

Emotional functioning and post-traumatic outcomes in the aftermath of a traumatic event

Edited by

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Published in

Frontiers in Psychology



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ISSN 1664-8714
ISBN 978-2-83251-295-1
DOI 10.3389/978-2-83251-295-1

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Emotional functioning and post-traumatic outcomes in the aftermath of a traumatic event

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Citation

Di Tella, M., Castelli, L., Romeo, A., eds. (2023). *Emotional functioning and post-traumatic outcomes in the aftermath of a traumatic event*.

Lausanne: Frontiers Media SA. doi: 10.3389/978-2-83251-295-1

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OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 05 December 2022
ACCEPTED 12 December 2022
PUBLISHED 23 December 2022

CITATION
Romeo A, Castelli L and Di Tella M
(2022) Editorial: Emotional functioning
and post-traumatic outcomes in the
aftermath of a traumatic event.
Front. Psychol. 13:1116690.
doi: 10.3389/fpsyg.2022.1116690

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Editorial: Emotional functioning and post-traumatic outcomes in the aftermath of a traumatic event

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KEYWORDS

emotional functioning, trauma, post-traumatic growth (PTG), post-traumatic stress, anxiety/depressive symptoms

Editorial on the Research Topic

Emotional functioning and post-traumatic outcomes in the aftermath of a traumatic event

The terrifying aftermath of trauma can cause both negative and positive psychological outcomes. Traumatic events can induce people to experience a series of strong negative emotional responses, resulting in symptoms of psychological distress, such as post-traumatic stress symptoms (PTSS) and anxiety/depressive symptoms (e.g., Wang et al., 2005). Conversely, positive outcomes usually identify with post-traumatic growth (PTG), which refers to the experience of positive psychological change that occurs as a result of the struggle with highly challenging life circumstances (Tedeschi and Calhoun, 2004).

In the occurrence of both negative and positive psychological reactions, a series of factors can play an important role (e.g., emotional functioning and coping strategies) (Romeo et al., 2019, 2022).

The present Research Topic aimed to shed further light on controversial aspects concerning the psychological consequences of a traumatic event, collecting contributions from different countries and fields.

Overall, we have twelve accepted papers. Half of these papers reported results of post-traumatic outcomes associated with the COVID-19 outbreak. Particularly, Lamiani et al. conducted a grounded theory based on the experience of 24 clinical psychologists who provided extensive support to the population during the pandemic in Italy. Results of the focus groups showed that repositioning (i.e., dealing with and integrating unpleasant emotional experiences deriving from the pandemic through different coping strategies) was the core task people had to face after the emergency phase of COVID-19.

Healthcare workers were also the focus of the study by Zakeri et al. The authors investigated mental health in nurses before and during the first wave of the COVID-19 pandemic in Iran. Results showed that while the level of burnout remained the same, anxiety, stress and depression increased significantly during the COVID-19 pandemic.

Another study of Zakeri et al. aimed to compare the compassion satisfaction, compassion fatigue and hardiness among nurses before and during the COVID-19 outbreak.

Although no significant differences were found between these psychological aspects before and during the COVID-19 outbreak, results showed that hardiness was a significant predictor of both compassion satisfaction and compassion fatigue.

The traumatic impact of COVID-19 on healthcare workers' mental health has also been examined by Yeung et al. They found that higher COVID-19-specific worries, higher perceived stigma of being a healthcare worker, and lower work satisfaction predicted higher anxiety symptoms in nurses in Hong Kong.

The direct and indirect impact of the COVID-19 pandemic was examined by two studies. Particularly, Taurisano et al. investigated psychological outcomes in a group of patients infected with COVID-19 comparing them to a sample of healthy participants. Results showed significant gender differences, with women reporting higher scores than men, in PTSS, depressive symptoms and representation of interpersonal distance in the clinical group only. The study of Bhushan et al. aimed to examine the direct (death or hospitalization in the family) and the indirect (media reports of the COVID situation) exposure of COVID-19 experience on children and adolescents and its subsequent relationship with PTSS and PTG during the second wave of COVID-19 in India. Overall, results revealed that 68.9% of them had PTSS, and 39.8% of those reporting PTSS were also experiencing PTG. Both direct and indirect exposure of COVID-19 was associated with higher PTSS. Arousal appeared to be the most frequently reported traumatic symptom.

The other four accepted studies sought to investigate post-traumatic outcomes in different other traumatic events. Fausor et al. examined long-term PTG in adults directly exposed to terrorist attacks in Spain (time span: 2–47 years earlier). Results revealed gender differences in PTG levels, with women reporting higher scores than men, and a positive linear relationship between PTG and cumulative trauma after the terrorist attacks. Significant positive associations were also detected between some PTG dimensions (i.e., appreciation of life and spiritual change) and PTSS.

The study of Rowe et al. aimed to analyze mental health symptoms among first aiders exposed to different traumatic events. As expected, rates of mental health outcomes in first aiders were higher than in the general population. Particularly, women reported higher levels of PTSS than men, and a significant correlation between the number of traumatic events and years of experience was detected.

Zięba et al. examined the associations between prioritizing positivity, styles of rumination, coping strategies, and PTG in a group of participants exposed to different critical events. Two evaluations were conducted and a series of validated measures were administered. Results revealed that PTG was positively associated with prioritizing positivity, deliberate rumination,

and religious coping, whereas negative relationships were found between the former and intrusive rumination.

Furthermore, Zeighami et al. conducted a qualitative study that aimed to investigate the effects of sexual harassment in the workplace on Iranian nurses. From the content analysis four subcategories have been extracted: “psychological trauma,” “detrimental effects of work,” “physical problems,” and “disintegration of warm family relationships.” In sum, sexual harassment had a greater negative psychological consequences for nurses and had a significant burden on the healthcare system due to decreased productivity and loss of active labor.

Finally, two papers examined the association between post-traumatic outcomes and cognitive and emotional abilities. Particularly, the study of Elam and Taku aimed to examine how perceived PTG and resiliency were, respectively, associated with empathy and emotion recognition in a group of college students. Results showed that perceived PTG and resilience were related to different cognitive abilities. In fact, PTG significantly predicted increased emotion recognition but not empathy, whereas resilience was found to be negatively associated with empathy but not with emotion recognition.

Mariani et al. explored whether emotional processes perform different functions during waking thoughts and night dreams during the first lockdown in Italy. Two different processes of emotional elaboration emerged: the use of greater symbolization processes during dreams and a higher emotional distance in waking thoughts. Findings suggested a greater contact with the processing of trauma during the nocturnal processes, and a greater use of defensive strategies during the diurnal processes.

In conclusion, the studies included in the present Research Topic have shown that both positive and negative post-traumatic outcomes may emerge in the aftermath of a traumatic event. Some studies have highlighted that PTSS and PTG can co-occur, with socio-demographic and psychological differences that seem to characterize the levels of positive and negative outcomes. Particularly, women have been found to experience higher levels of both growth and PTSS than men, whereas distinct emotional and cognitive processes have been shown to predict PTG and PTSS. On the one hand, deliberate rumination, religious coping and emotion recognition abilities seem to promote PTG, while, on the other hand, intrusive rumination and symbolization processes during dreams appear to predispose individuals to high levels of distress.

Given the complexity of those relationships, further research is needed to clarify the association between negative and positive psychological outcomes in the aftermath of a traumatic event.

Author contributions

Conceptualization and writing—original draft preparation: MD and AR. Writing—review and editing: AR and LC.

Supervision: MD. All authors have read and agreed to the published version of the manuscript.

Acknowledgments

Thanks to all the authors who contributed to this Research Topic.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships

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Feeling Anxious Amid the COVID-19 Pandemic: Factors Associated With Anxiety Symptoms Among Nurses in Hong Kong

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OPEN ACCESS

Edited by:

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University of Turin, Italy

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 28 July 2021

Accepted: 30 August 2021

Published: 01 October 2021

Citation:

Yeung NC-y, Wong EL-y, Cheung AW-I, Yeoh E-k and Wong SY-s (2021)
Feeling Anxious Amid the COVID-19
Pandemic: Factors Associated With
Anxiety Symptoms Among Nurses in
Hong Kong.
Front. Psychol. 12:748575.
doi: 10.3389/fpsyg.2021.748575

Background: The coronavirus (COVID-19) pandemic has increased the burden for the medical systems around the world. In Hong Kong, the pandemic not only affects the local populations, but also the healthcare workers. Healthcare workers, especially nurses, involving in COVID-19 treatments are highly susceptible to adverse psychological outcomes (e.g., anxiety symptoms). Studies have shown that socio-demographic characteristics, COVID-19-specific worries, and work settings-related variables are associated with healthcare workers' well-being during the COVID-19 pandemic. However, relevant studies for nurses in Hong Kong are limited. This study examined the psychosocial correlates of anxiety symptoms among nurses in Hong Kong.

Methods: Nurses ($N = 1,510$) working in hospitals and community settings were recruited through nursing associations in Hong Kong between August 8, 2020 and September 22, 2020. They were invited to complete a cross-sectional survey measuring their anxiety symptoms, sociodemographic characteristics, COVID-19-specific worries, and satisfaction with work and workplace pandemic-control guidelines.

Results: 17.2% of nurses reported moderate to severe levels of anxiety symptoms. Results from hierarchical regressions found that higher COVID-19-specific worries (contracting COVID-19, family members contracting COVID-19 due to their nursing work, insufficient protective equipment at workplace) (β s ranged from 0.07 to 0.20, $ps < 0.01$), higher perceived stigma of being a healthcare worker ($\beta = 0.18$, $p < 0.001$), and lower work satisfaction ($\beta = -0.21$, $p < 0.001$) were associated with higher anxiety symptoms.

Conclusion: A moderate proportion of nurses in Hong Kong did report levels of anxiety symptoms amid the COVID-19 pandemic. Futures studies could focus on the contributing factors of anxiety symptoms to design for effective strategies to promote nurses' well-being during pandemic situations.

Keywords: anxiety symptoms, COVID-19, nurses, work satisfaction, infection worry

INTRODUCTION

The Coronavirus pandemic (COVID-19) has become an international public health emergency, posing continuous threats to lives and healthcare systems worldwide. Since the first reported case on January 23, 2020, Hong Kong has reported 12,063 COVID-19 cases and 212 deaths as of August 23, 2021 (The Government of the Hong Kong Special Administrative Region, 2021). Studies have also found that the COVID-19 and its relevant control measures bring enormous psychological impacts (e.g., depression and anxiety) on the general population in Hong Kong (Choi et al., 2020). The COVID-19 pandemic is therefore highly stressful among people in Hong Kong.

Amid the COVID-19 pandemic, the needs of healthcare workers are largely neglected. Indeed, nurses have been identified as a segment of the healthcare worker population at higher physical and psychological risks due to exposure to patients' illness experience (Walton et al., 2020). Nurses' roles generally involve much closer contact with patients and spending longer time to serve patients' needs (Hamama-Raz and Minerbi, 2019). In Hong Kong, nurses have faced severe demands during the COVID-19 infection peaks (e.g., increased case load), plus experienced health-related worries about contracting COVID-19 and infecting their family members during the pandemic (Cheung et al., 2020). It is not surprising that local nurses are subject to high levels of anxiety symptoms. Understanding the potential determinants of nurses' well-being would help tailoring effective psychosocial interventions. This study aimed to examine the psychosocial correlates of Hong Kong nurses' anxiety symptoms during the COVID-19 pandemic.

Potential Factors Associated With Anxiety Symptoms Among Nurses Amid the COVID-19 Pandemic

COVID-19-related stressors are likely to contribute to nurses' psychological well-being. For example, a prior study found that perceived risk of contracting COVID-19 was associated with anxiety symptoms, frontline nurses in China during COVID-19 pandemic (Cui et al., 2021). Working at hospitals and clinics during COVID-19 pandemic might increase nurses' worries about passing infection to family members being due to their jobs, which in turn affect healthcare workers' well-being (Li et al., 2020; Walton et al., 2020). It has also been found that healthcare workers' worries about insufficient personal protective equipment were associated with higher distress among healthcare workers in the United States (Hennein et al., 2021) and Korea (Han et al., 2021). Relevant studies are limited in the Hong Kong context. Therefore, we speculated that COVID-19-related worries would also be associated with more anxiety symptoms among local nurses in Hong Kong.

When facing highly stressful events like the COVID-19 pandemic, having different aspects of coping resources available could contribute to nurses' well-being (Labrague and De Los Santos, 2020). A recent review has supported that personal coping resources and work-related resources/risk factors are important determinants of psychological well-being among

employees during the COVID-19 crisis (Rigotti et al., 2021), including healthcare workers. In this study, we aimed to examine the roles of interpersonal and work-related coping resources in anxiety symptoms among nurses in Hong Kong.

Regarding interpersonal resources, emerging research has started to examine the role of perceived stigma in healthcare workers' well-being during the COVID-19 pandemic. Due to the job nature, it is inevitable for healthcare workers to have the close contact with suspected and diagnosed cases of COVID-19 in the pandemic situation. Healthcare workers are commonly regarded as individuals with high risks for infecting and transmitting the virus. In the contexts of prior pandemic situations like the Severe Acute Respiratory Syndrome (SARS) and the Middle East Respiratory Syndrome (MERS), perceived stigma has been found to be a significant contributor of poor psychological well-being among healthcare workers (Gupta and Sahoo, 2020). Specific to the context of COVID-19, perceived stigma was associated with adverse mental health outcomes (e.g., psychological distress, probable depression) among healthcare workers in Bangladesh (Khan et al., 2021) and the US (Hennein et al., 2021). Health professionals' exposures to stigma or discriminatory behaviors may lead to gradual physical and psychological deterioration (Ramaci et al., 2020). In Hong Kong, healthcare workers are generally highly respected professions (Schoeb, 2016). It is important to examine how perceived stigma of being a healthcare worker contribute to local nurses' well-being in the context of COVID-19.

Research also suggests that work-related coping resources (e.g., level of job satisfaction, pandemic control measures at the institutions) can be associated with well-being among healthcare workers. Studies have found that individuals who are satisfied with work are more likely to find meaning in nature of work, which facilitate well-being during the COVID-19 pandemic (Hamama-Raz et al., 2021). Another study found that higher work satisfaction was associated with perceptions of positive changes (e.g., secondary posttraumatic growth) from the work experience during the pandemic among paramedics and nurses in Poland (Ogińska-Bulik et al., 2021a). The protective role of work satisfaction in anxiety symptoms among nurses should be further examined. On the other hand, workplace arrangements matter in employees' well-being during the pandemic. For example, implementation of COVID-19-related accommodating measures (e.g., introduction of reliable information resources, preventive measures to reduce risk of infection at workplace) were associated with lower psychological distress and better job performance among a heterogeneous sample of Japanese employees from multiple industries (Sasaki et al., 2020). Having transparent and timely policies for prevention of nosocomial infections (e.g., healthcare-associated infections) at the hospitals/clinics was associated with lower risks for probable depression and anxiety among healthcare workers in the US (Hennein et al., 2021). Whether satisfaction with workplace pandemic control guidelines could contribute to anxiety symptoms among local nurses has yet to be explored. Based on the above-mentioned literature, we expected that work satisfaction and satisfaction with workplace pandemic control guidelines would be associated with lower

anxiety symptoms among Hong Kong nurses during the COVID-19 pandemic.

Purpose and Hypotheses

This study examined the psychosocial correlates of anxiety symptoms among nurses in Hong Kong amid the COVID-19 pandemic. Based on the aforementioned studies, we hypothesized that higher levels of COVID-19 worries and perceived stigma, plus lower levels of work-related resources (work satisfaction, satisfaction with workplace pandemic control guidelines) were associated with higher anxiety symptoms.

METHODS

Participants and Recruitment Strategies

The nurses working in either public or private service provision in different settings (including inpatient, outpatient, outreach service in community setting) were eligible for this study. Those who were nursing trainees and retired nurses were excluded from the study sample. All registered members of the Association of Hong Kong Nursing Staff ($n = 16,500$), the labor union of nurses in Hong Kong, were approached and invited to this study using their email contacts. The self-administered questionnaire was distributed to the nurses in an internet-based link along with an invitation email. An information sheet about the study was included at the beginning of the questionnaire, followed by an electronic consent form. The participants who agreed to join the study filled in the questionnaire on their own electronic devices. A reminder for participation into the survey was sent 2 weeks after the first invitation email. Responses from 1,566 participants were collected *via* the online platform. Among them, 56 did not fulfill the eligibility criteria (e.g., not being a nurse, being retired, or being a nursing student). Therefore, only 1,510 valid responses representing working nurses included both worked as full-time or part-time in health care settings were retained in the analyses.

Comparison of sample characteristics was made with statistics of nurse population in Hong Kong to explore the potential selection bias. Although the response rate was low (1,510/16,500), characteristics of this sample were matched to nurse population in Hong Kong according to the latest statistics from Department of Health (Department of Health, 2016).

Upon completing the questionnaire, participants received HKD\$50 (approximately USD\$6.43 for compensation of their time. The study was conducted between August 8, 2020–September 22, 2020 (when there were 5,059 patients diagnosed and 105 dead from COVID-19 in Hong Kong). The study protocol was approved by the Research Ethics Committee (CUHK-NTEC CREC) at the first author's institution (Protocol no. CRE-2020.073).

Measures

Anxiety Symptoms

The General Anxiety Disorder-7 (GAD-7) was used to measure participant's levels of anxiety over the last 2 weeks (Spitzer et al., 2006). On a 4-point Likert scale (0 as *not at all* to 3 as *nearly every day*), a higher sum score from all items (e.g., “feeling nervous, anxious, or on edge”) indicated more frequent anxiety symptoms.

The Chinese version of the GAD-7 has been shown to be reliable and valid in community populations in Hong Kong, with a cut-off point of ≥ 10 indicating at least a moderate level of anxiety (Choi et al., 2020). The Cronbach's alpha for this sample was 0.91.

COVID-19 Specific Worries

Three items were specifically developed to measure participants' worries about the consequences of getting COVID-19 (i.e., “I worry that I would infect with COVID-19 from work,” “I worry that my family members would infect with COVID-19 because of my work,” and “I worry that the protective equipment at my workplace is not sufficient”). On a 5-point scale (1 as *not at all true*, 5 as *always true*), higher item scores represented higher COVID-19-related worries.

Perceived Stigma

Three items were specifically developed to measure participants' perceived stigma of being a healthcare worker during the COVID-19 pandemic (i.e., “Because of my job, I felt being stigmatized by (1) my family/relatives, (2) my neighbors, and (3) friends at social gatherings. On a dichotomous scale (1 as *yes*, 0 as *no*), a higher sum score represented higher perceived stigma of being a healthcare worker. A similar scoring method was also used in another study measuring perceived stigma among healthcare workers in Columbia (Campo-Arias et al., 2021). We conducted a supplementary exploratory factor analysis to examine the dimensionality of the items. One factor was extracted through principal component analysis with orthogonal rotation, explaining 42.1% of variances in perceived stigma. Those results supported that this concept was suitable to be represented in a single dimension for the subsequent regression analysis.

Work Satisfaction

One item was used to measure participants' work satisfaction during the COVID-19 pandemic (“how much do you feel satisfied with my current job?”), on a 5-point scale (1 as *strongly unsatisfied*, 5 as *strongly satisfied*). A higher score indicated a higher level of job satisfaction. Prior research has supported the validity of this single item measure in predicting health outcomes among employees in different countries (Dolbier et al., 2005).

Satisfaction With Workplace Pandemic Control Guidelines

Five items were developed to measure participants' satisfaction with pandemic control guidelines at their workplace. Participants were asked to rate their level of satisfaction toward the different aspects of the workplace pandemic control guidelines (i.e., comprehensiveness, clarity, timeliness, transparency, and efficacy), on a 5-point scale (1 as *strongly unsatisfied*, 5 as *strongly satisfied*). A higher mean score from the item responses represented a higher level of satisfaction of workplace pandemic control guidelines. We also conducted a supplementary exploratory factor analysis to examine the dimensionality of the items. One factor was extracted through principal component analysis with orthogonal rotation, explaining 79.8% of variances in satisfaction with workplace pandemic control guidelines.

Those results supported that this concept was suitable to be represented in a single dimension for the subsequent regression analysis. The Cronbach's alpha of the scale in this sample was 0.94.

Sociodemographic and Job-Context Variables

Socio-demographic variables (e.g., age, years in the profession, marital status, religious affiliation) and job-context variables (e.g., working in a team specifically caring for COVID-19 patients and suspected cases (aka “dirty team”) were measured.

Analytic Plan

Descriptive statistics and Pearson correlations among the major variables were computed. Internal consistencies of the scales were indicated by their corresponding Cronbach's alphas. Hierarchical regressions were conducted to examine the associations between the independent variables and anxiety symptoms. The sequence of entering independent variables followed the suggestions from prior studies on individuals' well-being in response to emerging infectious diseases and other traumatic events (Yeung et al., 2016, 2021). In the first block, background variables showing significant associations with anxiety symptoms in bivariate correlations were entered. In the second and third blocks, COVID-19 worries, and perceived stigma were entered in the model, respectively. In the last block, work-related coping resources (i.e., work satisfaction, satisfaction with workplace pandemic control guidelines) were entered. The analyses were conducted using SPSS 26.0.

Sample Size Planning

Expecting a small-to-medium effect size ($f^2 = 0.05$) in the association between the independent variables and anxiety symptoms in the hierarchical regression analysis, we needed at least 515 participants to achieve a statistical power of 0.95 at $p = 0.05$ (G*Power 3.1.2). With our sample size ($N = 1,510$), we should be able to detect the expected effect size with sufficient statistical power.

RESULTS

Participants' Characteristics

Most of the participants were aged between 30 and 39 (36.8%) and married (50.7%). On average, they have been working in the profession for around 8.9 years ($SD = 8.60$). About one-fifth of the participants were specifically taking care for diagnosed and suspected cases of patients with COVID-19 (“dirty team”) (18.5%) and reporting at least a moderate level of anxiety ($GAD \geq 10$) (17.2%) (Table 1).

Correlations Between Independent Variables and Anxiety Symptoms

The correlation analysis results showed that higher levels of COVID-19-specific worries (infecting with COVID-19, family members infecting with COVID-19 due to the participants' nursing duties, insufficiency of protective equipment at workplace), higher perceived stigma, lower work satisfaction, and lower satisfaction with workplace pandemic control guidelines were correlated with higher anxiety symptoms (rs ranged from

TABLE 1 | Characteristics of the participants ($N = 1,510$).

