
78. Aman J, Abbas J, Lela U, Shi G. Religious affiliation, daily spirituals, and private religious factors promote marital commitment among married couples: does religiosity help people amid the COVID-19 crisis? *Front Psychol.* (2021) 12:657400. doi: 10.3389/fpsyg.2021.657400
79. Azadi NA, Ziapour A, Lebni JY, Irandoost SF, Abbas J, Chaboksavar F. The effect of education based on health belief model on promoting preventive behaviors of hypertensive disease in the staff of the Iran University of Medical Sciences. *Arch Public Health.* (2021) 79:69. doi: 10.1186/s13690-021-00594-4
80. Azizi MR, Atlasi R, Ziapour A, Abbas J, Naemi R. Innovative human resource management strategies during the COVID-19 pandemic: a systematic narrative review approach. *Heliyon.* (2021) 7:e07233. doi: 10.1016/j.heliyon.2021.e07233
81. Taufik ER, Raza S, Zahid H, Abbas J, Mohd Sobri FA, Sidiki SN. Nexus between integrating technology readiness 2.0 index and students' e-library services adoption amid the COVID-19 challenges: implications based on the theory of planned behavior. *J Educ Health Promot.* (2021) 10.
82. Agius S, Grech A, Grech V. The way in which COVID-19 changed behavior on social media in Malta. *Early Hum Dev.* (2020) 2020:105255. doi: 10.1016/j.earlhumdev.2020.105255
83. Zhao J, Han H, Zhong B, Xie W, Chen Y, Zhi M. Health information on social media helps mitigate Crohn's disease symptoms and improves patients' clinical course. *Comput Hum Behav.* (2021) 115:106588. doi: 10.1016/j.chb.2020.106588
84. Abbas J, Mubeen R, Iorember PT, Raza S, Mamirkulova G. Exploring the impact of COVID-19 on tourism: transformational potential and implications for a sustainable recovery of the travel and leisure industry. *Curr Res Behav Sci.* (2021) 2:100033. doi: 10.1016/j.crbeha.2021.100033
85. Khazaie H, Lebni JY, Abbas J, Mahaki B, Chaboksavar F, Kianipour N, et al. Internet addiction status and related factors among medical students: a cross-sectional study in Western Iran. *Int Q Commun Health Educ.* (2021) 42(2). doi: 10.1177/0272684X211025438
86. Lebni JY, Toghroli R, Abbas J, NeJhaddadgar N, Salahshoor MR, Mansourian M, et al. A study of internet addiction and its effects on mental health: a study based on Iranian University Students. *J Educ Health Promot.* (2020) 9:205. doi: 10.4103/jehp.jehp_148_20
87. Tang Z, Miller AS, Zhou Z, Warkentin M. Does government social media promote users' information security behavior towards COVID-19 scams? Cultivation effects and protective motivations. *Govern Inform Q.* (2021) 2021:101572. doi: 10.1016/j.giq.2021.101572
88. Gever VC, Talabi FO, Adelabu O, Sanusi BO, Talabi JM. Modeling predictors of COVID- 19 health behavior adoption, sustenance, and discontinuation among social media users in Nigeria. *Telemat Informat.* (2021) 2021:101584. doi: 10.1016/j.tele.2021.101584
89. Su Z, McDonnell D, Wen J, Kozak M, Abbas J, Segalo S, et al. Mental health consequences of COVID-19 media coverage: the need for effective crisis communication practices. *Global Health.* (2021) 17:4. doi: 10.1186/s12992-020-00654-4
90. Abbas J, Wang D, Su Z, Ziapour A. The role of social media in the advent of COVID- 19 pandemic: crisis management, mental health challenges, and implications. *Risk Manage Healthcare Policy.* (2021) 14:1917–32. doi: 10.2147/RMHP.S284313