	Frequency (%) / Mean (SD)
Age group	
18–25	381 (25.2%)
26–35	555 (36.8%)
36–45	354 (23.4%)
46–55	210 (13.9%)
Above 55	10 (0.7%)
Marital status	
Single	692 (45.8%)
Married	765 (50.7%)
Separated/Divorced/Widowed	53 (3.5%)
Having a religious affiliation	552 (36.6%)
Years in the profession	8.91 (8.560)
<1 year	82 (5.4%)
1–3 years	315 (20.9%)
3–5 years	226 (15.0%)
5–10 years	383 (25.3%)
10–20 years	248 (16.4%)
More than 20 years	256 (17.0%)
Working in the team caring for COVID-19 patients and suspected cases (i.e., “dirty team”)	280 (18.5%)
Probable anxiety ($GAD-7 \geq 10$)	256 (17.2%)

0.12 to 0.39, $p < 0.05$) (Table 2). Regarding socio-demographic variables, younger age, fewer years in the profession, not being married, having children (rs ranged from -0.15 to -0.09 , $ps < 0.001$), and working in the “dirty team” were correlated with more anxiety symptoms ($r = 0.12$, $p < 0.001$). Those variables were included as covariates in the subsequent regression analysis. Other socio-demographic variables reported non-significant correlations with anxiety symptoms ($ps > 0.05$, not tabulated).

Hierarchical Regression Analysis

Given that the independent variables were moderately correlated with each other, the independent variables were checked for multicollinearity in the regression analysis. We did not find any variables reporting a variance inflation factor ($VIF \geq 4$), supporting the absence of multicollinearity. In Block 1, the background variables explained 3.3% of variance in anxiety symptoms. Specifically, younger age ($\beta = -0.12$, $p < 0.01$) and working in the “dirty team” ($\beta = 0.10$, $p < 0.01$) were significantly associated with higher anxiety symptoms. In Block 2, higher levels of worries about contracting COVID-19 from work, about family members contracting COVID-19 due to their nursing duties, and about insufficient protective equipment at workplace (β s ranged from 0.13 to 0.25, $ps < 0.001$) were significantly associated with higher anxiety symptoms. In Block 3, higher perceived stigma of being a healthcare worker was associated with higher anxiety symptoms ($\beta = 0.20$, $p < 0.001$), explaining an additional 3.7% of variance. In Block 4, work-related coping resources variables explained an additional 3.8% of the variance in anxiety symptoms. Only work satisfaction was

TABLE 2 | Descriptive statistics and correlations among major variables ($N = 1,510$).

	1	2	3	4	5	6	7	8	9	10	11	12
1. Anxiety symptoms (GAD-7)	–											
2. Age [†]	–0.15***	–										
3. Years in the profession	–0.10***	0.65***	–									
4. Marital status [†]	–0.09***	0.41***	0.37***	–								
5. Having children [†]	–0.09***	0.43***	0.31***	0.66***	–							
6. Dirty team [†]	0.12***	–0.10***	–0.03	–0.10***	–0.11***	–						
7. Worry about infecting with COVID-19	0.45***	–0.29***	–0.23***	–0.11***	–0.11***	0.16***	–					
8. Worry about family members infecting with COVID-19	0.43***	–0.27***	–0.21***	–0.11***	–0.11***	0.14***	0.80***	–				
9. Worry about insufficient protective equipment at workplace	0.35***	–0.26***	–0.18***	–0.13***	–0.14***	0.12***	0.54***	0.52***	–			
10. Perceived stigma	0.32***	–0.10***	–0.09***	–0.07**	–0.10***	0.18***	0.25***	0.23***	0.21***	–		
11. Work satisfaction	–0.39***	0.23***	0.15***	0.15***	0.15***	–0.12***	–0.36***	–0.35***	–0.34***	–0.22***	–	
12. Satisfaction with workplace pandemic control guidelines	–0.32***	0.31***	0.20***	0.18***	0.22***	–0.09***	–0.40***	–0.39***	–0.48***	–0.19***	0.53***	–
Mean	5.79	2.28	8.91	0.51	0.38	0.19	3.15	3.48	3.08	0.40	3.33	3.14
SD	4.65	1.01	8.60	0.50	0.49	0.39	0.89	1.02	1.01	0.64	0.87	0.89

* $p \leq 0.05$, ** $p \leq 0.01$, and *** $p \leq 0.001$. [†]Age: 18–29 (1), 30–39 (2), 40–49 (3), 50–59 (4), 60–69 (5); Marital status: Married (1), Single/separated/widowed (0); Having children: Yes (1), No (0); Dirty team: Yes (1), No (0).

associated with lower anxiety symptoms ($\beta = -0.21$, $p < 0.001$). With all the independent variables, the overall model explained 30.4% of variances in anxiety symptoms (Table 3).

DISCUSSION

This was one of the first studies in examining the psychosocial correlates of anxiety symptoms among nurses in Hong Kong amid the COVID-19 pandemic. We found that 17.2% of nurses in Hong Kong reported moderate-to-severe levels of anxiety symptoms (GAD-7 ≥ 10). Using the same measurement scale, our sample reported a comparable prevalence of probable anxiety (GAD-7 ≥ 10) with healthcare workers in India (Wilson et al., 2020), and China (Liu et al., 2021); but slightly lower than those in Iran (Pouralizadeh et al., 2020), the United Kingdom (Choudhury et al., 2020), and the United States (Kim et al., 2021). Regional differences in the severity of the pandemic and the time of conducting the study might contribute to the discrepancies.

Not surprisingly, we found that different aspects of COVID-19 worries (including worries of contracting COVID-19, family members being infected with COVID-19 from participants' nursing duties, insufficiency of personal protection equipment at workplace) were independently contributing to anxiety symptoms among the nurses in Hong Kong. Similar findings have been reported in healthcare workers in other countries, including China (Zhang et al., 2021), Korea (Han et al., 2021), and the US (Hennein et al., 2021). Providing nurses with safe and secure work environments and sufficient supply of personal protective equipment is required for protection of mental health among nurses coping with the pandemic. Moreover, it will still be important to examine other aspects

of worries and their contributions to those workers' well-being. Research has found that healthcare workers in the US and UK expressed concerns about the access to support for personal and family needs (e.g., childcare, lodging, and transportation) with increasing working hours and demands, about the capability of providing competent medical care if deployed to a new unit, and dealing with emotional reactions of patients (Cipolletti et al., 2020; Shanafelt et al., 2020). Having more comprehensive measurements about COVID-19-related worries will further inform health organizations/institutions about what issues they should address to serve the needs of the healthcare workers.

Even of the level of perceived stigma was not high in the sample (mean = 0.40 out of 3) and healthcare workers are generally highly respected professions in Hong Kong (Schoeb, 2016), perceived stigma was associated with higher anxiety symptoms among those nurses. Given that the study was conducted in relatively early stage of the pandemic (August–September 2020) with higher reliance on social distancing measures and personal hygiene (when there was no vaccination campaign rolling out yet), public fear about contracting COVID-19 from healthcare workers was still prevalent. Such fear might drive stigmatizing behaviors among the public and relatives (e.g., avoidance toward their acquaintances and neighbors who worked as healthcare workers) (Stangl et al., 2019). The finding has been in line with studies on healthcare workers in Bangladesh (Khan et al., 2021), Korea (Han et al., 2021), and the US (Hennein et al., 2021), implying that such phenomenon might be culturally universal. In addition, it is noteworthy that nurses who worked in the “dirty team” were more likely to report a higher level of perceived stigma. Such observations were also consistent with studies in Bangladesh (Khan et al., 2021) and

TABLE 3 | Hierarchical regression analyses explaining anxiety symptoms ($N = 1,510$).

	Anxiety Symptoms (GAD-7)	
	β	ΔR^2
Block 1—Sociodemographic and job-context variables		0.033***
Age [†]	−0.12**	
Years in the profession	−0.01	
Marital status [†]	−0.01	
Having children [†]	−0.02	
Dirty team [†]	0.10***	
Block 2—COVID-19 worries		0.196***
Age [†]	0.00	
Years in the profession	0.03	
Marital status [†]	−0.01	
Having children [†]	−0.03	
Dirty team [†]	0.03	
Worry about infecting with COVID-19	0.25***	
Worry about family members infecting with COVID-19	0.15***	
Worry about insufficient protection equipment	0.13***	
Block 3—Perceived stigma		0.037***
Age [†]	−0.01	
Years in the profession	0.03	
Marital status [†]	−0.01	
Having children [†]	−0.02	
Dirty team [†]	0.01	
Worry about infecting with COVID-19	0.23***	
Worry about family members infecting with COVID-19	0.14***	
Worry about insufficient protection equipment	0.12***	
perceived stigma of being a healthcare worker	0.20***	
Block 4—Work-related resources		0.038***
Age [†]	0.02	
Years in the profession	0.03	
Marital status [†]	−0.00	
Having children [†]	0.01	
Dirty team [†]	0.00	
Worry about infecting with COVID-19	0.20***	
Worry about family members infecting with COVID-19	0.12***	
Worry about insufficient protection equipment	0.07**	
perceived stigma of being a healthcare worker	0.18***	
Work satisfaction	−0.21***	
Satisfaction with workplace pandemic control guidelines	−0.03	
Total R^2		0.304

* $p \leq 0.05$, ** $p \leq 0.01$, and *** $p \leq 0.001$. [†]Age: 18–29 (1), 30–39 (2), 40–49 (3), 50–59 (4), 60–69 (5); Marital status: Married (1), Single/separated/widowed (0); Having children: Yes (1), No (0); Dirty team: Yes (1), No (0).

Egypt (Mostafa et al., 2020) showing that healthcare workers who directly cared for COVID-19 patients reported higher perceived stigma than their counterparts who did not. Given that exposure to stigma or discriminatory behaviors may lead to gradual physical and psychological deterioration among healthcare workers (Ramaci et al., 2020), greater psychosocial support should be provided for healthcare workers, especially those at a higher risk of stigmatization.

Consistent with some prior studies (Hamama-Raz et al., 2021; Hennein et al., 2021; Ogińska-Bulik et al., 2021b), nurses who experienced lower work satisfaction were more likely to report more anxiety symptoms. The benefits of work satisfaction might also be associated with people's coping strategies toward work-related stressors. For example, a study in Poland found that higher work satisfaction was associated with more adaptive coping strategies (e.g., positive reframing, acceptance) among healthcare workers providing care for trauma victims in the hospitals (Ogińska-Bulik et al., 2021a). Those strategies have also been found to be associated with better psychological well-being among healthcare workers in the COVID-19 pandemic situations (Mong and Noguchi, 2021).

Even satisfaction of workplace pandemic control guidelines was bivariate correlated with fewer anxiety symptoms, it did not emerge as a significant contributor after accounting for other variables. It implied that COVID-19 worries, and work satisfaction might be even more important factors associated with anxiety symptoms among the nurses. To better understand how working environment might affect healthcare workers' adjustments to the COVID-19, it will still be important to further examine other aspects of work settings and arrangements and their contributions to those workers' well-being. For example, a previous study showed that satisfaction with the workload and the capability of participating in decision making were associated with fewer anxiety symptoms, whereas satisfaction with monetary compensation was associated with lower perceived stress among public health doctors in Korea (Han et al., 2021). Having more detailed analysis on the roles of specific aspects of work arrangements will benefit health organizations/institutions to adjust their measures to serve the needs of the healthcare workers.

Limitations

This study had several limitations. First, it was a cross-sectional study so that the tested relationships were not causal. Future studies could examine how the changes in the independent variables could predict anxiety symptoms temporally using longitudinal designs. Second, all of the measures were self-reported, which might be subject to recall bias. However, the use of self-reported measures is common among many studies conducted during the COVID-19 pandemic (Salari et al., 2020) due to its convenience, low cost, and ease of administration at pandemic situations. Third, we recruited nurses through nursing associations in Hong Kong, where self-selected bias might be apparent. Comparable to response rates in some prior studies targeting at healthcare workers conducted online during the COVID-19 pandemic (Alenazi et al., 2020; Ammar et al., 2020), our response rate was low at 9.2% (1,510/16,500). Despite the

low response rate, characteristics of this sample were matched to nurse population in Hong Kong according to the latest statistics from Department of Health (Department of Health, 2016). Readers should be noted that the findings might not be fully generalizable to the nurses and healthcare professionals in other countries with different medical systems. Fourth, the model only explained a moderate proportion of variance in anxiety symptoms. Other factors may be at play. For example, personality attributes (e.g., resilience, Type D personality) (Labrague and De Los Santos, 2020; Tuman, 2021), coping strategies (Si et al., 2020; Özçevik Subaşı et al., 2021), and impact of the pandemic on family roles have been found to be important contributors to people's well-being during COVID-19 (Cipolotti et al., 2020; Luceño-Moreno et al., 2020). Considering these variables could allow a more comprehensive capture the contributors to people's mental health outcomes in response to the pandemic. Fifth, this study targeted on an underserved population in the literature. Some scales and items (e.g., COVID-19 distress, work-related stress) were newly developed for the context of COVID-19, which were yet to be fully validated in this population. Specifically-developed items were also commonly used as predictors of mental health outcomes among different Asian populations during the COVID-19 pandemic (Choi et al., 2020; Yeung et al., 2020). Even our self-developed scales reported satisfactory psychometric properties, validating our findings by measuring the same concepts (e.g., Work Satisfaction Scale, perceived stigma for healthcare workers) (Traynor and Wade, 1993; Mostafa et al., 2021) or similar concepts (e.g., COVID-19 organizational support) (Zhang et al., 2020) with other standardized scales is worthwhile.

Implications

This study highlighted that COVID-19 worries, perceived stigma, and work satisfaction might be prominent contributors to anxiety symptoms among those nurses. The World Health Organization recommends that healthcare workers should maintain self-care, be attentive to their own mental health problems, and reflect on how their experiences may influence themselves and their loved ones. Identifying and instituting effective treatment strategies to improve psychological outcomes for nurses is essential. Practically, our findings also implied that alleviating COVID-19 worries, addressing stigma toward healthcare workers, and increasing work satisfaction might be important intervention strategies to reducing anxiety symptoms among the nurses amid the COVID-19 pandemic. Development of digital interventions targeting at healthcare workers' well-being has also been emerging. Recently in the United Kingdom, a free digital education package has been developed to provide valuable information to enhance healthcare workers' skills in coping with

social stigma, self-care, and social support seeking during the pandemic (Blake et al., 2020). On the other hand, experimental studies also indicated that expressive writing interventions could be effective in improving psychological health among Italian healthcare workers during the COVID-19 pandemic (Procaccia et al., 2021). Tailoring an intervention for local healthcare workers based on our findings, it is worth exploring if similar mobile applications providing additional modules to allow individuals to reflect on positive work experience and meaning derived from job duties, plus express negative emotions related to stigmatization experience would facilitate well-being.

CONCLUSION

A moderate proportion of nurses in Hong Kong did report at least moderate levels of anxiety symptoms amid the COVID-19 pandemic. This study highlighted that COVID-19 worries, perceived stigma, and work satisfaction were the important contributors to anxiety symptoms among those nurses. We hope our findings could help tailoring intervention strategies to promote nurses' well-being during pandemic situations.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because their containing information that could compromise the privacy of research participant. The datasets are available from the corresponding author on reasonable request. Requests to access the datasets should be directed to lywong@cuhk.edu.hk.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Joint Chinese University of Hong Kong—New Territories East Cluster Clinical Research Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

NY and EW conceptualized the study and led on the manuscript writing. AC and NY collected and analyzed the data. E-kY and SW provided feedback on drafts of the manuscript. All authors approved the final manuscript draft.

ACKNOWLEDGMENTS

The author thanked the Association of Hong Kong Nursing Staff for supporting the recruitment of participants.

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Narratives of Dreams and Waking Thoughts: Emotional Processing in Relation to the COVID-19 Pandemic

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OPEN ACCESS

Edited by:

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University of Turin, Italy

Reviewed by:

Agata Benfante,
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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 21 July 2021

Accepted: 12 October 2021

Published: 02 November 2021

Citation:

Mariani R, Gennaro A, Monaco S,
Di Trani M and Salvatore S (2021)
Narratives of Dreams and Waking
Thoughts: Emotional Processing
in Relation to the COVID-19
Pandemic.
Front. Psychol. 12:745081.
doi: 10.3389/fpsyg.2021.745081

The Coronavirus-19 (COVID-19) pandemic posed a significant challenge to the physical, mental, and emotional well-being of each individual. It also brought the importance of daily emotional management for survival to the forefront of every human being. Our study aims to explore whether emotional processes perform different functions during waking thoughts and night dreams during the first lockdown in Italy. Utilizing Multiple Code Theory (MCT), our goal is to verify whether waking thoughts facilitate a functional disconnection in order to manage the trauma caused by COVID-19. Two online forms were distributed to random participants in the general population, presenting a total of 49 reports of night dreams (23 males; mean age 33.45 ds. 10.12; word mean 238.54 ds. 146.8) and 48 reports of waking thoughts (25 males; mean age 34.54 ds. 12.8; word mean M. 91 words ds. 23). The Referential Process linguistic measures and Affect Salience Index were utilized. It was found that Affect Salience is present in both dreams and in waking thoughts; however, Referential Activity was higher in dreams and Reflection and Affect words were higher in waking thoughts. Two different processes of emotional elaboration emerged. The results highlight the use of greater symbolization processes during dreams and a higher emotional distance in waking thoughts. These results confirm that during the nocturnal processes, there is greater contact with the processing of trauma, while during the diurnal processes, defensive strategies were activated to cope with and manage life via a moment of the defensive disruption of daily activities.

Keywords: dreams, linguistic features, referential process, COVID-19, affective salience

INTRODUCTION

A Traumatic Global Experience: Dreaming and the Narrative Process During COVID-19

The present research project aims to offer an analysis and understanding of affective processing processes during a very difficult moment of human existence, such as the experience of the COVID-19 pandemic, which involved every single inhabitant of the earth.

The processing of emotional trauma is a theme that has been extensively studied (Murray and Segal, 1994; Rachman, 2001), but to date, new questions have emerged regarding it. Recently, the spread of the CORonaVirus Disease 2019 (COVID-19) created a unique historical context

(Viscuso and Mangiapane, 2020), which we can consider as a real collective event that we assume to be universal. The entire world population felt at risk of extinction (Diamandis, 2021) and each human being has had to emotionally and cognitively adapt to it (Daly and Robinson, 2021). The lockdown rules imposed the safest procedures possible at the time, such as the mandate to wear masks and the “stay at home” imposition. After 1 year, these protocols are the “new normal” (Rab et al., 2020), but this new reality has had a huge impact on social life (Beam and Kim, 2020), work conditions (Bonacini et al., 2021) and the emotions related to these changes (Li et al., 2020). Research immediately showed that the relationship between the COVID-19 pandemic and mental disorders (Castellini et al., 2021; Czeisler et al., 2021; Wang et al., 2021) increased, when compared to pre-pandemic times (Rossi et al., 2020). While many researchers have focused on the impact of COVID-19 on mental health, the intent of this work is to explore, given the same traumatic event, how emotional processing processes perform different functions during dreams and waking thoughts. We utilized the exploratory medium of writing to understand the different emotional processes that occur during the day and during the night. Historically, narratives are the most direct modality used to explore the cognitive and emotive reorganization of individuals (Polkinghorne, 1995). The theoretical models that analyze the narratives (Pennebaker, 2000; Solano, 2013; Bucci, 2021a) highlight how it is possible to understand the emotional organization and the structure of the person’s defenses during a particular moment in life. The autobiographical narrative capacity is closely linked to the use of defenses and the ability to stay in contact with the different emotions that the events of external and internal reality create in each of us (Boag, 2020). For example, studies on the process of psychotherapy have shown how the progressive lowering of the ego’s defenses allowed for a greater awareness of one’s own experiences (Kramer et al., 2020; De Roten et al., 2021). Most researchers used the analysis of narratives to capture the experience and the cognitive and emotional elaboration put in place to face and cope with the pandemic (De Leo and Trabucchi, 2020; Negri et al., 2020; Creese et al., 2021; Herbert et al., 2021). At the same time, many studies have focused on dreams, as carriers of a common experience and the unconscious elaborations which emerged (Iorio et al., 2020; MacKay and DeCicco, 2020; Mota et al., 2020; Pesonen et al., 2020). In our work, we have tried to combine and compare the two types of writing to investigate how mental processes are adaptive to highly stressful events trying to preserve the main tasks of daily life.

Emotional Communication Processing and Affective Salience: Two Prospectives in Exploring the Language of Emotion

One theory of emotional processing that has explored the processes of integration and disconnection of traumatic experience is the Multiple Code Theory (MCT). This model poses that information is processed in parallel (McClelland et al., 1989) among three different systems, which organizes the experience in a global and raw way: (1) the subsymbolic coding system is characterized by experience gradients, and they

manifest as sensations and feelings in all sensory modalities, as well as in physical and motoric experience; (2) the non-verbal symbolic coding system, which is delegated to representations, images, and metaphors; (3) and the symbolic verbal coding system, which concerns words. From the beginning of life, humans think and interact in subsymbolic and symbolic formats (Bucci, 2021b). Bucci (2021b) argues that a Referential Process (RP) connects these three types of processing systems by transforming information from one to another. The RP allows people to express their emotional experiences into words. The theory has also been updated to include new advancements in social neuroscience, such as research on mirror neuron networks, social cognition, and embodied communication (Goleman, 1998; Gallese, 2009; Borghi and Cimatti, 2010). The RP and emotional communication are connected to Damasio’s notion of dispositional representations (Damasio, 2010) that provide a neurobiological basis for the concept of emotional schema. These innate dispositional representations can be associated to the arousal/emotional activation and to a non-conscious state of the self where raw bodily aspects are totalizing. Different theoretical perspectives suggest that affect and emotions could be conceived of in terms of the basic processes laying at the core of the self (see the notions of core-self by Panksepp, 1998, 2005) and the proto-self by Damasio (1999, 2010). These basic processes represent the first, fast, and frugal modes through which the subject appraises the environmental patterns (Gigerenzer and Goldstein, 1996) to trigger and orient cognitive processing (Muramatsu and Hanoch, 2005). For example, Barrett et al. (2007) and Barrett (2017) theory of constructed emotions suggests that affect guides actions and constructs perceptions in the present. Emotions are not distinct entities; rather they result in a continuous process aimed to map out the demands of the environment and the set modes to address its variations (Gross and Barrett, 2011). It has been highlighted (Posner et al., 2005) that distinct neural pathways do not serve distinct emotions, but that two underlying neurophysiological dimensions are used to organize emotions: that of arousal (the extent to which an emotion is associated with an individual sensation of energy) and valence (the extent to which an emotion reflects a negative or positive state of mind; Barrett et al., 2007). In sum, in emotion processing, arousal and valence are classification dimensions which organize the basic process aimed to monitor each individuals’ global relationship to the world that we refer to as emotion (Barrett and Lindquist, 2008).

Emotional arousal could be acknowledged as the extent of activation experienced as a reaction to stimuli (Lang et al., 1999; Deckert et al., 2020). However, arousal represents an autonomous psychological concept associated with emotional states that is indexed by the activation of the sympathetic nervous system, the autonomic nervous system, or the endocrine system (Russell and Barrett, 1999; McGaugh, 2004). Accordingly, in their review, Storbeck and Clore (2008) highlight the role of the production of arousal to intensify perceptions, evaluations, and enhanced long-term memory for events. This concludes that while the valenced affective cues serve as information about value, the arousal dimension provides information about the urgency to intensify processing strategies.

In sum, in analogy to several psychoanalytic streams of thought (Klein, 1937; Bion, 1967; Green, 1977; Matte Blanco, 1981; Bornstein and Masling, 1998; Beebe and Lachmann, 2002), arousal and valence could be understood of in terms of the basic affective representations regulating and organizing mental functioning which, in turn, is organized into emotions in order to map out answers to environmental demands.

Connecting/Disconnecting Emotional Experience to Language

Scherer (2005) posits that the episodes which constitute an emotional schema's combinations, called "profiles of appraisal," are made up of the activation of the schema's affective core in various circumstances. The speakers or writers (in our research-writers) are often not directly aware of the components of the affective core that organize the emotional schema, and it is not often clear how they feel at the moment. Naming emotional labels or trying to explain feelings is often opposing to the processes at play when trying to understand emotional feeling, according to MCT (Bucci, 2021a). The RP involves expressing the parallel flow of multiple experiences in the discrete single channel of the verbal mode. This process is based on three specific major functions of connecting experience to words: Arousal, Symbolizing, and Reflection/Reorganizing. Arousal is concerned with the activation of content that is outside or within the boundaries of awareness. The Symbolizing function follows the arousing material that has been accumulating outside of awareness and takes it in to a more accessible form, linked to linguistic form. A specific experience occurs that symbolizes components of a certain emotional schema that the individual can vocally convey in the form of a story, a memory, or a dream. Then, after the schema has been experienced and portrayed as a narrative or played out in the relationship, fresh reflections on previous experiences might combine during Reflection/Reorganization. All people who tell or write about their own experiences have the power to activate the RP by going through all three processes.

Bucci and Maskit (2007) hypothesize that if the RP is disrupted (e.g., by conflict or trauma), or fails to develop adequately, the verbal and non-verbal systems within the schemas may be disconnected, thereby affecting the organization of the schemas, the regulation of emotional arousal, and the construction of emotional meanings. The idea of disconnection within the emotional schemas can be applied to both somatic and mental pathology (Di Trani et al., 2018; Negri et al., 2019; Mariani et al., 2020; Negri and Ongis, 2021). A specific pattern of disconnection is given by the high use of defenses, such as rationalizations or an abstract language (Renzi et al., 2020; Mariani and Hoffman, 2021; Negri and Ongis, 2021). Other research highlights how high levels of arousal and rationalization can activate a disconnection, which generates a disorganization phase (Bucci and Crisafulli, 2021).

Aim of the Study

Given this collective traumatic event, our research aims to explore whether emotional processing mechanisms perform distinctive tasks when writing reports of waking thoughts vs. writing reports

of night dreams during the first lockdown in Italy. Our goal was to explore whether the reports of waking thoughts showed a functional disconnection to handle the traumatic event caused by the COVID-19 pandemic, as per MCT (Bucci, 2021b). The dream writing process activates an integration of the RP in order to integrate and elaborate the traumatic experience of the pandemic during sleep. During the day, emotional elaboration is functionally deactivated to manage normal adaptive functions. More specifically, we hypothesized that:

- Reports of waking thoughts and night dreams will show the same levels of arousal;
- Reports of night dreams will present an integrated RP, showing higher Referential Activity, which is useful in elaborating the COVID-19 pandemic experience;
- Reports of waking thoughts will show higher cognitive and abstract functions to explain emotional activation;
- The arousal activation will present different relations to the symbolizing process in reports of waking thoughts and night dreams.

MATERIALS AND METHODS

Participants

The sample was recruited from the general Italian population during the first week of the first lockdown. Each person was randomly assigned to one of two groups. Participants completed the informed consent and a sociodemographic questionnaire. One group was asked: "What did you dream about tonight? Write down your dreams freely during the lockdown." A group of 49 individuals (23 males and 27 females) participated in this task. The mean age of participants in this group was 33.45 ($SD = 10.12$). Of these participants, 30% graduated college and 70% had one degree; 14% lived alone, 62% lived with family, and 24% with lived with a cohabitant; 40% described themselves as single and 60% reported to be in a relationship. The other group was asked: "How are you experiencing this period of lockdown? Freely write about your experience." A group of 48 individuals (25 males, 23 females) participated in this task. Group members had a mean age of 34.54 ($SD = 12.8$). Of these participants, 27% graduated and 73% had degree; 19% lived alone, 52% lived with family and 29% lived with a cohabitant; 35% described themselves as single and 65% reported to be in a relationship. The dreams dataset had a mean word count of 238.54 ($SD = 146.8$) and the waking thoughts report word count was smaller ($M = 9$, $SD = 23$).

This study was carried out in accordance with the code of ethics of the World Medical Association (Declaration of Helsinki), and approved by the Ethics Committee of Department of Dynamic, Clinical and Health Psychology of the University "Sapienza."

Measures

Affective Salience Index

This computerized measure assesses for Arousal in written text. The affective salience index (ASI) is based on the view that affect is a global embodied source of meaning (Fornari, 1976;

Salvatore and Freda, 2011; Valsiner, 2021)—namely, that patterns of activation of the whole body provide the subject with the experience of the world as a global entity. A preliminary version of ASI was used in a recent study to analyze the evolution of the meaning behind the characterization of dreams of a patient throughout the course of psychotherapy (Gennaro et al., 2020). In the context of that study, ASI proved successful in estimating the saturation of the affect-laden meanings in the patient's dreams. In this study, ASI followed a meaningful, though non-linear trajectory, which was globally indicative of their progressive increase of the patient's capacity to elaborate unconscious, affectively relevant areas of the mental landscape. Further studies conducted (Gennaro et al., 2020) which compared ASI to an individual's physiological index of propensity to affective arousal (measured by Heart Rate Variability), transcript semantic complexity (measured as Semantic Entropy Index) and lexical syntactic complexity (measured through Flesch Vacca Index), proved ASI to be a reliable text-based index able to detect the affect intensity contribution of affective meanings to the whole semantic content of the text under investigation. Accordingly, we consider ASI as a proxy of affective intensity, not so much as the sum of single emotions, but as the structuring of co-activation of affect, paving the way for the expression of emotions (Berrios, 2019).

ASI is based on an automated procedure of textual implementations by the ACASM procedure (Salvatore et al., 2012, 2017) via T-Lab software. First, a Lexical Correspondence Analysis (LCA), based on the textual context*lexical unit matrix allows to define a factorial space, where each of the factors maps a component of the meaning being activated within the whole textual corpus. Moreover, the LCA output provides the coordinate on the factorial space of each textual unit in which the textual corpus is segmented. The factorial coordinate of the i -th textual unit on the j -th factorial dimension is a measure of the degree of their association—the higher the coordinate, the higher the association is, therefore, the higher the contribution of the j -th factorial dimension is to the meaning of the i -th textual unit.

Factorial coordinates are used to compute the ASI. More specifically, the ASI is calculated for each textual unit, as its Euclidian distance from the origin of factorial space. It is worth highlighting that the Euclidian distance is computed by using the coordinates of the first two factorial dimensions only, as in equation (1). This is so because the ASI assumes that the first two dimensions are the computational equivalents of primary affective dimensions.

$$ASI_t = \sqrt{CF1_{(t)}^2 + CF2_{(t)}^2} \quad (1)$$

ASI_t stands for the Affective Saturation Index of the textual unit t . $CF1_{(t)}$ and $CF2_{(t)}$ stand for the factorial coordinates of the textual unit t , on the first and second factorial dimensions, respectively. From (1), it can be seen that ASI increases when one or both of the factorial coordinates increase. Accordingly, ASI can be interpreted as a measure of the magnitude of the contribution of the two first dimensions of the factorial space to the meaning of the textual unit—the higher the ASI, the greater the contribution. Therefore, ASI can be considered an index of

the degree of saturation of the affective meanings comprising the textual unit.

Italian Weighted Referential Activity Dictionary

The Italian weighted referential activity dictionary (IWRAD) is a computerized measure (Mariani et al., 2013) in the Italian language which is able to detect the Symbolizing Phase. It contains a list of 9,596 frequently used Italian words, each assigned a weight between 0 and 1, with 0.5 as the neutral value. A high score represents a high level of RA, which corresponds to a high level of concreteness, specificity, clarity, and imagery in the speech sample. Part of the value of the IWRAD derives from its power to assess a particular linguistic style (rather than only focusing on content) and to represent the unintended aspects of emotional involvement (Maskit, 2021). Linguistic measures of the Referential Process can be processed by the Discourse Attribute Analysis Program (DAAP; Maskit, 2021). In this study, the Italian version, IDAAP (Italian Discourse Attribute Analysis Program) was utilized.

Italian Weighted Reflection and Reorganization List

The Italian weighted reflection and reorganization list (IWRRL) is a computerized measure of the Reflection/Reorganization process in the Italian language. It contains a list of 1,633 frequently used Italian words, each assigned a weight between 0 and 1, with 0.5 as the neutral value (Negri et al., 2018). A high score on this measure represents high competence in reorganization and reflection in speech, referring to the degree to which the speaker is trying to recognize and understand the emotional significance of an event or set of events in their own or someone else's life, or in a dream or fantasy. It is not about abstract reflection, but rather a person's reasoning related to an experience that has been vividly experienced. Through IWRRL, it is possible to detect and model the reorganizing phase of the referential process. RR measures can be processed by DAAP (Maskit, 2021).

Italian Reflection Dictionary

The Italian reflection dictionary (IREF) is a test analysis list of content words concerning how people think and communicate their thoughts. The dictionary includes basic logic words and words referring to cognitive or logical functions or the failures of these functions. It is a measure of the abstraction-intellectualizing process. IREF measures can be processed by DAAP (Maskit, 2021).

Italian Affect Dictionary

The Italian affect dictionary (IAFF) is a list that contains 1,786 Italian words concerning how people feel and communicate feelings directly. It includes emotion labels, functions associated with affective arousal, and words indicating an emotional response, either positive or negative. Measures can be processed by DAAP (Maskit, 2021).

Data Analysis

According to the hypotheses of the present work, in order to test for the different working processes of dreams and reports

TABLE 1 | Comparison COVID-19 pandemic dreams and waking thoughts writing.

Linguistic measures ^a	Dreams N. Segments 247		Waking thoughts N. Segments 75		T	p	Effect size
	M	SD	M	SD			
IREF	0.03	0.02	0.04	0.03	-3.135	0.002*	-0.41
IWRAD	0.52	0.012	0.49	0.021	9.008	0.000*	1.06
IWRRL	0.54	0.01	0.55	0.023	-2.941	0.004*	-0.38
ASI	0.77	0.87	0.74	1.02	0.208	0.835	0.02

Independent t-test, * $p < 0.01$.

^aIREF, Italian Reflection Dictionary; IWRAD, Italian Weighted Referential Activity Dictionary; IWRRL, Italian Weighted Reflection and Reorganization List; ASI, Affective Saliency Index.

of waking thoughts in the context of traumatic experiences, a *t*-test comparison has been run involving the IDAAP linguistic measures, ASI, and the individuals' elaborative capacity as independent variables. In order to explore the relationship between ASI and other Linguistic measures in the two types of narratives, Pearson's correlation will be applied in reports of night dreams and waking thoughts.

RESULTS

The initial results of the two sample groups for the *t*-tests involving age, gender, education, and marital status did not show any significant differences. Further, the Chi-Square analyses didn't show any significant results either. Therefore, we could consider the two sample groups as similar. The *t*-test comparison displayed insightful results; significant differences have been highlighted for several variables. Following our hypothesis, no differences were detected in the ASI comparison between reports of dreams and reports of waking thoughts, as shown in **Table 1**. We also found a significantly higher level of IWRAD in dreams with a considerable effect size (1.06). Reports of waking thoughts further showed significantly higher levels of IAFF, IREF, and IWRRL.

Additionally, Pearson's correlation also showed some interesting results (see **Table 2**). While it was found that the ASI is negatively correlated to IWRAD and IWRRL in reports of dreams, there was no correlation in reports of waking thoughts.

DISCUSSION

Our work explored the different narrative modalities in relation to the same traumatic event caused by the COVID-19 pandemic through the writing of dreams and waking thoughts. Our hypotheses argued that different emotional processes take place in the writing of dreams and in the writing of waking thoughts, therefore expressing a different form of adaptation to the event manifested in reality. Specifically, we hypothesized that the ASI in the narrated texts would not have been different between the narratives of the day and the narratives of the night. ASI, as a measure of arousal activation should be the same, given that the pandemic was shocking for the entire Italian population. Our results confirm our hypothesis. However, although the level of emotional activation was different, we hypothesized that the

dream narratives allowed for a greater ability to connect the lived experience to language. In fact, according to the MCT (Severino et al., 1989), dreams are one of the greatest processes of emotional and symbolic connection. Indeed, our results confirm that symbolization processes are significantly greater in dream scriptures. These results further confirm psychodynamic theories (Sands, 2010) which state that dream processes enable the ability to symbolize emotional schemas and to represent negative and anguish feelings. Another hypothesis of ours concerned the processes of reflection/reorganization of the emotional experience. We hypothesized that this process was more involved in the diurnal writings, as an attempt to explain the pandemic situation and find rational solutions to the experience. This hypothesis was also confirmed. During the day, the individual needs to adapt more functionally to reality and disconnect the emotional activation that would otherwise dominate the day as well. During the narratives of the waking thoughts, cognitive organization should prevail.

Our last hypothesis argued that different relationships existed between the arousal shown in the ASI measure and the other linguistic measures referred to the RP.

To verify this hypothesis, we analyzed the correlations between the different measures. We hypothesized that the correlations between the levels of arousal by ASI and the other linguistic measures should be different. Generally, a good level of the RP that allows for the connection between emotions and language implies a correlation between the processes of Symbolization and Reflection/Reorganization. In fact, this process emerges only in dreams, while no correlations

TABLE 2 | Pearson's correlation in reports of dreams and waking thoughts.

	ISAFF ^a	IREF	IWRAD	IWRRL
Dreams				
^b ASI (n. 247)	-0.093	0.030	-0.136*	-0.218**
Waking thoughts				
ASI (n.75)	-0.186	-0.084	0.020	-0.095

Pearson's correlation two tails $p < 0.01^*$; $p < 0.001^{**}$.

^aISAFF, Italian Dictionary of, respectively, Sum of Positive, Negative, Neutral Affects; IREF, Italian Reflection Dictionary; IWRAD, Italian Weighted Referential Activity Dictionary; IWRRL, Italian Weighted Reflection and Reorganization List.

^bASI, Affective Saliency Index.

emerge between the measures in waking thoughts, which is also supportive of our hypothesis.

CONCLUSION

In conclusion, these results open up interesting theoretical speculations regarding the function of dreams. Further research should be carried out to confirm these findings in a more generalized way, concluding that dreams allow for a facilitation in the elaboration of traumatic emotional experiences. Our results support the findings of researchers who found that dreams could play a role in the reorganization of experience, particularly, in reference to memories, trauma, and the general ability of problem solving (Fosshage, 2007; Mariani et al., 2021). These results are in line with the studies on the psychotherapeutic process, which highlight how dream processing allows for the processing of traumatic experiences (Gennaro et al., 2020). Much research has been carried out on dreams in relation to the pandemic and the main findings highlight the central role that emotional processing plays in the dream function. Our results, albeit taken with caution due to the large sample size, show that the nocturnal and diurnal affective processes perform complex but diversified functions, useful for human adaptation and the survival of trauma (Borghi et al., 2021; Giovanardi and Spangler, 2021).

LIMITATIONS

Despite the interesting results gained evidencing the different emotional processes that took place in the writing of dreams and in the writing of waking thought, limits need not be underestimated. The sample size is quite narrow and limited to a specific population. Nevertheless, this work could be read as preliminary evidence used to implement further studies,

with similar research designs, to shed light on the specific mechanisms underpinning the workings of dreams. For example, the comparison of the narratives of dreams and waking thoughts in traumatic and non-traumatic contexts could help provide further insight to the mechanisms paving trauma elaboration, which could provide useful implications for clinical practice. A long-term follow-up study could be one relevant direction for future research. Finally, more psychological variables could be researched in further studies in order to explore how they would influence the emotional regulation of individuals.

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 of Department of Dynamic and Clinical Psychology, and Health Studies. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RM contributed to all the phases of the study. AG and SM participated in research design development, in results interpretation, and in writing and editing the manuscript. MD participated in results interpretation and in writing the manuscript. SS supervised and monitored the project. All authors contributed to the article and approved the submitted version.

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Loss of Individual and Social Identity: Consequences of Sexual Harassment of Iranian Nurses in the Workplace

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OPEN ACCESS

Edited by:

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University of Turin, Italy

Reviewed by:

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 05 September 2021

Accepted: 26 October 2021

Published: 16 November 2021

Citation:

Zeighami M,
Mangolian Shahrababaki P, Zakeri MA
and Dehghan M (2021) Loss
of Individual and Social Identity:
Consequences of Sexual Harassment
of Iranian Nurses in the Workplace.
Front. Psychol. 12:770859.
doi: 10.3389/fpsyg.2021.770859

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Background: Sexual harassment in the workplace is a common event with negative consequences for victims. Working conditions become unstable because of sexual harassment, and workplace insecurity causes psychological distress and physical problems, as well as a reduction in the quality of care. Therefore, the current study sought to investigate the effects of sexual harassment in the workplace on Iranian nurses.

Materials and Methods: This qualitative study used conventional content analysis with a descriptive-exploratory approach to investigate the consequences of sexual harassment in Iranian nurses ($n = 22$). The purposeful sampling method was used. Semi-structured and in-depth interviews were used to collect data. Maximum diversity in terms of age, sex, work experience, level of education, marital status, and type of hospital and ward was observed in order to obtain rich information. The Guba and Lincoln criteria were used to improve the study's trustworthiness and rigor, and the Graneheim and Lundman method was used to analyze the content.

Results: Two hundred and twenty-seventh number codes, one main category, four subcategories, and eighteen primary categories were extracted from the data in this study. The main category of "loss of individual and social identity: the consequences of sexual harassment in nurses" is divided into four subcategories: "psychological trauma," "detrimental effects of work," "physical problems," and "disintegration of warm family relationships." Sexual harassment had a greater psychological impact on victims.

Conclusion: Sexual harassment has a number of negative consequences for nurses' personal and professional lives and can impose a significant burden on the healthcare system due to decreased productivity and loss of active labor. Therefore, it requires increased attention and focus.

Keywords: sexual harassment, nurse, consequences, qualitative content analysis, Iran, lived experience

INTRODUCTION

Workplace violence (WPV) is a threat to employees' safety, well-being, and health that is defined as incidents occurring in work-related situations in which employees are abused, threatened, or assaulted (McPhaul and Lipscomb, 2004). Nurses have been the most frequently targeted WPV worldwide, among all healthcare workers (Spector et al., 2014). Numerous studies have revealed that more than half of nurses have been subjected to verbal assault and approximately one-third have been subjected to physical assault (Ridenour et al., 2015). According to Yang et al. (2018), 94.6% of nurses reported a high prevalence of WPV, which can include verbal assault, physical assault, and sexual harassment.

Sexual harassment in nurses is an unacceptable international phenomenon and a serious problem; however, according to the literature, more than half of nurses (58.1%) have been subjected to at least one type of sexual harassment (Maghraby et al., 2020). However, sexual harassment in the clinical setting has been reported by 30–72% of registered nurses (Berry et al., 2012; Spector et al., 2014). As sexual harassment is reported rarely, the rate of sexual harassment in nursing may be much higher (Bondestam and Lundqvist, 2020). Sexual harassment is a form of sex discrimination, which puts either women or men at an unfair disadvantage. Gender-based violence has been used as a conceptual framework for understanding gender harassment, sexual harassment, sexual assault, date rape violence, and other forms of gendered violence (Latcheva, 2017). In other words, sexual harassment is a component of both actual and potential gender-based violence. Sexual coercion, as well as sexual abuse and assault, can all exist in different systems (Bondestam and Lundqvist, 2020). Sexual harassment of nurses is defined as inappropriate and bad words of sexual matters directed at a nurse, which directly or indirectly threaten a person's ability to perform their tasks (Danielsen and DFAAPA, 2018).

Sexual harassment in the workplace is a worldwide problem. According to Kahsay et al. (2020), the frequency of sexual harassment among nurses ranges from 10 to 87.5%, with patients (46%) being the most common source. Tollstern Landin et al. (2020) discovered that in Tanzania, Africa, nearly 10% of nurses and nursing students were sexually harassed, with "sexual jokes and comment" (61.3%) and "unwelcome touching and hugging" (61.3%) being the most common forms of sexual harassment (48.4%). The study also revealed that sexual harassment in the workplace could be extremely dangerous, posing a serious job risk and stigma for nurses (Tollstern Landin et al., 2020). Sexual harassment is defined as a workplace problem that causes shame or humiliation, impairs the nurse's ability to do the right thing, lowers the quality of work life, and endangers the well-being of victims. Furthermore, sexual harassment in the hospital setting can result in a reduction or loss of proper nursing care, affecting patient care (Nielsen et al., 2017; Kim et al., 2018). According to Ali and Ezz El Rigal (2019), sexual harassment in nursing students is prevalent in the clinical setting, affecting them physically, mentally, and in all aspects of their lives, and can lead to nurse's burnout and poor practice. According to Kim et al. (2018) sexually harassed nurses experienced severe negative emotions.

Sexual harassment has the potential to disrupt work and create an intimidating, hostile, or offensive environment. This can refer to a single incident or a series of incidents that were either intentional, unintentional, or coercive (Bondestam and Lundqvist, 2020).

Nielsen et al. (2017) demonstrated that sexual harassment is a multifaceted and complex phenomenon. Sexual harassment frequently causes a wide range of problems in the workplace. Workplaces rarely have guidelines or policies in place to manage and/or prevent sexual harassment or inappropriate sexual behavior, and this is frequently addressed on a temporary and sporadic basis (Nielsen et al., 2017). Many sexually harassed women, on the other hand, do not talk to anyone about their experiences and only a few report the most serious incidents to their workplace hierarchy or an official (Latcheva, 2017).