91. Carpenter CJ. A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Commun.* (2010) 25:661–9. doi: 10.1080/10410236.2010.521906

92. Jones CJ, Smith H, Llewellyn C. Evaluating the effectiveness of health belief model interventions in improving adherence: a systematic review. *Health Psychol Rev.* (2014) 8:253–69. doi: 10.1080/17437199.2013.802623
93. Castonguay J, Filer CR, Pitts MJ. Seeking help for depression: applying the health belief model to illness narratives. *Southern Commun J.* (2016) 81:289–303. doi: 10.1080/1041794X.2016.1165729
94. Moradi F, Tourani S, Ziapour A, Abbas J, Hematti M, Moghadam EJ, et al. Emotional intelligence and quality of life in elderly diabetic patients. *Int Q Community Health Educ.* (2020). doi: 10.21203/rs.2.18394/v1
95. Moradi F, Toghroli R, Abbas J, Ziapour A, Lebni JY, Aghili A, et al. Hospital managers' skills required and onward challenges: a qualitative study. *J Educ Health Promot.* (2020) 9:228. doi: 10.4103/jehp.jehp_171_20
96. Abbas J, Aman J, Nurunnabi M, Bano S. The impact of social media on learning behavior for sustainable education: evidence of students from selected universities in Pakistan. *Sustainability.* (2019) 11:1683. doi: 10.3390/su11061683
97. Merchant RM, Lurie N. Social media and emergency preparedness in response to novel coronavirus. *JAMA.* (2020) 323:2011–2. doi: 10.1001/jama.2020.4469
98. Cerra V, Saxena SC. Growth dynamics: the myth of economic recovery. *Am Econ Rev.* (2008) 98:439–57. doi: 10.1257/aer.98.1.439
99. Griffith SM, Huang W-S, Lin C-C, Chen Y-C, Chang K-E, Lin T-H, et al. Long-range air pollution transport in East Asia during the first week of the COVID-19 lockdown in China. *Sci Tot Environ.* (2020) 741:140214. doi: 10.1016/j.scitotenv.2020.140214
100. Goshit GG, Jelilov G, Iorember PT, Celik B, Davd-Wayas OM. Asymmetric effects of monetary policy shocks on output growth in Nigeria: Evidence from nonlinearARDLandHatemi-Jcausality tests. *J Public Affairs.* (2020) 2020:e2449. doi: 10.1002/pa.2449
101. Jelilov G, Iorember PT, Usman O, Yua PM. Testing the nexus between stock market returns and inflation in Nigeria: does the effect of COVID-19 pandemic matter? *J Public Aff.* (2020) 20:e2289. doi: 10.1002/pa.2289
102. Iorember PT, Jelilov G, Usman O, Isik A, Celik B. The influence of renewable energy use, human capital, and trade on environmental quality in South Africa: multiple structural breaks cointegration approach. *Environ Sci Pollut Res Int.* (2021) 28:13162–74. doi: 10.1007/s11356-020-11370-2
103. Iorember PT, Jelilov G. Computable general equilibrium analysis of increase in government agricultural expenditure on household welfare in Nigeria. *Afr Dev Rev.* (2018) 30:362–71. doi: 10.1111/1467-8268.12344
104. Iorember PT, Goshit GG, Dabwor DT. Testing the nexus between renewable energy consumption and environmental quality in Nigeria: the role of broad-based financial development. *Afr Dev Rev.* (2020) 32:163–75. doi: 10.1111/1467-8268.12425
105. Goshit GG, Iorember PT. Measuring the asymmetric pass-through of monetary policy rate to unemployment in Nigeria: evidence from nonlinear ARDL. *Nigerian J Econ Soc Stud.* (2020) 62:369–87.