The reasons for sexual harassment of nurses are still unknown. Poor working conditions, hierarchical organizations, the normalization of gender-based violence, cultural context, and a lack of active leadership have all contributed to sexual harassment (Bondestam and Lundqvist, 2020). Therefore, as a serious occupational risk, sexual harassment can cause psychological complications for nurses and reduce psychological complications for nurses and reduce patient care (Nielsen et al., 2017; Kim et al., 2018). As a result, more understanding of the consequences of sexual harassment in nurses is required in order to support and assist sexually harassed victims (Tollstern Landin et al., 2020). As an obvious part of the problems of organizational-professional culture, it is necessary to take basic measures to manage inappropriate sexual behaviors and to prevent sexual harassment among nurses (Nielsen et al., 2017). As a result, understanding nurses' experiences in such situations is critical. Identifying the effects of sexual harassment in the workplace on nurses can aid in the development of necessary interventions to reduce it (Najafi et al., 2018).

Since quantitative research methods cannot fully address such issues, qualitative research is frequently used to investigate phenomena in depth. As a result, it is necessary to investigate nurses' experiences by analyzing their statements and feelings using a qualitative approach because the conditions of nurses in different countries differ in terms of sexual harassment experience. Therefore, the current study sought to investigate the effects of sexual harassment in the workplace on Iranian nurses. Nurse managers can use the findings of this study to identify complications and reduce sexual harassment in nurses.

MATERIALS AND METHODS

Study Design and Setting

The current research is part of a larger project to develop and test the psychometric properties of a sexual harassment scale in Iranian nurses. This qualitative study used conventional content analysis in conjunction with a descriptive-exploratory approach. The term "content analysis" refers to a qualitative technique for analyzing written, verbal, or visual communication messages with the intent of describing phenomena. The purpose of this study was to examine both hidden and manifest content. This study was conducted in Kerman, the largest city in southeastern Iran.

Sampling, Participant, and Data Collection

In the current study, sampling was continued until data saturation was reached, and information saturation was reached after interviews with 22 participants. Participants were chosen using purposeful sampling. Nurses working in various wards of hospitals affiliated with Kerman University of Medical Sciences (KUMS) and several private hospitals were interviewed. In addition, three of the participants were key informants. The interviews were held at pre-arranged times with the participants. To obtain rich and varied information, nurses with diverse and rich experiences were interviewed. Furthermore, various personal and occupational characteristics such as gender, age, marital status, level of education, work experience, position, type of hospital (public, private, educational) and wards in which they had work experience were chosen to provide a diverse range of information. There were 18 female and 4 male nurses (Table 1). The nurses' ages ranged from 25 to 51 years, and their work experience ranged from 2 to 28 years. Some inclusion criteria were used to select participants. In this study, nurses with bachelor's and advanced degrees and clinical experience were interviewed. The first researcher conducted individual semi-structured and face-to-face interviews. Table 2 shows some of the questions that demonstrate the consequences of sexual harassment. The interviews lasted 30–100 min, were audio recorded, and were handwritten verbatim. Samples were collected from September 2020 to April 2021.

Ethical Consideration

The KUMS Ethics Committee approved all of the processes and procedures used in the study (Ethics Code: IR.KMU.REC.1399.353). First, the objectives of the study, the method of data collection and recording, the roles of the researcher and the participants, and the observance of privacy and confidentiality of the data were explained orally to the participants, who were assured that they could withdraw from the study at any time. The researcher obtained written consent from the participants before inviting them to participate in the study.

Data Analysis

The following concepts are considered important when performing conventional qualitative content analysis: unit of analysis, meaning unit, condensation, code, category, and theme. The unit of analysis is the foundation of qualitative content analysis (Graneheim and Lundman, 2004). Each interview was treated as a separate unit of analysis in this study. The text was then divided into meaning units. Table 3 provides an example. The meaning units were condensed while keeping the theme in mind. The condensed meaning units were then labeled, and subcategories were created. The next step was to develop the categories that were characteristic of qualitative content analysis. The main category of "loss of individual and social identity: the consequences of sexual harassment in nurses" was obtained in the current study (Table 4). The analysis lasted from September 2020 to July 2021.

TABLE 1 | Characteristics of participants ($N = 22$).

Participants characteristics		Number
Sex	Female	18
	Male	4
Marital status	Single	7
	Married	12
	Divorced	3
Education level	Bachelor's degree	15
	Master's degree	6
	Ph.D.	1
Type of employment	Contract recruiters-1 ^a	4
	Contract recruiters-2 ^b	5
	Hired	13
Position	Nurse	14
	Head nurse	2
	Supervisor	3
	Faculty member	3
Hospital type*	Educational-governmental	20
	Non-educational-governmental	1
	Private	9
Type of ward*	Emergency	11
	Medical	8
	ICU	7
	Operation room	6
	CCU	5
	General surgery	4
	Nursing management office	3
	Orthopedics	3
	Psychiatry	3
	Pediatrics	2
	Gastroenterology	2
	Burn	1
	Dialysis	1

^aIt is obligatory to work for government for 2 years at a lower rate of pay.

^bAnnually contracted with payment less than hired nurses.

*Some participants had work experiences in different wards and hospitals.

TABLE 2 | Example of questions.

Questions

1. Could you please tell me about your experience regarding sexual harassment in the workplace?
2. How did you feel and react when you were sexually harassed in the workplace?
3. What effect has sexual harassment in the workplace had on your physical and mental health?
4. How has sexual harassment in the workplace affected your career and work?
5. How has workplace sexual harassment affected your personal and family life?

Trustworthiness

To describe trustworthiness, qualitative research typically employs four criteria: credibility, conformability, dependability, and transferability (Kyngas et al., 2020). In the current study, several methods were used to increase trustworthiness.

In the current study, the researcher attempted to create a good relationship with the participants by staying in the

TABLE 3 | Example of qualitative content analysis process.

Main category	Categories	Subcategories	Code	Condensation	Meaning unit
Loss of individual and social identity: consequences of sexual harassment of Iranian nurses in the workplace	Psychological trauma	Mental disorder	Nurse's with depression due to sexual harassment	Physician abuse of room emptiness and nurse sexual harassment and nurse with depressive disorder	When the examination of the patients was finished, I wanted to leave, but the resident told me to stay, and he immediately closed the door and hugged me, kissing and touching my body. I was terrified, and my entire body shook. Following this incident, I became isolated and quiet. I cried all the time until I went to see a psychiatrist, who prescribed me antidepressants. I could not get this problem out of my head.
	Detrimental effects of work	Decreased quality care	Nurse's medical error due to loss of concentration caused by sexual harassment	Touching and sexual harassment of a nurse by a resident in an empty ward, loss of concentration of the nurse and giving the wrong medication to the patient	I was working the nightshift. I was preparing the patient's medicine in the workroom when the resident came in, closed the door, and before I could react, he hugged and touched me tightly from behind. I felt terrible, lost my concentration, and gave the wrong medicine to the patient.
	Physical problems	Illness	Headache and muscle pains following sexual harassment in workplace	Severe pain in neck, shoulder and back muscles of nurse due to excessive contraction following sexual jokes of colleagues	I had been getting many headaches; my neck, shoulders, and back were painful. After reviewing all of the images and tests, the doctor concluded that I had no problem; I simply contracted my muscles excessively. He asked me the reason. Then I discovered that this happened during genital surgeries because men used to make many sexual jokes during the operation, and I became irritated and subconsciously contracted my muscles.
	Disintegration of warm family relationships	Cold emotional relationships	Cold relationships due to being informed about sexual harassment in workplace	Cold relations because the spouse was informed about sexual harassment in the workplace; he became nervous and blamed his wife	He was a coworker who was constantly texting and calling. I told my husband the story so that he would not be suspicious and I could solve my problem with his assistance. He became very nervous when he heard this and blamed me. Instead of offering comfort, he scolded and has remained cold with me ever since.

TABLE 4 | Primary categories, subcategories, and main category extracted from qualitative content analysis.

Main category	Categories	Subcategories
Loss of individual and social identity: consequences of sexual harassment of Iranian nurses in the workplace	Psychological trauma	Resentment and irritation Stress and anxiety Mental rumination Anger Feelings of guilt and shame Feeling of hatred Feeling of fear and insecurity Feeling of emptiness and worthlessness Mental disorders
	Detrimental effects of work	Decreased quality of care Feelings of isolation from the outside world Shifts in attitudes toward nursing Job loss
	Physical problems	Changes in appetite Sleep disorders Illness
	Disintegration of warm family relationships	Being reprimanded by the husband Cold emotional relationships

field for a long time (1 year) to collect and analyze data. In order to collect a more in-depth data, the researcher tried to select participants with different characteristics (maximum variation). We also referred to the participants again and made revisions after assessing each interview, if necessary, to clarify ambiguities and corroborate the extracted thoughts (member check). In addition, we engaged two experienced researchers to analyze and interpret data, and all extracted codes and categories were reviewed and accepted by the authors to boost credibility. During the research procedure, the research team designed and produced a mind map in order to improve data confirmability. The transcripts of several interviews, as well as the codes and extracted categories, were given to the two members of research team (expert in conducting qualitative research), who were asked to double-check the data coding process' accuracy. The external observer approach was used in this study to analyze his possible comparable understanding with the researcher and seek for contradictory examples in order to achieve the dependability. As a result, the data were handed to two researchers (expert in conducting qualitative research), and the data's dependability was confirmed based on the same understanding. To increase the data's transferability and appropriateness, the research findings were supplied to two of the same samples as the current study's samples who were not participants, and their opinions were asked, and a conceptual generalization was made based on the similarities. We also tried to describe all the steps of the research in detail.

Findings

The concept of "loss of individual and social identity: the consequences of sexual harassment in nurses" was presented at the end of the content analysis process. There are 18 primary categories and a main category. After continuous comparative analysis, code condensation, 227 codes remained (Table 4).

Main Category: Loss of Individual and Social Identity: Consequences of Sexual Harassment in Nurses

According to the participants' experiences, the consequences of nurse's sexual harassment in the workplace include four subcategories: "psychological trauma," "detrimental effects of work," "physical problems," and "disintegration of warm family relationships."

Psychological Trauma

The male and female participants' experiences revealed that sexual harassment had destructive effects on the soul and psyche. There was resentment and irritation, stress and anxiety, mental rumination, anger, along with feelings of guilt, shame, hatred, emptiness and worthlessness, fear and insecurity as well as mental disorders among the study's participants.

A- Resentment and irritation: Some male and female participants reported having a bad feeling, crying, and severe discomfort because of sexual harassment.

"It was impossible for me to believe. It made me feel awful. I was outraged that he allowed himself to have this sexual look at someone who was the same age as his own granddaughter." (Participant No. 8, a woman with four years of clinical work experience)

B- Stress and anxiety: According to the majority of male and female participants, sexual harassment such as touching, hugging, and frequent phone calls disrupted the nurses' practices, especially during night shifts, and caused severe anxiety about attending night work and certain places such as elevators.

"The patient's companion hugged and kissed me from behind while I was working. I felt awful for a while and was very worried. I was nervous and irritated, and I was under a lot of stress at night work." (Participant No. 13, a woman with 8 years of clinical work experience)

C- Mental rumination: Some male and female participants reported disturbing thoughts due to constant recall of annoying scenes, mental preoccupation due to constant harassment, and mental conflict due to annoying words.

"After the sexual harassment I experienced at work, I cannot stop thinking about it, and I worry constantly that my husband will discover what happened and refuse to let me go back to work." (Participant No. 7, a woman with 17 years of clinical work experience)

D- Anger: Some male and female participants reported feelings of rage and anger after being touched, pushed, shown unwanted love affair, asked for an illicit relationship, or subjected to obscene language.

"Despite knowing that I am married, my co-worker sent me a love letter and asked for a relationship. I was furious. Every muscle in my body trembled with fury and rage. What did he take me for?" (Participant No. 1, a woman with 2 years of work experience)

D- Feelings of shame and guilt: Participants reported feeling of shame and embarrassment regarding colleagues knowing about harassment, being touched by a coworker, and hearing the patient use obscene language in front of others. They also felt guilty due to not reporting sexual harassment.

"The patient's companion began cursing me, extremely vulgar and obscene insults that were humiliating in front of the others. I was drenched in sweat because of my embarrassment. For a long time, I felt guilty and blamed myself." (Participant No. 21, a man with 7 years of clinical work experience)

E- Feelings of hatred: Some participants reported feelings of disgust and hatred of the workplace, especially mixed work environments, hatred of marrying a doctor, hatred of male patients, and hatred of oneself.

"Because of the harassment I witnessed from my male coworkers, I have become pessimistic about all the men who work in the hospital, and I forbade my daughter from marrying a doctor." (Participant No. 14, a woman with 28 years of clinical and educational experience)

F- Feelings of emptiness and worthlessness: Participants in the study reported low self-esteem and feelings of worthlessness.

"She kept texting me and asking for a relationship and it irritated me that he only saw me as someone to satisfy his sexual desires. I felt insignificant." (Participant No. 6, a woman with 2 years of clinical work experience)

G- Feelings of fear and insecurity: Some participants reported extreme fear of being at work, fear of being alone with a male colleague after harassment, fear of coworkers realizing sexual harassment and defamation, fear of the spouse being informed and preventing her from working, and workplace insecurity.

"I was summoned to the doctor's room. When I walked in, he closed the door and, as he guided me to a seat, he wrapped his hand around my waist and began massaging my side. I was so terrified that my entire body was shaking. This is a fear I have had for a long time." (Participant 9, a woman with 4 years of clinical work experience)

H- Mental disorder: Some participants reported mental disorders such as obsessive-compulsive disorder, posttraumatic stress disorder, depression, and hospitalization in a psychiatric hospital.

"I felt terrible after the sexual harassment I endured. I felt helpless, tired, and depleted of energy, and I was diagnosed with depression and prescribed medication." (Participant No. 10, a woman with 10 years of clinical experience)

Detrimental Effects of Work

Sexual harassment has been shown to have negative effects on a person's job and career, according to participant feedback. Participants in the study reported decreased quality of care, feelings of isolation from the outside world, shifts in attitudes toward nursing, and job loss.

A- Decreased quality of care: Some male and female participants reported reduced concentration, forgetfulness of some care tasks, medical errors, decreased effective communication and interaction with patients, deliberate failure to do some care tasks due to fear of being at the patient's bedside, and refusal to go to the ward round.

"The harassment I witnessed had a significant impact on my interaction with the patient. I tried to be nice to patients and talk to them whenever possible, but I lost my trust in both the patient and his companion. I was not interested to talk to the patient, so my interaction with him was limited." (Participant No. 12, a woman with 4 years of clinical experience)

B- Feeling of isolation from the outside world: Some study participants reported that this type of consequence included ignoring the nurse's words and requests, giving her too many night and hard work shifts due to dissatisfaction with an illegitimate relationship, reporting sexual harassment to superiors, and changing her workplace against her will.

"I reported the surgeon's abusive behavior to the head nurse, thinking the problem would be resolved, but the next day the head nurse called and said I have been transferred to the emergency department. I enjoyed working in the operating room because I had a lot of experiences in this field." (Participant 19, a woman with 25 years of work experience)

C- Shifts in attitudes toward the nursing profession: Some male and female participants stated that this consequence during their studentship changed their attitudes and wanted to leave nursing profession. Some participants also stated that sexual harassment changed their views on nursing negatively.

"I have a bad feeling about this profession because I have had some very unpleasant sexual experiences. Even after all these years, this vision has become ingrained in me, and I do not advise anyone to pursue a career in this field." (Participant No. 2, a woman with 26 years of clinical work experience)

D- Job loss: Some male and female participants reported that this consequence resulted in absenteeism, quitting and resignation.

"When I was in my first year of work and experienced sexual harassment, I did not go to work for about 2 weeks, was absent,

and wanted to resign.” (Participant No. 15, a woman with 23 years of work experience)

Physical Problems

The female participants' experiences revealed that sexual harassment caused physical problems in the form of involvement and disease in various body systems. The study's participants got sick, lost appetite, and slept poorly.

A- Changes in appetite: Some study participants reported changes in appetite, anorexia and anorexia nervosa, as well as bulimia, which led to severe overweight.

“I became anorexic as a result of the unsolicited messages my male colleague sent me, which took over my life.” (Participant No. 2, a woman with 26 years of clinical work experience)

B- Sleep disorders: The experiences of some participants showed that this consequence was in the form of sleep disorders at night, lack of sleep and nightmares.

“I had nightmares for a long time. I did not sleep at night; I did remember that face and that movement.” (Participant 18, a woman with 15 years of clinical work experience)

C- Illness: Participants reported physical problems like hand and body tremors, increased heart rate, paleness, headaches, muscle spasms and aches, back and shoulder pain, gastro intestinal ulcers, irritable bowel syndrome, hemorrhoids, and sleeping pill addiction.

“I developed physical problems and irritable bowel syndrome after being sexually harassed at work. Migraine headaches became extremely severe, and I had a headache for several days.” (Participant No. 12, a woman with 4 years of clinical work experience)

Disintegration of Warm Family Relationships

The female participants' experiences revealed that one of the consequences of sexual harassment was the breakdown of family life. The study's participants reported cold family relations and reprimands from their husbands.

A- Being reprimanded by the husband: According to the experiences of some study participants, this type of consequence took the form of being scolded, prejudiced, and restrained by the spouse.

“When I told my husband about the sexual harassment, I expected consolation, but it was the opposite. He treated me coldly, he is angry at me, he blames me, he constantly interrogates me, and I have to tell him where I am going, what I am doing, and who I spoke with on the phone.” (Participant No. 7, a woman with 17 years of work experience)

B- Cold emotional relationships: Some study participants reported negative effects on married life, comparison of their spouse's behaviors with deceptive love expressions, and the cancelation of marriage.

“I am cold with my husband. I am comparing my husband with that man. My husband does not say such words to me, and he does not say I love you once a day, but this man is always caring about me.” (Participant No. 1, a woman with 2 years of experience)

DISCUSSION

This qualitative study aimed to understand how Iranian nurses deal with sexual harassment. This study highlights the need for a better understanding of sexual harassment in the nursing profession. The current study revealed that nurses faced many negative feelings and consequences of sexual harassment at workplace. Despite some studies in Iran on WPV among nurses, this is the first qualitative study on the negative consequences of sexual harassment among Iranian nurses. The analysis of nurse' experiences revealed four main themes: psychological trauma, detrimental effects of work, physical problems, and disintegration of warm family relationships.

Psychological Trauma

This refers to the psychological problems nurses face because of the negative consequences of sexual harassment in the workplace. Several studies, including this one, have found that sexual harassment can have negative psychological effects such as mental health disorders (Nielsen et al., 2010; Ali and Ezz El Rigal, 2019), sadness, shame, and anger (Tollstern Landin et al., 2020). Psychological imbalances can cause severe negative emotions and fear in nurses (Nielsen et al., 2017; Kim et al., 2018). Nielsen et al. (2010) discovered a correlation between sexual harassment and mental health in nurses (Nielsen et al., 2010). According to Ali and Ezz El Rigal (2019), sexual harassment of nursing students had an impact on their physical and mental health, and more than half of nurses complained of mental disorders, with a significant percentage of them complaining of insomnia. According to Tollstern Landin et al. (2020), victims of sexual harassment were upset when they returned to work and felt ashamed, angry, and depressed, which could have a negative psychological impact on nurses. According to Kim et al. (2018) sexually harassed nurses were unable to maintain a psychological balance, experienced severe negative emotions, and feared the consequences and long-term effects of sexual harassment. Nielsen et al. (2017) discovered that sexual harassment caused fear, feelings of insecurity and disability in nurses and healthcare workers. These findings show that sexual harassment of nurses, regardless of the type of society or culture, has had devastating psychological effects on nurses, and that basic measures must be taken to reduce and eliminate this problem. To reduce and treat the consequences of sexual harassment, it is recommended that nurses' psychological problems be monitored and that initial interventions such as professional psychological counseling be implemented.

Detrimental Effects of Work

Sexual harassment in the workplace has a negative impact on one's job. According to the current study's findings, sexual harassment is associated with factors that contribute to burnout, such as loss of occupational motivation (Tollstern Landin et al., 2020), job dissatisfaction (Nielsen et al., 2010; Ali and Ezz El Rigal, 2019; Maghraby et al., 2020), loss of job and negative job effects (Gabay and Shafraan Tikva, 2020; Maghraby et al., 2020), problems with routine work processes

(Nielsen et al., 2017), and negative effects on patient care (Kim et al., 2018; Gabay and Shafran Tikva, 2020). Tollstern Landin et al. (2020) demonstrated that sexual harassment could be a serious job risk and stigma for nurses in Tanzania, Africa, and an important factor in losing occupational motivation (Tollstern Landin et al., 2020). Similarly, Ali and Ezz El Rigal (2019) discovered that sexual harassment had an impact on nursing students' job satisfaction (Ali and Ezz El Rigal, 2019). According to Maghraby et al. (2020), sexual harassment was associated with lower job satisfaction, which was the main complaint reported by more than half of the sexually harassed nurses (64.2%). Sexual harassment may also lead to nurses' intention to leave their jobs, negatively affecting the nurses' workforce (Maghraby et al., 2020). Nielsen et al. (2010) discovered a correlation between sexual harassment and job satisfaction (Nielsen et al., 2010). According to Hutagalung and Ishak (2012), sexual harassment reduces job satisfaction and increases job stress, and sexual harassment can be a predictor of job satisfaction and job stress. According to Nielsen et al. (2017), sexual harassment frequently leads to work-related problems such as long-term leave and resignation in nurses and healthcare workers. According to Gabay and Shafran Tikva (2020), sexual harassment can reduce nursing care and cause nurses to quit the profession. Kim et al. (2018) also demonstrated that one of the issues reported by sexually harassed nurses was its impact on patient care. These findings indicate that the negative occupational effects of sexual harassment cause a wide range of problems for nurses. It is critical to focus on solutions to reduce the negative effects of sexual harassment in the workplace. The most important point, however, is to take steps to prevent sexual harassment of nurses, which should be considered by nurse managers at the community level.

Physical Problems

Nurses have reported physical problems as a negative consequence of sexual harassment in the workplace. However, the current study's findings indicate that some nurses were so affected by sexual harassment that they developed physical illnesses in addition to mental health problems. According to Ali and Ezz El Rigal (2019), sexual harassment of nursing students had an effect on their physical condition, with a significant percentage of them complaining of insomnia. According to Gabay and Shafran Tikva (2020), sexual harassment leaves people feeling unprotected, lonely, and alienated. Maghraby et al. (2020) discovered that sexual harassment caused physical complications in sexually harassed nurses such as headaches and fatigue.