106. Philip A, Iorember PT. Macroeconomic and household welfare impact of an increase in the minimum wage in Nigeria: a computable general equilibrium model. *Am J Econ.* (2017) 7:249–58. doi: 10.5923/j.economics.20170705.06
107. Usman O, Olanipekun IO, Iorember PT, Abu-Goodman M. Modelling environmental degradation in South Africa: the effects of energy consumption, democracy, and globalization using innovation accounting tests. *Environ Sci Pollut Res Int.* (2020) 27:8334–49. doi: 10.1007/s11356-019-06687-6
108. Usman O, Iorember PT, Olanipekun IO. Revisiting the environmental Kuznets curve (EKC) hypothesis in India: the effects of energy consumption and democracy. *Environ Sci Pollut Res Int.* (2019) 26:13390–400. doi: 10.1007/s11356-019-04696-z
109. Wang Q, Su M. A preliminary assessment of the impact of COVID-19 on environment - A case study of China. *Sci Total Environ.* (2020) 728:138915. doi: 10.1016/j.scitotenv.2020.138915
110. Pereira V, Temouri Y, Patnaik S, Mellahi K. Managing and preparing for emerging infectious diseases: avoiding a catastrophe. *Acad Manage Perspect.* (2020) 34:480–92. doi: 10.5465/amp.2019.0023
111. Markel H, Lipman HB, Navarro JA, Sloan A, Michalsen JR, Stern AM, et al. Nonpharmaceutical interventions implemented by US cities during the 1918-1919 influenza pandemic. *JAMA.* (2007) 298:644–54. doi: 10.1001/jama.298.6.644
112. Shuja KH, Aqeel M, Jaffar A, Ahmed A. COVID-19 pandemic and impending global mental health implications. *Psychiatria Danubina.* (2020) 32:32–5. doi: 10.24869/psyd.2020.32
113. Abbas J. The impact of coronavirus (Sars-cov2) epidemic on individuals' mental health: the protective measures of Pakistan in managing and sustaining transmissible disease. *Psychiatr Danub.* (2020) 32:472–7. doi: 10.24869/psyd.2020.472
114. Su Z, Wen J, Abbas J, McDonnell D, Cheshmehzangi A, Li X, et al. A race for a better understanding of COVID-19 vaccine non- adopters. *Brain Behav Immun Health.* (2020) 9:100159. doi: 10.1016/j.bbih.2020.100159
115. Yoosefi Lebni J, Abbas J, Moradi F, Salahshoor MR, Chaboksavar F, Irandoost SF, et al. How the COVID-19 pandemic effected economic, social, political, and cultural factors: a lesson from Iran. *Int J Soc Psychiatry.* (2020) 67:298–300. doi: 10.1177/0020764020939984
116. Fattahi E, Solhi M, Abbas J, Kasmaei P, Rastaghi S, Pouresmaeil M, et al. Prioritization of needs among students of University of Medical Sciences: a needs assessment. *J Educ Health Promot.* (2020) 9:57. doi: 10.4103/0445-7706.281641
117. Pouresmaeil M, Abbas J, Solhi M, Ziapour A, Fattahi E. Prioritizing health promotion lifestyle domains in students of Qazvin University of Medical Sciences from the students and professors' perspective. *J Educ Health Promot.* (2019) 8:228. doi: 10.4103/jehp.jehp_250_19
118. Abbas J. Crisis management, transnational healthcare challenges, and opportunities: the intersection of COVID-19 pandemic and global mental health. *Res Global.* (2021) 2021:100037. doi: 10.1016/j.resglo.2021.100037
119. Shoib S, Buitrago JETG, Shuja KH, Aqeel M, Filippis R de, Abbas J, et al. Suicidal behavior sociocultural factors in developing countries during COVID-19. *Encephale* (2021) S0013-7006:00183-4. doi: 10.1016/j.encep.2021.06.011
120. Mohammadi A, Pishgar E, Firouraghi N, Bagheri N, Shamsoddini A, Abbas J, et al. A geodatabase of blood pressure level and the associated factors including lifestyle, nutritional, air pollution, and urban greenspace. *BMC Res Notes* 14, 416. doi: 10.1186/s13104-021-05830-2
121. Li J, et al., Tourists' health risk threats amid COVID-19 era: Role of technology innovation, Transformation, and recovery implications for sustainable tourism. *Front. Psychol.* (2021) 12:7619.
122. Su Z, McDonnell D, Li X, Bennett B, Segalo S, Abbas J, et al. COVID-19 Vaccine Donations-Vaccine Empathy or Vaccine Diplomacy? A Narrative Literature Review. *Vaccines (Basel).* 15:1024. doi: 10.3390/vaccines9091024
123. Toqeer S, Aqeel M, Shuja KH, Bibi A, Abbas J, et al. Attachment styles, facebook addiction, dissociation and alexithymia in university students; a mediational model. *Nature-Nurture Journal of Psychology.* (2021) 1:28–37.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer MB declared a shared affiliation, with no collaboration, with the author JA at the time of the review.

The reviewer SB declared a shared affiliation, with no collaboration, with the author RM at the time of the review.

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