The prevalence of violence and physical problems varies by region to region in the world. According to Spector et al. (2014), the Anglo region is particularly prone to any type of violence, with physical violence being the most common in psychiatric units and emergency departments. However, some of these differences could be attributed to nurses being more open about sexual harassment in this region. However, the type of violence varies depending on the situation and the source of the violence (Spector et al., 2014). It is obvious

that nurses are at risk of violence and physical problems. More research is needed to find effective solutions to reduce physical problems of nurses. Nurse managers should prioritize the use of rules and effective treatment protocols, as well as comprehensive support, in order to prevent and reduce physical problems of nurses.

Disintegration of Warm Family Relationships

Nurses participating in the current study reported the breakdown of warm family relationships as a result of workplace sexual harassment. According to Ali and Ezz El Rigal (2019), sexual harassment of nursing students affected their family relationships. Maghraby et al. (2020) demonstrated that sexual harassment had an impact on the personal lives of sexually harassed nurses. According to a review of the literature, studies have focused less on the effects of sexual harassment on nurses' family relationships. One of the main reasons participants refused to disclose sexual harassment could be disintegration of family ties. Another reason is that similar studies are paying more attention to the prevalence of sexual harassment. The current study, on the other hand, focused on the negative consequences of sexual harassment. Another reason could be the different cultural contexts of different societies, as well as individuals' sensitivity to reporting the negative consequences of sexual harassment. Some nursing students believed that the definition of sexual harassment was ambiguous, and they accepted sexual harassment as an unavoidable part of their job (Birks et al., 2018). Sixty percent of nurses have also acted irresponsibly to reports of sexual harassment (Ali and Ezz El Rigal, 2019).

Nurses require a variety of strategies to deal with the negative consequences of sexual harassment in the workplace, including increased knowledge and awareness (Tollstern Landin et al., 2020), the need to diagnose and differentiate sexual harassment (Nielsen et al., 2017; Kim et al., 2018), early preparation (Davis and Richardson, 2017), an emphasis on self-care (Kim et al., 2018), an emphasis on correct reporting (Birks et al., 2018), the prevention and management of inappropriate sexual behaviors (Nielsen et al., 2017), and the need for security systems and adoption of policies (Ali and Ezz El Rigal, 2019), effective coping and strategies in nursing (Kim et al., 2018), and support of sexually harassed victims (Tollstern Landin et al., 2020). Nurses require more knowledge of sexual harassment, and hospitals and medical schools should focus on their ability to increase nurses' sexual harassment knowledge and awareness (Tollstern Landin et al., 2020). Assisting nursing students in effectively diagnosing and dealing with sexual harassment is a critical component of ensuring learning quality care during clinical practice, which can increase nurses' sensitivity (Ali and Ezz El Rigal, 2019) and prevent some future clinical problems. This necessitates a quick and decisive reporting system (Kim et al., 2018).

The current study's findings indicate that a training program for sexual harassment prevention in nursing, as well as

a systematic reporting system, are required (Birks et al., 2018). To reduce this problem, we must establish WPV management teams as well as appropriate rules and regulations that can improve workplace safety and patient care quality. There are effective strategies to deal with nurse harassment, such as documenting each incident and initiating legal proceedings, condemning sexual abuse, demanding the severe punishment for perpetrators, and improving the image of nurses in the media. Health care facilities should adopt policies and strategies aimed at reducing harassment and creating a safe working environment for nurses (Ali and Ezz El Rigal, 2019). In addition to prevention measures, hospitals and medical schools should do everything possible to support and assist sexually harassed victims (Tollstern Landin et al., 2020).

A comparison of the current study's findings with similar studies from other countries demonstrates the severity of sexual harassment of nurses. Different social, cultural, and moral contexts, differences in hospital policies and management, work environment and conditions, and differences in nurses' knowledge about sexual harassment can all have an impact on the severity of the consequences of sexual harassment among nurses. However, nurse managers must take immediate and comprehensive action to address these consequences. We hope to learn about nurses' experiences with sexual harassment and the negative consequences as a result of this study. Furthermore, it is hoped that a safe environment free of sexual harassment will be created for nurses.

LIMITATIONS

Although the interview was conducted individually and the nurses were assured that the information and findings of the interview were confidential, the participants may not have disclosed all information in this regard due to the cultural sensitivity of sexual harassment in Iran. Given that the majority of the participants in this study were female, generalizing the findings to both sexes should be done with caution. In present study setting, the majority of nurses were female, with a minor number of male nurses. Therefore, totally the number of male nurse were less than the females. Although, the researchers attempted to interview as many male participants who had experienced sexual harassment as possible, we could not find more male nurses with experience of sexual harassment that want to participate in the study. May be the female gender of the interviewer or who identified them to us has influenced on their willingness. The current study's findings were obtained from southeastern part of Iran. Due to the various cultural and ethnic differences in Iran, these differences should be taken into account in future studies. As many studies around the world have been used in this regard, current findings can extend beyond the cultural context of Iran. More research, however, is

required to understand the negative consequences of sexual harassment in nurses.

CONCLUSION

The study's findings provide important and practical insights into nurses' perceptions of sexual harassment in the workplace. According to the findings of this study, nurses face a wide range of problems in their personal and social lives as a result of the numerous and destructive negative effects and consequences of sexual harassment in the workplace. Nurses in the current study faced numerous challenges, including psychological trauma, detrimental effects of work, physical problems, and the disintegration of warm family relationships. To overcome these obstacles, they require effective strategies, comprehensive support, effective enforcement of laws and policies, and organizational measures to prevent and reduce sexual harassment, which nurse managers at the community level must consider. Nurse managers should be aware of a negative impact of sexual harassment on nurses. As a result, the need to prevent and reduce sexual harassment among nurses should be prioritized. These efforts aim to reduce the negative effects of sexual harassment on nurses while also improving health-care quality. However, more research is needed to understand the negative consequences of sexual harassment in nurses in various social, cultural, and moral contexts.

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 Kerman University of Medical Sciences. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MZ, PMS, and MD designed the study and collected the data. MZ, PMS, MAZ, and MD contributed to the study design, they provided critical feedback on the study and qualitative analysis, and inputted to the draft of this manuscript. MZ and MAZ wrote the manuscript. All authors have read and approved the final manuscript.

ACKNOWLEDGMENTS

We would like to thank the nurses who participated in the study.

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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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Burnout, Anxiety, Stress, and Depression Among Iranian Nurses: Before and During the First Wave of the COVID-19 Pandemic

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 05 October 2021

Accepted: 01 November 2021

Published: 25 November 2021

Citation:

Zakeri MA, Rahiminezhad E,
Salehi F, Ganjeh H and Dehghan M
(2021) Burnout, Anxiety, Stress, and
Depression Among Iranian Nurses:
Before and During the First Wave
of the COVID-19 Pandemic.
Front. Psychol. 12:789737.
doi: 10.3389/fpsyg.2021.789737

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Background: Nurses are the major healthcare workforce in an epidemic and have the most contact with patients. Frontline nurses face many health challenges during the COVID-19 epidemic, are directly at risk when treating and caring for COVID-19 patients, and thus experience severe stress and problems in the workplace leading to physical, mental, and social disorders, as well as burnout, anxiety, stress, and depression. The purpose of this study was to compare burnout, anxiety, stress, and depression in nurses before and during the first wave of the COVID-19 pandemic.

Methods: This was a cross sectional study. We assessed 266 frontline nurses before and 242 frontline nurses during the first wave of the COVID-19 pandemic with one year apart in 2019 and 2020 (two-stage sampling). The data were collected using demographic questionnaire, Maslach Burnout Questionnaire and Depression, Anxiety and Stress Scale (DASS-21) in public hospitals in Southern Iran.

Results: There were no significant differences between groups in subscales of burnout ($p > 0.05$). Anxiety, stress and depression scores significantly increased during the first wave of the COVID-19 pandemic compared with before the COVID-19 outbreak ($p < 0.05$). There were significant differences between groups in level of anxiety ($p < 0.001$) and stress ($p = 0.04$). Before the COVID-19 outbreak, burnout predicted 11, 15, and 13% of the variance of anxiety, stress and depression, respectively. In addition, stress, monthly working hours and shift were variables that predicted 16% of the variance of burnout before COVID-19.

Conclusion: The results of the present study showed that burnout during the first wave of the COVID-19 pandemic did not change significantly compared with before COVID-19. Anxiety, stress and depression increased significantly first wave of the COVID-19 pandemic.

Keywords: burnout, anxiety, stress, depression, nurse, COVID-19

INTRODUCTION

COVID-19 first appeared in Wuhan, China in December 2019 and quickly spread throughout the world (Chen et al., 2020). On March 11, 2020, the World Health Organization declared the COVID-19 outbreak a pandemic (Sahin et al., 2020). Nurses are the major healthcare workforce in an epidemic (Wan et al., 2020) and have the most contact with patients (Kisa, 2020). Frontline nurses face many health challenges during the COVID-19 epidemic (Zakeri et al., 2021d), are directly at risk when treating and caring for COVID-19 patients, and thus experience severe stress and problems in the workplace leading to physical, mental, and social disorders, as well as burnout (Kisa, 2020), anxiety, stress, and depression (Wan et al., 2020).

Burnout syndrome is a dangerous overwork condition that can lead to physical or mental illness (Guixia and Hui, 2020). This syndrome was first identified in the early 1970s, primarily among health-care workers (Sahin et al., 2020). According to World Health Organization on May 28, 2019, occupational burnout is a syndrome resulting from chronic work-related stress (Wan et al., 2020). Fatigue, general pain, coronary artery disease, respiratory problems, emotional exhaustion, irritability, impaired concentration, depression, decreased self-esteem, and loss of interest in patients are all symptoms of BOS (Kisa, 2020; Sahin et al., 2020). Reduced health-care performance, feeling of negativism related to one's job, a high rate of turnover in personnel, and increased service costs are symptoms of organizational burnout. With an increasing epidemic, occupational burnout remains a significant risk factor affecting the quality of life and health of healthcare workers, particularly nurses (Hofmeyer et al., 2020).

Wan et al. (2020) investigated factors related to occupational burnout among Chinese nurses during the COVID-19 outbreak. They discovered that nurses had a high level of anxiety and a moderate level of occupational burnout (Wan et al., 2020). Guixia and Hui (2020) discovered a relationship between nurse's occupational burnout, anxiety, and depression during the COVID-19 epidemic (Guixia and Hui, 2020).

Anxiety is a generalized, unpleasant, and vague feeling of panic with an unknown origin that includes uncertainty, helplessness, and physiological arousal, as well as symptoms such as fatigue, restlessness, and increased heart rate (Vilagut et al., 2016; Liu et al., 2020). Stress is an unavoidable part of everyday life. Work-related stress is defined as emotional, perceptual, behavioral, and physiological reactions to negativism related to one's job, organization, or workplace (Zakeri et al., 2021a). Depression is one of the most common behavioral disorders, according to the World Health Organization, and is associated with low mood, loss of interest, feelings of guilt and worthlessness, changes in energy, concentration, sleep, and appetite (Vilagut et al., 2016). According to Zakeri et al. (2021a), anxiety, stress, and depression were very common among the frontline workers caring for the COVID-19 patients (Zakeri et al., 2021a). Cai et al. (2020) studied 534 physicians, nurses, and primary care providers in Hubei State and found that they were under a lot of stress during the COVID-19 outbreak (Cai et al., 2020). Anxiety during or after a crisis can impair mental reasoning and abstract thinking skills,

as well as cause a lack of attention and coordination in health-care professionals (nurses, physicians, etc.). Anxiety can reduce the effectiveness of healthcare professionals' efforts to protect people's health, and direct contact with COVID-19 patients can cause serious concerns like fear of death and virus transmission to family members, as well as feelings of loneliness and anger, all of which can lead to stress and depression (Celmece and Menekay, 2020). When a person is constantly exposed to anxiety and stress, he/she loses confidence and becomes depressed, which increase work-related stress and lower performance. They gradually lose their mental and physical abilities, and eventually develop unstable mental and neurological disorders (Vilagut et al., 2016; Zakeri et al., 2021c). The deadly and uncontrollable nature of COVID-19, together with the relatively high rate of infection and mortality among healthcare professionals, can provoke feelings of anxiety and stress in medical staff. Issues such as social stigmatization, shortage of personal protection equipment supplies, and heavy workload on the staff during the COVID - 19 pandemic can aggravate this situation. Therefore, this pandemic is expected to have a substantial psychological impact on healthcare professionals (Jalili et al., 2021). Studies have revealed the psychological impacts of this life-threatening virus on people, especially medical staff. As in Italy, two infected nurses committed suicide due to fear of spreading COVID-19 to patients. It is possible that fear and anxiety of falling sick or dying, and helplessness will drive increased suicide rates in 2020 (Alizadeh et al., 2020).

As a result, these factors may have an impact on nurses' job performance and health and lower their quality of life (Celmece and Menekay, 2020). Celmece and Menekay (2020) showed the impact of stress, anxiety, and occupational burnout on the quality of life of health care professionals (physicians, nurses, and health care assistants) caring for the COVID-19 patients during pandemic (Celmece and Menekay, 2020).

The physical and mental health of nurses is critical for providing health care during the COVID-19 epidemic. Identifying the factors that contribute to occupational burnout, anxiety, stress, and depression in nurses can thus help develop strategies to address these issues. Furthermore, no study compared burnout, anxiety, stress, and depression in nurses before and during the first wave of the COVID-19 pandemic. As a result, the purpose of this study was to compare occupational burnout, anxiety, stress, and depression in nurses before and during the first wave of the COVID-19 pandemic.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional study was used to investigate the effect of burnout, anxiety, stress, and depression on the nurses before and during the first wave of the COVID-19 pandemic in Ali Ebn Abi Taleb hospital in southern Iran.

Sample Size and Sampling

Sampling was performed before (from April to July 2019) and during the first wave of the COVID-19 pandemic (from April

to July 2020), one year apart. Before the COVID-19 outbreak, 400 nurses were employed in Ali Ebn Abi Taleb hospital, while during the first wave of the COVID-19 pandemic, 500 nurses were employed in Ali Ebn Abi Taleb hospital. This hospital was the only COVID-19 referral hospital in Rafsanjan city, south-east Iran. In both cases, sampling was performed using the census method. Inclusion criteria were as follows: (1) nurses taking care of the patients, (2) nurses with one year of work experience, and (3) nurses who had spent at least 3 months at the hospital. Nurses with a history of mental disorders (self-reported) and incomplete questionnaires were excluded.

Before the COVID-19 outbreak, 279 frontline nurses out of 400 nurses completed the questionnaires, with 13 being excluded from the study because of high missing value. Therefore, the effective response rate 66.5% ($n = 266$) before the COVID-19 epidemic. During the first wave of the COVID-19 Pandemic, questionnaires were completed by 255 frontline nurses out of 500 nurses, 13 of whom were excluded from the study because of high missing value and one was excluded due to the history of mental disorders. Therefore, the effective response rate of the nurses was 48.4% ($n = 242$) during the first wave of the COVID-19 Pandemic. Power analysis calculations with G*Power software (version 3.1.9.2) indicated that (power = 90% and $P = 0.05$) 235 participants would be needed in each group to detect an effect size of 0.3. Finally, 508 nurses' data were used in the final analysis.

Measurements

A three-part questionnaire was used for data gathering. A: Demographic information questionnaire B: Maslach Burnout Questionnaire, and C: Depression, Anxiety and Stress Scale (DASS-21).

Demographic Information Questionnaire

The first section included of questions on demographic variables (i.e., gender, age, marital status, educational level, income, type of employment, work experience, ward, shift, and working hours per month).

Maslach Burnout Inventory

The most common tool for burnout measurement is maslach burnout inventory (MBI). It includes 22 items and consists of three subscales, including emotional exhaustion (9 items), depersonalization (5 items) and reduced personal accomplishment (8 items). MBI is rated on a scale of 0 (never) to 6 (every day), with scores ranging from 0 to 54 for emotional exhaustion, 0 to 30 for depersonalization, and 0 to 48 for lack of personal accomplishment. High scores in emotional exhaustion, depersonalization and reduced personal accomplishment are considered as high burnout. The scoring procedure of MBI is as follows: emotional exhaustion: high (>26), medium (17–26), and low (<17); depersonalization: high (>12), medium (7–12), and low (<7); reduced personal accomplishment: high (>39), medium (32–39), and low (<32) (Kamali et al., 2020). In addition, Iranian researchers reported Cronbach's alpha greater than 0.70 for 3 dimensions in nurses (Moalemi et al., 2018). In the present study, the Cronbach's alpha coefficients of emotional exhaustion, depersonalization, reduced personal

accomplishment, and the whole scale were 0.88, 0.72, 0.66, and 0.86, respectively.

Depression, Anxiety, Stress Scale

Depression, anxiety, stress scale was developed by Lovibond in 1995 to assess three subscales of depression, anxiety and stress (Lovibond and Lovibond, 1995). Each scale of DASS-21 consists of seven items on a four-point Likert scale (never / low / medium / high). The lowest score is zero and the highest score is three, with the sum of the scores obtained being the final score of DASS-21. The final score of the subscales should be doubled. In Iran, Samani and Jokar reported the retest validity to be 0.80, 0.76, and 0.77 for depression, anxiety and stress, respectively. Cronbach's alpha coefficients were reported to be 0.81, 0.74, and 0.78, for depression, anxiety and stress, respectively (Zakeri et al., 2021b). In the present study, the Cronbach's alpha coefficients of depression, anxiety, stress and the whole scale were 0.88, 0.85, 0.87, and 0.94, respectively.

Data Collection and Data Analysis

After obtaining the necessary permissions, the researcher referred to the research settings and started sampling in two hospitals in Rafsanjan. We collected data of 400 nurses from April to July 2019 before the COVID-19 outbreak and 500 nurses from April to July 2020 during the first wave of the COVID-19 pandemic. Thus, demographic information, MBI and DASS-21 questionnaires were distributed among the eligible nurses both before and during the first wave of the COVID-19 pandemic, and they completed the questionnaires in the presence of the researcher.

Descriptive statistics (frequency, percentage, mean and standard deviation) were used to describe demographic characteristics and mean scores of the questionnaires. Independent *t*-test, ANOVA test and multivariate linear regression test were used to determine the correlates of burnout, depression, anxiety, and stress scores before and during the first wave of the COVID-19 pandemic. A significance level of 0.05 was considered.

Ethical Considerations

Ethical approval was obtained from the Ethics Committee of Rafsanjan University of Medical Sciences (IR.RUMS.REC.1397.099 and IR.RUMS.REC.1399.135). All participants received written information from the researcher and signed an informed consent form before inclusion in the study. The objectives of the study, the confidentiality and anonymity of the information were explained and participants were free to complete the questionnaire.

RESULTS

The mean age of the participants was 33.32 ± 6.12 and 33.07 ± 6.90 before and during the first wave of the COVID-19 pandemic, respectively. The demographic data of the participants before and during COVID-19 is presented in **Table 1**.

TABLE 1 | Comparison of the demographic characteristics of the participants before and during the first wave of the COVID-19 Pandemic.

Variables	Before COVID-19 (<i>n</i> = 266)					During the first wave of the COVID-19 pandemic (<i>n</i> = 242)				
	<i>n</i> (%)	Burnout	Anxiety	Stress	Depression	<i>n</i> (%)	Burnout	Anxiety	Stress	Depression
Gender										
Male	50 (18.8)	<i>t</i> = 1.85 (0.06)	<i>t</i> = 0.62 (0.53)	<i>t</i> = −0.27 (0.78)	<i>t</i> = 0.50 (0.61)	68 (28.1)	<i>t</i> = 1.30 (0.23)	<i>t</i> = −0.90 (0.36)	<i>t</i> = −1.33 (0.18)	<i>t</i> = −0.43 (0.66)
Female	216 (81.2)					174 (71.9)				
Marital status										
Unmarried / widowed / divorce	47 (17.7)	<i>t</i> = −0.42 (0.70)	<i>t</i> = −0.97 (0.33)	<i>t</i> = −0.40 (0.68)	<i>t</i> = −1.05 (0.29)	59 (24.4)	<i>t</i> = 1.04 (0.29)	<i>t</i> = 1.25 (0.21)	<i>t</i> = 0.76 (0.44)	<i>t</i> = 0.80 (0.42)
Married	219 (82.3)					183 (75.6)				
Number of children										
0	106 (39.8)					79 (32.6)				
1	60 (22.6)	<i>F</i> = 0.86 (0.46)	<i>F</i> = 0.53 (0.66)	<i>F</i> = 0.80 (0.49)	<i>F</i> = 0.76 (0.51)	55 (22.7)	<i>F</i> = 1.08 (0.35)	<i>F</i> = 0.30 (0.82)	<i>F</i> = 0.79 (0.50)	<i>F</i> = 0.56 (0.63)
2	81 (30.5)					81 (33.5)				
3≤	19 (7.1)					27 (11.2)				
Educational level										
Bachelor	237 (89.1)	<i>t</i> = 0.19 (0.84)	<i>t</i> = −0.87 (0.38)	<i>t</i> = −0.62 (0.53)	<i>t</i> = −0.90 (0.36)	223 (92.1)	<i>t</i> = −0.80 (0.42)	<i>t</i> = −0.49 (0.62)	<i>t</i> = −0.55 (0.57)	<i>t</i> = 0.46 (0.64)
Masters	29 (10.9)					19 (7.9)				
Income (million riyal)										
<3	106 (39.8)	<i>F</i> = 0.86 (0.42)	<i>F</i> = 1.35 (0.26)	<i>F</i> = 1.34 (0.26)	<i>F</i> = 0.33 (0.71)	28 (11.6)	<i>F</i> = 2.85 (0.05)	<i>F</i> = 0.12 (0.88)	<i>F</i> = 0.76 (0.46)	<i>F</i> = 1.51 (0.22)
3–5	141 (53.1)					177 (73.1)				
>5	19 (7.1)					36 (15.3)				
Type of employment										
Hired	164 (61.7)	<i>t</i> = −0.69 (0.48)	<i>t</i> = 0.71 (0.47)	<i>t</i> = 1.09 (0.27)	<i>t</i> = 1.05 (0.29)	161 (66.5)	<i>t</i> = 0.46 (0.64)	<i>t</i> = −0.27 (0.78)	<i>t</i> = −0.64 (0.52)	<i>t</i> = −0.54 (0.58)
Contract recruiters ^a / Committed ^b	102 (38.3)					81 (33.5)				
Work experience (yr.)										
>5	73 (27.4)					87 (36.0)				
5–10	120 (45.1)	<i>F</i> = 0.65 (0.58)	<i>F</i> = 2.73 (0.04)	<i>F</i> = 4.57 (0.004)	<i>F</i> = 4.16 (0.007)	67 (27.7)	<i>F</i> = 0.32 (0.81)	<i>F</i> = 0.79 (0.49)	<i>F</i> = 1.79 (0.14)	<i>F</i> = 1.12 (0.33)
11–15	40 (15.0)					38 (15.7)				
>15	33 (12.4)					50 (20.7)				
Ward										
Critical/intensive	76 (28.6)					89 (36.8)				
Emergency	44 (16.5)	<i>F</i> = 5.35 (0.001)	<i>F</i> = 1.77 (0.15)	<i>F</i> = 1.06 (0.36)	<i>F</i> = 2.00 (0.11)	65 (26.9)	<i>F</i> = 0.97 (0.40)	<i>F</i> = 0.54 (0.65)	<i>F</i> = 0.39 (0.75)	<i>F</i> = 0.55 (0.64)
Medical	90 (33.8)					59 (24.4)				
Others	56 (21.1)					29 (12.0)				
Shift										
Fixed	26 (9.8)	<i>t</i> = −2.16 (0.03)	<i>t</i> = −1.42 (0.15)	<i>t</i> = −1.17 (0.24)	<i>t</i> = −1.61 (0.10)	23 (9.5)	<i>t</i> = −0.13 (0.89)	<i>t</i> = −0.02 (0.98)	<i>t</i> = 1.00 (0.31)	<i>t</i> = 0.50 (0.61)
Rotational	240 (90.2)					219 (90.5)				

(Continued)

TABLE 1 | (Continued)

Variables	Before COVID-19 (n = 266)				During the first wave of the COVID-19 pandemic (n = 242)					
	n (%)	Burnout	Anxiety	Stress	Depression	n (%)	Burnout	Anxiety	Stress	Depression
Working hours (h) per month										
<150	46 (17.3)					46 (19.0)				
150–160	100 (37.6)	$F = 2.08$ (0.10)	$F = 2.70$ (0.04)	$F = 2.94$ (0.03)	$F = 2.57$ (0.05)	108 (44.6)	$F = 0.84$ (0.47)	$F = 0.87$ (0.45)	$F = 0.27$ (0.84)	$F = 0.65$ (0.57)
161–170	80 (30.1)					49 (20.2)				
>170	40 (15.0)					39 (16.1)				

Data were presented as number (%). t, independent t-test; F, analysis of variance test; ^a, annually contracted with payment similar to hired nurses, ^b, it is obligatory to work for government for 2 years at a lower rate of pay.

The mean scores of burnout were 41.19 ± 17.21 and 43.25 ± 16.13 before and during the first wave of the COVID-19 pandemic, respectively. The scores of burnout and all its dimensions did not change significantly before and during the first wave of the COVID-19 pandemic ($p > 0.05$) (Table 2). Based on the findings, before the COVID-19 epidemic, 12.4% of nurse had high emotional exhaustion, 10.2% had high depersonalization, and 0.4% had reduced personal accomplishment. during the first wave of the COVID-19 pandemic, 18.6% of nurse had high emotional exhaustion and 10.3% had high depersonalization (Figure 1).

Before the COVID-19 outbreak, the mean scores of anxiety, stress and depression were 8.74 ± 7.77 , 13.71 ± 8.89 and 9.90 ± 8.41 , respectively. during the first wave of the COVID-19 pandemic, the mean scores of anxiety, stress and depression were 12.65 ± 9.52 , 16.23 ± 9.25 , and 12.23 ± 9.25 , respectively. Anxiety, stress and depression scores significantly increased during the first wave of the COVID-19 pandemic compared with before the COVID-19 outbreak ($p < 0.05$) (Table 3). The majority of the participants had normal level of anxiety, stress and depression before and during the first wave of the COVID-19 pandemic (Figure 2).

Before the COVID-19 epidemic, burnout had a significant association with types of ward and shifts. In addition, anxiety, stress, and depression had significant association with work experience and monthly working hours. However, during the first wave of the COVID-19 pandemic, none of the background information had significant association with burnout, anxiety, stress, and depression (Table 1).

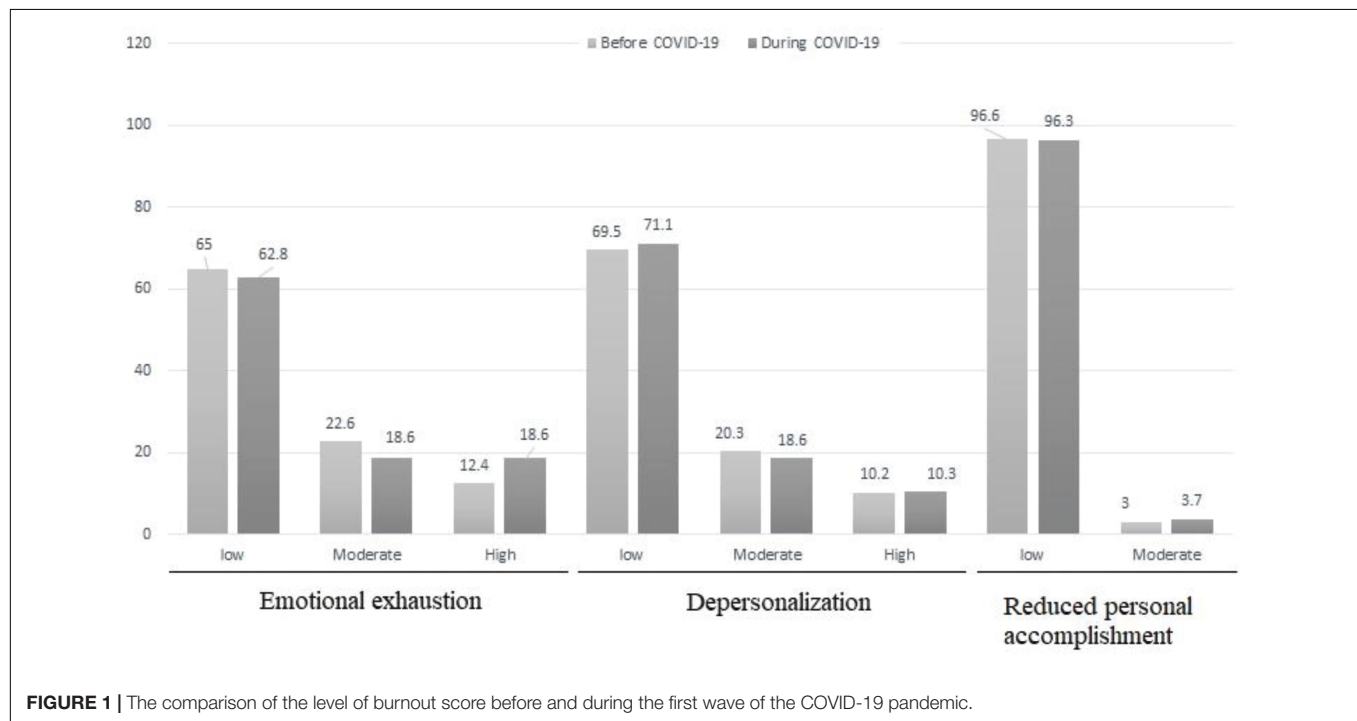
DISCUSSION

The researchers wanted to see how occupational burnout, anxiety, stress, and depression affected nurses before and during the first wave of the COVID-19 pandemic. According to the results of this study, there was no significant difference in occupational burnout during and before the first wave of the COVID-19 pandemic. When compared with before the COVID-19, anxiety, stress, and depression scores increased significantly.

Barello et al. (2020) showed that occupational burnout of the healthcare workers was high during the COVID-19 epidemics (Barello et al., 2020). Guixia and Hui (2020) showed that the rate of occupational burnout of nurses was high during the COVID-19 outbreak (Guixia and Hui, 2020). Jalili et al. (2021) showed that burnout is prevalent among healthcare workers caring for COVID-19 patients. Age, gender, job category, and site of practice contribute to the level of burnout that the staff experience (Jalili et al., 2021). The results of Barello et al. (2020), Guixia and Hui (2020) and Jalili et al. (2021) were inconsistent with the results of present study. The current study compared the rate of occupational burnout before and during the first wave of the COVID-19 pandemic, whereas the previous studies measured occupational burnout during the first wave of the COVID-19 pandemic. Wu et al. (2020) showed that health care workers (physicians and nurses) working in the frontline wards of COVID-19 had lower occupational burnout rates than health

TABLE 2 | Comparison of the burnout scores before and during the first wave of the COVID-19 pandemic.

Group Variables	Before COVID-19 (n = 266)			During the first wave of the COVID-19 pandemic (n = 242)			Independent t-test	P-value
	Median	Mean	Standard deviation	Median	Mean	Standard deviation		
Emotional exhaustion	15.00	15.20	10.27	13.00	16.15	10.49	−1.02	0.30
Depersonalization	5.00	5.53	4.52	4.50	5.77	4.91	−0.56	0.57
Reduced personal accomplishment	21.00	20.45	6.72	21.00	21.32	5.77	−1.56	0.11
Burnout	38.00	41.19	17.21	41.00	43.25	16.13	−1.38	0.16

**FIGURE 1** | The comparison of the level of burnout score before and during the first wave of the COVID-19 pandemic.

care workers working in non-COVID-19 wards (Wu et al., 2020). The present study compared nurses' occupational burnout before and during the first wave of the COVID-19 pandemic, but Wu et al. compared occupational burnout between healthcare workers in non-COVID-19 wards and frontline wards.

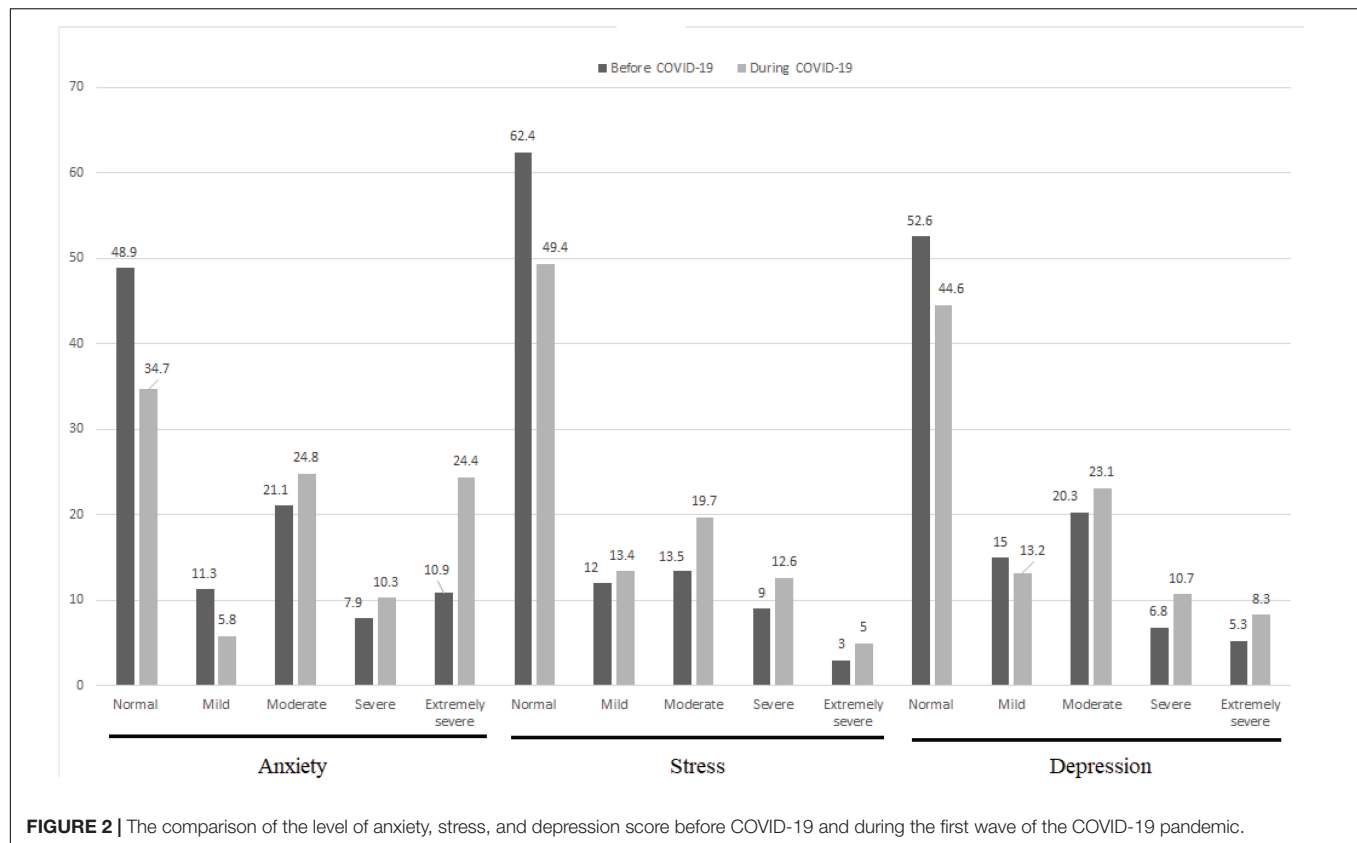
According to Gómez-Urquiza et al. (2017), burnout syndrome is very common among emergency nurses (Gómez-Urquiza et al., 2017). According to Zhang et al. (2014), intensive

care unit nurses have a high level of occupational burnout (Zhang et al., 2014). The current study compared nurses working in all wards (intensive care, emergency, medical, and so on) at two different times (before and during the first wave of the COVID-19 pandemic), but Zhang only studied intensive care unit nurses, while Gómez-Urquiza studied emergency nurses, and no comparison was made in both studies.

TABLE 3 | Comparison of the anxiety, stress, and depression scores among nurses before and during the first wave of the COVID-19 pandemic.

Group Variables	Before COVID-19 (n = 266)			During the first wave of the COVID-19 pandemic (n = 242)			Statistical test	Effect size	P-value
	Median	Mean	Standard deviation	Median	Mean	Standard deviation			
Anxiety	8.00	8.74	7.77	12.00	12.65	9.52	Z = −4.73	0.45	<0.001
Stress	12.00	13.71	8.89	16.00	16.23	9.25	t = −3.12	0.28	0.002
Depression	8.00	9.90	8.41	10.00	12.23	9.25	Z = −2.85	0.26	0.004

t, independent t-test; Z, Mann-Whitney U test.



Zakeri et al. (2021a) and Zheng et al. (2021) showed the high prevalence of depression and anxiety among nurses during the COVID-19 pandemic (Zakeri et al., 2021a; Zheng et al., 2021). Doo et al. (2021) revealed that nurses working in the COVID-19 wards had higher anxiety and depression than nurses working in other wards (Doo et al., 2021). Tiete et al. (2020) showed that healthcare workers (nurses and physicians) working in the COVID-19 wards had higher levels of anxiety, stress, and depression than health care workers working in other wards (non-COVID-19 wards) (Tiete et al., 2020). These studies are consistent with the present study because COVID-19 epidemic affects nurses' mental health and increases their anxiety, stress and depression.

Previous studies on the prevalence of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) have shown that healthcare workers are not only under stress during an outbreak, but may also be psychologically affected long after the initial outbreak (Lee et al., 2005; Khalid et al., 2016). Alizadeh et al. showed that there were some barriers and challenges to medical personnel exposed to COVID-19 that caused psychological distress. Some of these problems are related to the nature of illness, others are related to social and organizational demands, and some supportive resources buffer the relationship between occupational demands and psychological distress (Alizadeh et al., 2020). Despite the fact that each epidemic differs significantly in terms of geographical location, pathogenic characteristics, transmission

route, infection, mortality, and treatment availability, previous studies have found that epidemics have a significant impact on the psychological state of healthcare workers (Jiang, 2020).

During the COVID-19 epidemic, healthcare workers play an important role in the treatment and care of the patients with COVID-19. Healthcare workers are under a lot of stress during the epidemic (high risk of infection, concern about patients' treatment, etc.) (Liu et al., 2021). Physical, mental, and physical disorders result from the problems they experience at workplace, which lead to occupational burnout, anxiety, stress and depression (Wan et al., 2020). Occupational burnout is defined as a state of chronic work-related stress that reduces job satisfaction and can have a negative impact on nurses' efficiency, occupational advancement, and work quality (Wang et al., 2019). Anxiety causes a person not to use his/her abilities and talents properly. Job stress has a significant impact on physical and mental illness. High levels of stress can impair healthcare workers' performance as well as negatively affect their attitudes and behaviors (Vilagut et al., 2016). Depression is one of the five debilitating diseases and is predicted to be one of the major challenges in developed countries by 2030 (Zhang et al., 2020). Physical and mental health of nurses is important to provide health care during the COVID-19 epidemic. It is essential to diagnose, control and treat these disorders as soon as possible. Given the high prevalence of stress, anxiety and depression in healthcare workers caring for the COVID-19 patients (Zakeri et al., 2021a,c), managers should pay more

attention to the symptoms of these disorders and take steps to reduce them. Healthcare workers can be protected from anxiety, stress, depression, and occupational burnout by taking steps like seeking help from mental health professionals, getting enough rest, eating well, exercising regularly, and resting when they are tired (Guixia and Hui, 2020).

LIMITATIONS

There were some limitations to this study. Since the current study was conducted early in the COVID-19 epidemic, the long-term effects of burnout, anxiety, stress, and depression are dependent on the extent of COVID-19 prevalence. These factors may be influenced by current efforts to adapt the workplace to new conditions (such as providing protective equipment or increasing the number of health care professionals). As a result, a future follow-up study over several months is required. Another limitation is the cross-sectional design of the study. Because the epidemic is still ongoing, we are unable to demonstrate its impact on mental health in this study.

CONCLUSION

The current study found that the COVID-19 epidemic had an impact on the frontline nurses' mental health and increased their anxiety, stress, and depression. Occupational burnout was not different before and during the first wave of the COVID-19 pandemic. Physical and mental health of nurses is important to provide health care during the COVID-19 epidemic. Therefore, health care authorities and decision makers, at the national and international levels, should take measures to reduce these disorders in nurses who are in direct contact with COVID-19 patients, which increase the productivity of hospital staff, speed up epidemic control, and provide effective treatment for the COVID-19 patients.

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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 Ethics Committee of Rafsanjan University of Medical Sciences (IR.RUMS.REC.1397.099 and IR.RUMS.REC.1399.135). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MZ and MD: conceptualization, supervision, methodology, data analysis, and writing – reviewing and editing. ER, FS, and HG: conceptualization, data curation, software, and writing – original draft preparation. All authors contributed to the article and approved the submitted version.

FUNDING

This study is part of the research project No. IR.RUMS.99140 and No. IR.RUMS.97088.

ACKNOWLEDGMENTS

We would thank the authorities of the Social Determinants of Health Research Centre, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

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Post-traumatic Stress and Growth Among the Children and Adolescents in the Aftermath of COVID-19

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OPEN ACCESS

Edited by:

Annunziata Romeo,
University of Turin, Italy

Reviewed by:

Adolfo Di Crosta,
University of Studies G. d'Annunzio
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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 08 October 2021

Accepted: 29 December 2021

Published: 27 January 2022

Citation:

Bhushan B, Basu S and Ganai UJ
(2022) Post-traumatic Stress
and Growth Among the Children
and Adolescents in the Aftermath
of COVID-19.
Front. Psychol. 12:791263.
doi: 10.3389/fpsyg.2021.791263

The coronavirus disease 2019 (COVID-19) pandemic has enkindled many mental health problems across the globe. Prominent among them is the prevalence of post-traumatic stress (PTS) with hosts of its precipitating factors being present in the surrounding. With India witnessing severe impact of the second wave of COVID-19, marked by a large number of hospitalizations, deaths, unemployment, imposition of lockdowns, etc., its repercussions on children and adolescents demand particular attention. This study aims to examine the direct and the indirect exposure of COVID-19-related experiences on children and adolescents and its subsequent relationship with PTS and post-traumatic growth (PTG). The direct exposure was operationalized in terms of death or hospitalization in the family, while the indirect exposure was gauged in terms of exposure to media reports of the COVID situation. Data from 412 children and adolescents aged 9–20 years, collected online, revealed 68.9% of them with PTS. Interestingly, 39.8% of those reporting PTS were also experiencing PTG. Arousal appeared to be the most frequently reported characteristics of trauma. The multivariate analysis of variance (MANOVA) endorses significant difference between those with direct and indirect exposures to hospitalization. Those with direct exposure to hospitalization reported higher PTS. The indirect exposure of COVID-19-related news through electronic media was also significantly associated with higher PTS. Exposure through print media did not lead to significant difference in PTS, but those reading only magazines reported significantly higher PTG than not reading magazines. The findings are analyzed in the light of unfolding of events during the second wave of COVID-19 in India.

Keywords: COVID-19, post-traumatic stress (PTS), post-traumatic growth, children and adolescents, direct-indirect media exposure

INTRODUCTION

What began as common flu-type symptoms in December 2019 soon overtook the world, spreading at an exponential rate. By (World Health Organization [WHO], 2020) declared coronavirus disease 2019 (COVID-19) outbreak a pandemic. To control the rapid escalation of COVID-19, nations across the world tried to adopt various measures, including lockdown, which lasted from several weeks to several months. India also adopted this strategy to control the spread of the virus, announcing a nationwide lockdown on 24 March 2020 that was further extended till 3 May 2020 (Ministry of Home Affairs, 2020), impacting the daily lives of people drastically. Despite such efforts, the scenario became worse with the second wave of COVID that hit the country in March 2021. This was much more severe than the first wave, both in terms of symptom escalation and fatality rate, as well as shortage of hospital beds, oxygen supply, and medicines in parts of the country (Safi, 2021). By late April, India became the country with

the highest number of new and active cases (BBC, 2021). The policy of test, trace, and treat, and emphasis on COVID-19 specific behavior, along with vaccination resulted in the decline in positive cases during the first wave (Joshi and Mehendale, 2021). However, these measures could not curtail the spread of the virus in the community and resulted in the worst outbreak of the second wave. To add to this turmoil, many cases of mucormycosis (black fungus) and aspergillosis (white fungus) started surfacing. During the first wave, people infected with COVID were predominantly older than 60 years. However, the second wave claimed the lives of people aged 25–50 years (Jain et al., 2021).

The existing research in psychological science leaves us with a conjecture of likelihood of mental health-related issues in the aftermath of the pandemic, especially in those who have been infected. Disabling conditions such as post-traumatic stress (PTS) are prevalent among people because of traumatic events such as infectious diseases. Joseph and Williams (2005) have argued that “the phenomena of distressing intrusive thoughts, images, and pictures accompanied by the need to avoid these distressing emotions, thoughts, and reminders. To be normal reactions experienced by people in response to stressful and traumatic situations, indicative of the need for cognitive-emotional processing. Rather than an abnormal state of mind” (p. 426). Accordingly, several researchers have preferred to use the term “post-traumatic stress” instead of “post-traumatic stress disorder” (Bhushan and Kumar, 2007, 2009, 2012). We reiterate the same and have used the term “PTS” here. In a systematic review of the literature, Vindegaard and Benros (2020) have reported PTS in individuals exposed to COVID-19. They reviewed 43 studies. Two of them examined 919 adults with COVID-19 and found high prevalence (96.2%) of PTS. The remaining forty-one studies (2 on patients with preexisting psychiatric disorders, 20 on medical healthcare workers, and 19 on the general public) evaluated the indirect effect of the pandemic. There is an obvious absence of children and adolescents in these studies. Very few studies have focused on this vulnerable segment. Chen et al. (2021) studied the prevalence of PTS among 15,993 children and adolescents aged 8–18 years in the aftermath of COVID-19 in China. A total of 11.5% of participants met the clinical criteria. Selçuk et al. (2021) examined 447 adolescents during the COVID-19 outbreak on the moderate prevalence level of 28.5% of PTS in Turkey. This necessitates research focusing on children and adolescents. Given the likelihood of PTS in the wake of tremendously distressful situations such as COVID-19, high rates of PTS-like symptoms such as intrusion, avoidance of stimuli, negative alterations in cognition or mood, and marked alterations in arousal and reactivity have been reported in the survivors (Xiao et al., 2020). A recent review of 19 studies consisting a total of 93,569 participants shows the prevalence of PTS ranging from 7 to 53.8% in the general population (Xiong et al., 2020).

The pandemic has also affected the mental health of children and adolescents (Golberstein et al., 2020). Studies suggest that continued closures of academic institutions, isolation from peers and others in the social network, and economic closure have severely affected the mental health of children and adolescents (Holmes et al., 2020; Tan et al., 2020). Sleep disorders and PTS

are the most severe among the mental health problems, and about half of the children examined experienced them during the pandemic. The systematic review and meta-analysis by Ma et al. (2021), consisting of 23 studies with a total of 57,927 children and adolescents aged 0–18 years, provide evidence for depression in 28.6%, anxiety in 25.5%, sleep disorders in 44.2%, and PTS in 48.0% of children and adolescents during COVID-19. Hyland et al. (2021) examined depression and generalized anxiety disorder (GAD) during 6 weeks of lockdown in Ireland and found that the prevalence of neither depression nor GAD of affected during this phase of COVID-19. However, younger age was found to predict major depression.

Pre-COVID literature suggests an association between media exposure to traumatic events and PTS, ranging from high acute stress after media exposure to the Boston Marathon bombings (Holmes et al., 2020) to indirect exposure to the 2008 Wenchuan earthquake (Yeung et al., 2018). Pfefferbaum et al. (2001) found a positive correlation between viewing time of Oklahoma City bombing-related news and PTS symptoms in children who were unaffected by the incidence. Similar correlation between the duration of television exposure to scarred graphic images and PTS severity has been reported in Kuwaiti children and adolescents after the military occupation (Nader et al., 1993). Bhushan and Kumar (2009) compared PTS in children directly exposed to tsunami in India and those who were exposed to it through media and concluded that a traumatic event could result in PTS even in children who get indirectly exposed to it through media. They observed a significant sex difference on PTS, with women at a higher risk compared with men. Recent studies have also associated viewing COVID-19-related news even at the time of the outbreak with negative affect, anxiety, depression, and stress (Chao et al., 2020) and heightened fear of the virus after searching further information about the pandemic through different mediums (Mertens et al., 2020). The Director-General of WHO even went ahead referring to “infodemic” drawing a resemblance between the spread of news and the virus (Zarocostas, 2020).

A parallel body of research suggests positive psychological changes after the traumatic experiences, termed as post-traumatic growth (PTG, Tedeschi and Calhoun, 1995). PTG involves increased sense of personal strength, feeling of connectedness with others, finding new possibilities and opportunities, greater appreciation for life, and a deeper understanding of spiritual and existential questions (Tedeschi and Calhoun, 1996). Calhoun and Tedeschi (2006) explained PTSD and PTG as independent psychological constructs where the cognitive process activated by the distress experienced by the survivors result in a positive outlook of the self, others, and the world, resulting into PTG. This implies co-occurrence of PTSD and PTG. Recent studies have reported the presence of both negative psychological reactions and PTG during the COVID pandemic (Tomaszek and Muchacka-Cymerman, 2020; Cui et al., 2021; Hamam et al., 2021). Cui et al. (2021) found the prevalence of positive psychological reactions in 43.7% of nurses in China who reported above average PTG scores. Children and adolescents, the two most vulnerable groups, are underrepresented in the available studies related to COVID. This was the motivating factor behind undertaking this study.

The Present Study

This study aims to examine the direct and the indirect exposure of COVID-19-related experiences on children and adolescents and its subsequent relationship with PTS and PTG. It examines the prevalence of PTS and PTG among children and adolescents in India during the second wave of COVID-19. Furthermore, we investigated the difference between those with adversities at home arising out of COVID and those who were exposed to it through electronic and print media in terms of PTS. Earlier studies of PTS in tsunami-affected children and adolescents of India (Bhushan and Kumar, 2007, 2009) have shown higher level of trauma in this vulnerable group. Even 30.69–37.62% of those who were indirectly exposed to tsunami had relatively high intrusion (Bhushan and Kumar, 2009). In the absence of any study reporting the prevalence of PTS in children and adolescents of India during the COVID-19 and a single study reporting a prevalence of 28.2% in adults (Singh and Khokhar, 2021), we hypothesized (i) relatively high prevalence of PTS and PTG among the children and adolescents, (ii) significant difference in PTS (intrusion, avoidance, and arousal) among children and adolescents witnessing hospitalization compared with those who did not, (iii) significant difference in PTS (intrusion, avoidance, and arousal) among children and adolescents who witnessed death in family compared with those who did not, and (iv) significant difference in PTS (intrusion, avoidance, and arousal) among children and adolescents who have had electronic and/or print media exposure as compared with those who did not. We also explored the coexistence of PTS and PTG in children and adolescents who reported PTS during the second wave of COVID.

MATERIALS AND METHODS

Participants

The sample comprised of 412 children and adolescents (226 men and 186 women) aged 9–20 years ($M = 15.12$, $SD = 2.15$). Following the conventional practice in psychological science, we have operationally defined children as those belonging to the age range of 9–11 years and adolescents as those belonging to the age range of 12–20 years. Accordingly, 3.7% of the participants were children, while the remaining 96.3% were adolescents. Almost half of the participants (43%) belonged to the urban areas, while the remaining (57%) belonged to the rural areas. Of the participants, 89% had one or more siblings and half of them lived along with their grandparents (50%). Age ranging between 9 and 20 years with no reported symptoms of psychological distress or clinical prognosis was the inclusion criteria. Ongoing hospitalization of any close family member or diagnosed psychological problem was the exclusion criteria. None of the participants had COVID-19.

Measures

Information was collected about the demographics of the participants (e.g., age, gender, family size, rural or urban, and family type). The participants also reported hospitalization and death in the family due to the pandemic and exposure to the electronic and print media in a binary (“Yes” or “No”) format.

The Children’s Revised Impact of Event Scale (CRIES-13), a 13-item scale adapted from the Impact of Event Scale (IES, Horowitz et al., 1979; Perrin et al., 2005), was administered to the participants to identify the likelihood of PTS associated with the COVID-19 pandemic. The items of CRIES are rated on a four-point scale, according to the frequency of recurrence of the PTS reactions during the week before administration of the tool. The total score ranges between 0 and 65 and is attained from the scores of the three subscales (intrusion, avoidance, and arousal). Researchers have suggested that a cutoff score of 17 or above on the intrusion, avoidance, and arousal scale correctly identifies more than 80% of children diagnosed with PTS (Yule, 1998; Stallard et al., 1999). A cutoff of 30 indicates children at risk for PTS and has been known to maximize the sensitivity and specificity while minimizing the rate of false negatives (Perrin et al., 2005). The entire scale has a good internal consistency (Cronbach’s alpha 0.78), while the subscales individually have acceptable reliabilities (avoidance = 0.613; intrusion = 0.60; arousal = 0.612).

The Revised Post-traumatic Growth Inventory for Children (PTGI-C-R, Kilmer et al., 2009) was administered to measure PTG. Adapted from the PTGI, 10 out of the 21 original items have been selected for the PTGI-C-R, considering their suitability to children. The participants responded to these items on a 4-point rating scale (ranging from 0, no change, to 3, a lot of change including a “don’t know” option). Cronbach’s alpha for the total scale in this study is 0.70.

Procedure

India was badly hit by the second wave of COVID-19 between March and May 2021. The data were collected using Google survey forms in July 2021, 30 days after the second wave had lost its impetus. The link for the survey forms was circulated among the parents/guardians through specific e-groups of students and/or parents created after the schools were closed due to COVID. They were also contacted through their respective schools, and those who consented were asked to respond to the demographic profile form and the two tools. A total of 422 participants were involved through snowball sampling. The participants, as well as their parents, were informed about the voluntary nature of participation and their right to withdraw for any reason at any time during the data collection period. All this information were included in the informed consent form provided at the beginning of the survey form. The completion of the entire survey took approximately 8–10 min. As these children and adolescents were already involved in online classes conducted by their respective schools, they were familiar with online modes, such as using smartphones, personal computers, or laptops. The study protocol was approved by the Institutional Ethics Committee of the Indian Institute of Technology Kanpur. A total of 422 responses were obtained, out of which 412 were eligible for further analysis. Ten responses were rejected as they were incomplete.

Analysis

Besides descriptive statistics, the multivariate analysis of variance (MANOVA) was performed to analyze the differences in PTS (intrusion, avoidance, and arousal) and PTG scores among

children and adolescents with different levels of exposure to COVID-19. All the statistical analysis was carried out using SPSS version 21. An important assumption for carrying out MANOVA is that all the dependent variables should have a moderate correlation with each other (Meyers et al., 2016). Thus, the Pearson correlation among all the dependent variables was calculated.

RESULTS

Descriptive and Correlational Statistics

As summarized in **Table 1**, all the dependent variables were significantly positively correlated to each other. The highest correlation coefficient was observed between PTS and its three components, namely, intrusion ($r = 0.799$; $p < 0.01$), avoidance ($r = 0.746$; $p < 0.01$), and arousal ($r = 0.832$; $p < 0.01$). PTS and PTG were positively correlated ($r = 0.281$; $p < 0.01$) albeit the coefficient was low.

Occurrence of Post-traumatic Stress and Post-traumatic Growth

Table 2 presents the prevalence of PTS and PTG in the present sample. Keeping 17 as the cutoff for the subscales and 30 as the cutoff for the entire scale (as cited above), we found 284 out of the 412 participants to be affected by PTS, leading to a prevalence rate of 68.9%. Arousal emerged to be the most frequently associated characteristics of trauma (31.6%). A total of 113 children and adolescents suffering from PTS were also found to report PTG, accounting for 39.79% prevalence of PTG among those experiencing PTS. Thus, the first hypothesis claiming relatively high prevalence of PTS and PTG among the children and adolescents was accepted.

TABLE 1 | Mean, standard deviation (SD), and correlation among all the variables of the study.

Variables	Mean	SD	1	2	3	4	5
1. Intrusion	9.75	4.42	1				
2. Avoidance	10.62	4.77	0.410**	1			
3. Arousal	12.82	5.49	0.536**	0.387**	1		
4. PTS	33.19	11.66	0.799**	0.746**	0.832**	1	
5. PTG	19.22	4.96	0.275**	0.247**	0.161**	0.281**	1

** $p < 0.01$.

TABLE 2 | Prevalence of post-traumatic stress (PTS) and post-traumatic growth (PTG) in the present sample.

	N	Frequency	Percent
Intrusion	412	10	2.4%
Avoidance	412	35	8.5%
Arousal	412	130	31.6%
Post-traumatic stress	412	284	68.9%
PTG among participants suffering from PTS	284	113	39.79%

Multivariate Analysis of Variance

Table 3 demonstrates the groupwise difference for the demographic variables such as age, gender, location, and family on intrusion, avoidance, arousal, PTS, and PTG. The MANOVA suggests that of all the demographic variables, only location emerged to have a significant effect [Wilks' $\lambda = 0.94$, $F_{(4,368)} = 6.196$, $p < 0.001$]. Pairwise comparison revealed that participants living in rural areas experienced significantly higher intrusion and PTS scores as compared with those living in urban areas. Although other demographic variables did not yield significant outcome in multivariate testing, univariate testing showed that participants who had at least one or more siblings experienced higher PTG as compared with those without siblings.

Table 4 enumerates the results of the MANOVA testing the difference between participants who witnessed hospitalization and/or death in the family during the second wave of COVID-19 in India and those who did not. A statistically significant MANOVA was obtained for hospitalization [Wilks' $\lambda = 0.95$, $F_{(4,405)} = 5.404$, $p < 0.001$] but not for death [Wilks' $\lambda = 0.991$, $F_{(4,405)} = 0.905$, $p = 0.461$]. Pairwise comparisons for intrusion, avoidance, arousal, and the overall PTS score show significant difference along hospitalization and no hospitalization. Hence, the second hypothesis was also accepted. The participants who witnessed hospitalization recorded high on intrusion, avoidance, arousal, and PTS. As for PTG, no significant difference was observed between the two groups. As the participants who witnessed the death in the family due to the COVID-19 pandemic did not differ on PTS than those who had no deaths in family, the third hypothesis was rejected.

Table 5 enumerates the result of MANOVA testing the difference between participants with massive exposure to news through electronic media as compared with those who did not and participants who read COVID-related news through the print media (newspaper and/or magazines) compared with those who did not. MANOVA results show a statistically significant effect for the electronic media [Wilks' $\lambda = 0.908$, $F_{(4,405)} = 10.227$, $p < 0.001$] but not for the print media [Wilks' $\lambda = 0.984$, $F_{(4,405)} = 1.617$, $p = 0.169$]. Pairwise comparisons show significant difference between participants who watched news on electronic media and those who did not in terms of intrusion, avoidance, arousal, overall PTS as well as PTG with exposed group having higher scores on all these parameters. Although the MANOVA result did not emerge to be statistically significant for the print media, univariate testing revealed that participants who relied on print media during this stressful period had statistically higher intrusion scores as compared with those who did not read newspapers and/or magazines. As we only found evidence of difference in PTS (intrusion, avoidance, and arousal) for those who watched electronic media and those who did not, and not for print media, the fourth hypothesis is partially accepted.

DISCUSSION

This study aims to examine the prevalence of PTS among the children and adolescents of India during the second wave

TABLE 3 | Multivariate analysis of variance (MANOVA) table reporting the group difference for the demographic variables on intrusion, avoidance, arousal, PTS, and PTG.

	Age		Gender		p-value	Location		p-value	Siblings		p-value	Grandparents		p-value
	Children (N = 15)	Adolescents (N = 376)	Males (N = 212)	Females (N = 179)		Urban (N = 169)	Rural (N = 222)		Yes (N = 348)	No (N = 43)		Yes (N = 196)	No (N = 195)	
Intrusion	9.84 (1.205)	9.38 (0.41)	10.34 (0.69)	8.74 (0.72)	0.109	7.47 (0.56)	12.08 (0.87)	<0.001	10.23 (0.49)	8.27 (1.09)	0.102	9.74 (0.52)	9.41 (0.75)	0.717
Avoidance	11.29 (1.32)	9.33 (0.44)	10.24 (0.76)	9.79 (0.78)	0.680	10.27 (0.62)	9.71 (0.95)	0.618	10.61 (0.54)	8.91 (1.19)	0.193	9.71 (0.57)	10.22 (0.83)	0.605
Arousal	11.21 (1.54)	12.56 (0.52)	12.44 (0.88)	11.75 (0.92)	0.588	11.01 (0.72)	13.41 (1.11)	0.070	12.36 (0.63)	11.59 (1.39)	0.614	11.94 (0.66)	12.20 (0.97)	0.825
PTS	32.34 (3.15)	31.28 (1.06)	33.02 (1.81)	30.28 (1.87)	0.293	28.76 (1.47)	35.19 (2.26)	0.018	33.20 (1.29)	28.77 (2.84)	0.157	31.39 (1.35)	31.83 (1.97)	0.852
PTG	20.20 (1.36)	18.79 (0.46)	19.09 (0.78)	19.47 (0.81)	0.733	18.84 (0.63)	19.82 (0.97)	0.402	20.31 (0.56)	17.37 (1.22)	0.029	20.45 (0.58)	18.50 (0.85)	0.059
Multivariate test (Wilks' λ)	0.988, $F_{(4,368)} = 1.159$		0.991, $F_{(4,368)} = 0.812$		0.518	0.937, $F_{(4,368)} = 6.196$		<0.001	0.982, $F_{(4,368)} = 1.643$		0.163	0.988, $F_{(4,368)} = 1.122$		0.346

of COVID-19, the subsequent prevalence of PTG in those experiencing PTS, and lastly, to explore the effect of the direct (hospitalization and death) and indirect exposure (electronic and print media) of COVID-19 situation on PTS and PTG of the children and adolescents.

The findings of this study endorse that children and adolescents in India exhibited PTS as highlighted by a prevalence rate of 68.9%, with arousal (31.6%) being the most frequently reported symptom. The findings of this study show 39.79% of the children and adolescents with PTS also experience PTG. This unequivocally suggests coexistence of the two, at least for some time. A wide range of prevalence for PTS has been reported in literature concerning COVID-19. Hou et al. (2020) studied the prevalence of PTS in adolescents and children in China in the aftermath of COVID-19 and found a prevalence rate of 85.5%, while Zhang et al. (2020) found a prevalence of 10.6% in a similar population. Selçuk et al. (2021) has reported the prevalence rate of 28.5% of PTS in Turkey. The estimates provided by recent reviews are 48.0% (Ma et al., 2021) and 7–53.8% (Xiong et al., 2020). We did not find any study estimating the prevalence of PTS in the Indian children and adolescents in the aftermath of COVID-19. The only available estimate is for adults reporting a prevalence of 28.2% (Singh and Khokhar, 2021). Our findings (68.9%) far exceed these reported prevalence rates, necessitating immediate attention to the mental healthcare for this vulnerable segment of the population. Besides, it also shows the silver lining as a good percentage (39.79%) of those with PTS were also found with PTG.

On analyzing the effect of the demographic variables, namely, age (children and adolescents), gender (men and women), location (urban and rural), family in terms of having siblings and grandparents, it was found that participants differed on intrusion and PTS only in terms of their location of stay with those living in rural areas experiencing significantly higher intrusion and PTS. The reason for this particular difference might be that as compared with urban areas, rural areas lacked the necessary infrastructure to deal with the COVID-19 situation. The availability of hospitals, doctors, and advanced healthcare facilities (oxygen cylinders, PPE kit, masks, sanitizers, etc.) was mostly restricted to the urban areas. In many parts, it was observed that people from rural areas had to travel to urban areas for seeking advanced medical care. This could have led to more intrusive thoughts and greater PTS among them. Although previous studies have reported that women have higher prevalence of PTSD than men (Pyari et al., 2012), we do not find gender difference in this study. It seems that the pandemic affected everyone alike.

The findings also show that those who witnessed hospitalization due to the COVID-19 pandemic in the family reported high prevalence of PTS than those who did not. There was severe shortage of medications, hospital beds, and oxygen in India during the second wave of COVID-19 in India. The hospitalization had put a great toll on the mental health of the families. The experience of struggling to get medical facilities, dealing with finances, and living in the constant fear of losing their loved ones during the hospitalization period seems to be very traumatic experience for the people. Interestingly, the participants who witnessed death of any family member did

TABLE 4 | MANOVA table reporting the group difference based on direct exposure to trauma in the form of hospitalization and death.

	Hospitalization		<i>p</i> -value	Death		<i>p</i> -value
	Yes (<i>N</i> = 127)	No (<i>N</i> = 285)		Yes (<i>N</i> = 21)	No (<i>N</i> = 391)	
Intrusion	12.17 (0.59)	8.59 (0.88)	0.001	10.65 (1.03)	10.11 (0.24)	0.612
Avoidance	12.69 (0.63)	8.27 (0.95)	<0.001	9.83 (1.11)	11.12 (0.26)	0.259
Arousal	16.11 (0.71)	11.74 (1.06)	0.001	14.27 (1.24)	13.59 (0.29)	0.593
PTS	40.97 (1.49)	28.60 (2.24)	<0.001	34.75 (2.62)	34.82 (0.61)	0.979
PTG	19.59 (0.68)	18.06 (1.02)	0.214	18.18 (1.20)	19.47 (0.28)	0.296
Multivariate test (Wilks' λ)	0.949, $F_{(4,405)} = 5.404$		<0.001	0.991, $F_{(4,405)} = 0.905$		0.461

TABLE 5 | MANOVA table reporting the group difference based on indirect exposure to trauma in the form of news through electronic media and print media.

	Electronic media		<i>p</i> -value	Print media		<i>p</i> -value
	Yes (<i>N</i> = 302)	No (<i>N</i> = 110)		Yes (<i>N</i> = 310)	No (<i>N</i> = 102)	
Intrusion	10.31 (0.34)	7.40 (0.40)	<0.001	9.40 (0.32)	8.32 (0.42)	0.039
Avoidance	10.91 (0.38)	8.47 (0.44)	<0.001	9.78 (0.35)	9.60 (0.46)	0.741
Arousal	13.12 (0.43)	10.38 (0.50)	<0.001	12.37 (0.40)	11.12 (0.53)	0.061
PTS	34.34 (0.89)	26.24 (1.04)	<0.001	31.56 (0.83)	29.03 (1.09)	0.065
PTG	19.63 (0.40)	17.61 (0.47)	0.001	19.01 (0.37)	18.24 (0.49)	0.212
Multivariate test (Wilks' λ)	0.908, $F_{(4,405)} = 10.227$		<0.001	0.984, $F_{(4,405)} = 1.617$		0.169

not have significant PTS as compared with those who did not. Perhaps, seeing the slow deterioration of health of their loved one during hospitalization phase, along with the knowledge of the worst come scenario of the prevailing pandemic somewhere prepared the participants to reach a level of acceptance and acknowledge their grief process. Hence, the experience of struggling for medical facilities and living in the constant fear of losing a loved one as compared with the actual death of a loved one was probably a more traumatic experience for the participants. Moreover, in the present sample, we only had a few cases where death was observed in the family. This could also be the reason why the difference in the two groups failed to reach significance. The preliminary framework of anticipatory grief consisting of three steps (Lindemann, 1994) is in harmony with this finding. The COVID-19 deaths might have become bearable to the family members by separating themselves from their loved ones even before the actual death and adjusting to a new environment where the deceased was missing. This may even allow the grieving ones to form new bonds and relationships.

This study also finds a significant difference with regard to direct-indirect electronic media exposure, with those exposed to electronic media reporting higher PTS than those who were not. However, no significant difference in PTS was observed for those who had indirect exposure to print media. Thus, children and adolescents engaging in more pandemic-related information on electronic media were more likely to show higher PTS symptoms. These findings are partially in congruence with the previous findings stating that mainstream electronic media exposure to COVID-19 could result in PTS-related symptoms (Thompson et al., 2019; Chao et al., 2020; Holman et al., 2020). The results

also support the risk factor model of the PTS response, suggesting that pandemic-related media exposure is a potential risk factor for mental health (Freedy et al., 1992; Ben-Ezra et al., 2008). However, the reason why electronic media and not the print media emerged to have a significant effect is that the electronic media showed live videos of people running to hospitals, mass burials, burning pyres, the crying faces, and other horrific scenes. In contrast, the print media consisted of stories and images but lacked the direct firsthand experience and the intense visuals as was shown in electronic media. Therefore, these intense visuals shown in electronic media might have impacted children and adolescents to a greater extent than reading newspaper reports. To add to this, the continuous coverage of the COVID-19 situation by electronic media as against the one-time available information *via* the print media might also have led people to watch news channels more often and for longer periods than usual. Studies claim that prolonged and uncontrolled media exposure could reinforce rumination and intrusive thoughts, activate fear circuitry (Bhushan and Kumar, 2009; Bourne et al., 2013; Holman et al., 2014), and enhance autonomic activation, thus affecting physiological systems (Watkins, 2008; Gerin et al., 2012), leading to the increase in stress. Therefore, the children and adolescents with more electronic media exposure were found with PTS.

Although around 40% of children and adolescents suffering from PTS reported coexistence of PTG, we observed no significant difference in PTG with regard to direct exposure to trauma. However, in the case of indirect exposure to trauma, children and adolescents who were exposed to electronic media were found to report more PTG than those who were not

exposed to electronic media. These findings are in congruence with Yoshida et al. (2016), who also observed significantly higher PTG in children who watched the media reports of the Great East Japan Earthquake than those who did not. Studies suggest that watching media coverage of disasters can lead to deliberate rumination, which has been known to facilitate PTG (Taku et al., 2009; Zhou and Wu, 2016; Kim and Bae, 2019). A study by Taku et al. (2009) among US and Japanese samples reported that deliberate rumination strongly predicted the PTG for both the groups. A longitudinal study in the aftermath of an earthquake among the Chinese adolescents suggests that deliberate rumination is conducive to rebuilding the post-traumatic world and eventually elicits PTG after the trauma (Zhou and Wu, 2016). The deliberate rumination is, thus, an important factor facilitating PTG.

We reiterate that having around 40% of the children and adolescents reporting high level of PTS and also experiencing PTG proves the coexistence of PTS and PTG in COVID-affected population as well. This has been reported by other researchers as well (Wang et al., 2018; Fino et al., 2021). We did not directly investigate the possible factors explaining this relationship, but other researchers have reported resilience, emotion regulation, and high social support as mediating factors affecting this coexistence. However, the very fact that the participants of this study with at least one or more siblings experienced higher PTG suggests the significance of high social support from siblings in establishing and/or maintaining this coexistence.

Considering the severe global impact of COVID-19, the missing focus on children and adolescents, and the urban-centric view toward the whole situation, this study adds value to the ongoing research in this field. Very few studies have analyzed the effect of direct and indirect exposure on children and adolescent population. In the Indian context, we found no studies reporting PTS of children and adolescents, and thus, this study fills a very important gap in the existing literature. Moreover, the significant impact of indirect exposure with electronic media contributing significantly to PTS is an important finding bearing serious implications.

However, this study has several limitations. Although the Cronbach's alpha for the PTS scale was 0.78, the Cronbach's alpha for the subscales were 0.613, 0.60, and 0.612, respectively. The acceptable range is $0.7 \leq \alpha < 0.8$, and therefore, the PTS level estimated using this tool is also acceptable. Statisticians consider the internal consistency questionable when $0.6 \leq \alpha < 0.7$. Internal consistency suggests the coherence of the items. Thus, from a conservative point of view, one may question the dominance of arousal as a PTS characteristic reported in this study. This is a methodological limitation. The findings of this study are based on the cross-sectional data with a skewed sample in terms of age of the participants. Only 3.7% of participants were children, while the remaining 96.3% were adolescents. This limits the generalization of the findings for the child population. The lack of pre-COVID-19 prevalence rate of PTS limits the findings to the impact of the examined stressful situation only. Furthermore, the data were collected after 30 days of the catastrophic second wave. A longitudinal data would have helped see the unfolding of aftereffect of the pandemic.

CONCLUSION

This study shows the repercussions of direct and indirect exposure of COVID-19-related experiences of children and adolescents and its subsequent relationship with PTS and PTG. A substantial percentage of children and adolescents exhibited higher levels of PTS due to COVID-19. The direct exposure to hospitalization and indirect exposure *via* electronic media were significantly associated with PTS. The indirect exposure through print media, however, did not lead to significant rise in PTS. The indirect exposure to electronic media was found to influence COVID-19-related PTS in a major way. Moreover, those who reported PTS also reported PTG, indicating that they probably coexist.

The study holds several important implications. It found arousal to be the most frequently associated characteristics of trauma. Furthermore, children and adolescents of rural areas experienced significantly higher intrusion. These findings can be of immense help in planning mental health interventions. Children and adolescents with at least one or more siblings experienced higher PTG. This finding may hold a utilitarian value in designing the targeted interventions for this vulnerable population. Combining the family and sibling support system with psychological interventions might enable their optimization. The findings have some takeaways for the public health policy. It highlights the positive role of family structures, and the adverse impact of excessive exposure through mass media. An important takeaway is the management of media exposure for better control and choice of the content so as to avoid inadvertent mental health issues.

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 Institute Ethics Committee, Indian Institute of Technology Kanpur, India. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

BB, SB, and UG were involved in planning the study and data collection and analysis. All authors agreed to be accountable for the content of the study and equally contributed to the planning and conducting of the study.

ACKNOWLEDGMENTS

We thank the parents and school authorities for allowing their wards to participate in this study.

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Compassion Satisfaction, Compassion Fatigue and Hardiness Among Nurses: A Comparison Before and During the COVID-19 Outbreak

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OPEN ACCESS

Edited by:

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 15 November 2021

Accepted: 31 December 2021

Published: 10 February 2022

Citation:

Zakeri MA, Rahiminezhad E,
Salehi F, Ganjeh H and Dehghan M
(2022) Compassion Satisfaction,
Compassion Fatigue and Hardiness
Among Nurses: A Comparison Before
and During the COVID-19 Outbreak.
Front. Psychol. 12:815180.
doi: 10.3389/fpsyg.2021.815180

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Background: Nurses provide the majority of health-care services and face numerous health challenges during an epidemic. During the COVID-19 epidemic, nurses are subjected to physical, mental, and social disorders that impair their quality of life and hardiness. Therefore, it is important to be aware of the situation of nurses. The current study aimed to compare the compassion satisfaction, compassion fatigue and hardiness among nurses before and during the COVID-19 outbreak.

Materials and Methods: This cross-sectional study included 508 clinical nurses from one public hospital in southern Iran. The subjects were recruited using census sampling methods in 2019–2020. Sampling was performed before ($n = 266$) and during the COVID-19 ($n = 242$) with a 1-year interval. Although, the study setting was the same before and during the COVID-19, questionnaires were completed by different nurses before and during the COVID-19. Demographic questionnaire, professional quality of life (ProQOL) questionnaire and Occupational Hardiness Questionnaire were used to collect data.

Results: The scores of compassion satisfaction, compassion fatigue and hardiness did not differ significantly during the COVID-19 compared with before the COVID-19 ($p > 0.05$). Before COVID-19, hardiness and work experience predicted 11% of the variance of compassion satisfaction, whereas during COVID-19, hardiness and gender predicted 26% of the variance of compassion satisfaction. Before COVID-19, hardiness and work experience predicted 3% of the variance of compassion fatigue, whereas during COVID-19, hardiness, type of employment and gender predicted 6% of the variance of compassion fatigue.

Conclusion: The current study found that compassion satisfaction, compassion fatigue and hardiness did not change during the COVID-19 outbreak compared with before the COVID-19 outbreak. However, during the COVID-19, the hardiness was a significant

predictor of compassion satisfaction and compassion fatigue. The study results showed that it was possible to increase the compassion satisfaction and reduce the compassion fatigue by strengthening the hardiness of nurses. However, these results need to be considered in future studies, especially in crises such as COVID-19 disease.

Keywords: compassion satisfaction, compassion fatigue, hardiness, nurse, COVID-19

INTRODUCTION

COVID-19 first appeared in Wuhan, China in December 2019 and quickly spread throughout the world (Kisa, 2020). On March 11, 2020, the World Health Organization declared COVID-19 a pandemic (Sahin et al., 2020). Certainly, the general public has experienced anxiety, stress, fear, uncertainty, and insecurity as a result of the COVID-19 pandemic (Zakeri et al., 2021c,f). In this dire situation, nursing is one of the most important occupational groups, as well as one of the foundations of healthcare organizations. Due to its direct relationship with human health, the healthcare sector is now one of the most important areas of sustainable development in human societies (Zakeri et al., 2021b). Nurses provide the majority of the healthcare services in an epidemic (Wan et al., 2020), and they have the most contact with patients (Zakeri et al., 2021d). During the COVID-19 epidemic, front-line nurses face numerous health challenges (Wan et al., 2020) and are directly at risk when treating and caring for COVID-19 patients; as a result, severe stress and problems they experience at work lead to physical, mental, and social disorders (Kisa, 2020; Wan et al., 2020). Therefore, these factors can have an impact on nurses' job performance and health, as well as their overall quality of life (Celmece and Menekay, 2020).

The concept of quality of professional life, which is related to personality traits and work environment of individuals (Zakeri et al., 2020) has two dimensions: compassion satisfaction and compassion fatigue (Lu et al., 2020; Zakeri et al., 2020). Compassion satisfaction refers to a person's satisfaction with their ability to do their job well. Compassion satisfaction is one's attitude toward their job that is associated with positive tendencies or feelings about one's job (Zakeri et al., 2020). Compassion fatigue was firstly defined as an unpleasant psychological complication experienced by nurses and is divided into two parts: secondary traumatic stress and job burnout (Gerami Nejad et al., 2019). Employees with higher quality of professional life have a stronger organizational identity, higher job satisfaction, and are less likely to leave their jobs (Gerami Nejad et al., 2019; Zakeri et al., 2020). Before the COVID-19 outbreak, a meta-analysis study (2017) reported high prevalence of compassion satisfaction, compassion fatigue and burnout (Ruiz-Fernández et al., 2020a). Another study conducted on Australian emergency nurses also showed an average to high levels of compassion satisfaction and low to average levels of compassion fatigue (O'Callaghan et al., 2020). Celmece and Menekay (2020) found that stress, anxiety, and burnout had an impact on quality of life of healthcare workers caring for COVID-19 patients (Celmece and Menekay, 2020). Vafaei et al. (2020) reported a negative correlation between depression and quality

of life among obstetric and gynecological healthcare providers during the COVID-19 outbreak. However, social support had a significant impact on improving quality of life (Vafaei et al., 2020). Nurses' quality of life and job performance are influenced by their hardiness (Hatamipour et al., 2017).

Hardiness, a personality trait, serves as a source of resistance in the face of adversity. Hardy people have the ability to control life events, and they see problems as opportunities for advancement (Abdollahi et al., 2014; Teo et al., 2021). Maddi (2002) coined the term hardiness as a way to understand one's relationship with others, goals, and problems. Hardiness consists of three parts: commitment, control, and challenge (Maddi, 2002; Saksvik-Lehouillier et al., 2016). Highly committed people believe in the importance, value, and meaning of who they are and what they do, and as a result, they can find meaning and arouse their curiosity in everything they do. People who have a strong sense of control see life events as predictable and controllable, and they believe that they can influence everything that happens around them. Individuals who are highly challenging believe that change is a natural part of life. These people see positive or negative situations as opportunities to learn and grow rather than as threats to their security and well-being (Maddi, 2002; Saksvik-Lehouillier et al., 2016; Teo et al., 2021). Vagni et al. (2020b) studied hardiness and coping strategies as mediators of stress and secondary trauma among emergency workers during the outbreak of COVID-19. They showed that hardiness and coping strategies helped reduce stress that predicted secondary trauma. Hardiness causes emergency personnel to be active and resistant, and to solve problems (Vagni et al., 2020b). Before the COVID-19 outbreak, Maramis and Cong (2019) studied the relationship between nurses' hardiness personality and burnout. In this study, nurses had the highest level of hardiness (49.0%) and there was a poor but significant negative relationship between hardiness and burnout among nurses (Maramis and Cong, 2019).

A review of the literature comparing some variables before and after the COVID-19 pandemic indicates the need for further investigation into the impact of COVID-19 disease on these parameters. Zakeri et al. (2021e) showed that burnout did not change significantly during the COVID-19 pandemic compared with before the COVID-19. Zakeri et al. (2020) found that the mean scores of compassion satisfaction and burnout were 38.89 and 21.84, respectively, before the COVID-19 pandemic. However, Zhou et al. (2021) reported that these variables were 41.43 and 19.42, respectively, in the prevalence of COVID-19 disease. In addition, no study was found to compare compassion satisfaction, compassion fatigue and hardiness among nurses before and during the COVID-19 outbreak. Nurses are subjected to physical, mental, and social disorders during the COVID-19 epidemic (Zakeri et al., 2021a) that impair their quality of life and

hardiness. Therefore, it is important to be aware of the situation of nurses. The current study aimed to compare the compassion satisfaction, compassion fatigue and hardiness among nurses before and during the COVID-19 outbreak.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional study was conducted to investigate the compassion satisfaction, compassion fatigue, and hardiness of nurses in Rafsanjan before and during the COVID-19 outbreak.

Sample Size and Sampling

In the present study, the study population consisted of 400 nurses before the COVID-19 disease and 500 nurses in the first wave of COVID-19 disease who worked in intensive care units, general wards and other medical wards. This study was performed in two times, before the COVID-19 and during the first wave of COVID-19 epidemic with 1 year apart. Ali Ibn Abi Talib Hospital was the only COVID-19 referral hospital in Rafsanjan city, Kerman province. Both groups of nurses were participated in the study by census sampling method. Inclusion criterion for nurses before the COVID-19 outbreak was at least 1 year of nursing experience and inclusion criteria for nurses during the COVID-19 were at least 1 year of nursing experience and at least 3 months of caring for COVID-19 patients. Nurses with mental disorders (based on self-report) and incomplete questionnaire were excluded from the study. Although, the study setting was similar before and during the COVID-19, questionnaires were completed by different nurses before and during the COVID-19.

Before the COVID-19 outbreak (from April to July 2019), 279 nurses completed the questionnaires (out of 400), with 13 of them being excluded from the study because of high missing value. Therefore, the effective response rate of nurses was 66.5% ($n = 266$). During the COVID-19 outbreak (from April to July 2020), 255 completed the questionnaires (out of 500), with 12 of them being excluded from the study because of high missing value, and one being excluded due to the history of mental disorders, so the effective response rate of nurses was 48.4% ($n = 242$). Finally, the data of 508 nurses were used in the final analysis.

Measurements

A three-part questionnaire was used to collect data: socio-demographic characteristics, the professional quality of life questionnaire (ProQOL), and hardiness.

Socio-Demographic Characteristics

They include gender, age, marital status, educational level, income (million riyal), type of employment, work experience, ward, shift and working hours per month.

Professional Quality of Life Questionnaire

The ProQOL questionnaire consists of two sub-scales: (1) compassion satisfaction (10 items), (2) compassion fatigue (secondary traumatic stress and burnout include 20 items).

Compassion fatigue is conceptualized through secondary traumatic stress and burnout. The questionnaire consists of 30 items that are scored on a five-point Likert scale (never = 1 to always = 5). The items (1, 4, 15, 17, and 29) are scored inversely (Stamm, 2010). High scores of compassion satisfaction indicates one's satisfaction and ability to provide services and care whereas high scores of compassion fatigue reflect one's vulnerability to disappointment and discomfort. Standard scores for domains are classified as high (above 42), moderate (41–23), low (below 22). Zakeri et al. (2020) translated and used the questionnaire in Iran. Instrument validity was determined by content validity, and its reliability was determined by Cronbach's alpha coefficient. Reliability coefficients for CS, STS, and BO were 0.82, 0.8, and 0.47, respectively (Zakeri et al., 2020). In the present study, the Cronbach's alpha coefficients for CS, STS, and BO were 0.86, 0.79, and 0.51, respectively.

Occupational Hardiness Questionnaire

Moreno-Jiménez et al. (2014) developed the Hardiness Questionnaire, which consists of 17 items on a 4-point Likert scale ranging from completely disagree (1) to completely agree (4) to assess occupational hardiness. It consists of three parts: control (3, 6, 9, 12, and 15), challenge (2, 5, 8, 11, 13, and 17), and commitment (1, 4, 7, 10, 14, and 16). People with a score higher than 45 are hardy while those with a lower score are not. Moreno-Jiménez et al. (2014) used the internal consistency method and Cronbach's alpha coefficient to confirm the scientific validity and reliability of the Occupational Hardiness Questionnaire. Cronbach's alpha coefficients were 0.76, 0.80, 0.74, and 0.86 for control, challenge, commitment, and the whole scale, respectively (Moreno-Jiménez et al., 2014). Akbari Balotanbegan et al. (2015) approved it among nurses in Iran using internal consistency method and Cronbach's alpha coefficient. Cronbach's alpha coefficient for the total scale was 0.88 (Akbari Balotanbegan et al., 2015). In the present study, the Cronbach's alpha coefficients were 0.74, 0.73, 0.74, and 0.89 for control, challenge, commitment, and the whole scale, respectively.

Data Collection

Participants were frontline nurses from two hospitals in Rafsanjan ($n = 400$). We collected data from nurses between April and July 2019 before the COVID-19 and from April to July 2020 during the COVID-19. Before and during the COVID-19, sampling was performed based on the socio-demographic characteristics, the professional quality of life (ProQOL) and hardiness. The researcher began sampling after obtaining the necessary permits and distributed questionnaires among eligible nurses. Nurses completed the questionnaires at an appropriate time in the presence of the researcher.

Data Analysis

SPSS 25 was used for data analysis. Frequency, percentage, mean, and standard deviation were used to describe the participants' characteristics, the ProQOL and hardiness levels. Independent t test was used to compare the ProQOL and hardiness levels before and during the COVID-19 outbreak. Independent t test, analysis of variance test and multivariate linear regression test

were used to determine the correlates of ProQOL and hardiness before and during the COVID-19 outbreak. A significance level of 0.05 was considered.

Ethical Considerations

The study protocol was approved by the Rafsanjan University of Medical Sciences (IR.RUMS.REC.1397.099 and IR.RUMS.REC.1399.135). At the beginning of the study and before the sampling, the researcher explained some information about the study objectives, confidentiality and anonymity of the information, and the voluntary participation. It was necessary to meet ethical standards, which meant that participation was voluntary and that all information was kept confidential. Participants were assured that their participation or withdrawal from the study would have no effect on their work and that all of their information would remain private. An informed written consent form was obtained from eligible nurses.

RESULTS

Table 1 shows the characteristics of the participants. The mean ages of the participants was 33.32 ± 6.12 and 33.07 ± 6.90 before the COVID-19 and during the COVID-19, respectively. The majority of the participants were female, married, had a bachelor's degree, and had 3–5 years of work experiences.

The mean scores of compassion satisfaction and compassion fatigue were 38.78 ± 6.57 and 47.87 ± 9.81 , respectively, before the COVID-19. The mean scores of compassion satisfaction and compassion fatigue were 38.19 ± 6.52 and 49.70 ± 11.35 , respectively, during the COVID-19. The compassion satisfaction and compassion fatigue scores did not change significantly during the COVID-19 compared with before the COVID-19 ($p > 0.05$) (**Table 2**). The majority of the participants had moderate level of compassion satisfaction and compassion fatigue before and during the COVID-19 (**Figure 1**).

The mean scores of hardiness were 46.92 ± 7.05 and 46.84 ± 7.14 before and during the COVID-19, respectively. The scores of hardiness and all its dimensions did not change significantly during the COVID-19 compared with before the COVID-19 ($p > 0.05$) (**Table 3**). The majority of the participants had hardiness before and during the COVID-19 (**Figure 1**).

Multiple regression models were tested to see if study variables could predict compassion satisfaction, compassion fatigue, and hardiness before and during the COVID-19. Before the COVID-19, hardiness and work experience predicted 11% of the variance of compassion satisfaction, while hardiness and gender predicted 26% of the variance of compassion satisfaction during the COVID-19.

Before the COVID-19, hardiness and work experience predicted 3% of the variance of compassion fatigue, while, hardiness, type of employment, and gender predicted 6% of the variance of compassion fatigue during the COVID-19. Hardiness was found to be the best predictor of compassion satisfaction and compassion fatigue before and during the COVID-19 outbreak (**Table 4**). Marital status predicted 1% of the variance of hardiness

before the COVID-19 ($R^2 = 1\%$). Working hours per month predicted 3% of the variance of hardiness during the COVID-19.

DISCUSSION

The current study aimed to compare compassion satisfaction, compassion fatigue, and hardiness among nurses before and during the COVID-19 outbreak. The results showed that the scores of compassion satisfaction and compassion fatigue did not change during the COVID-19 outbreak compared to before the COVID-19 outbreak. Most of the participants had relatively moderate levels of compassion satisfaction and compassion fatigue before and during the COVID-19 outbreak. Scores of hardiness and its dimensions (commitment, control, and challenge) did not change significantly during the COVID-19 outbreak when compared to before the COVID-19 outbreak. Most of the participants were hardy both before and during the COVID-19 outbreak.

Trumello et al. (2020) showed that healthcare professionals dealing with patients with COVID-19 had lower levels of compassion satisfaction than those dealing with non-COVID-19 patients (Trumello et al., 2020). The reason for inconsistency was that in the present study, the level of compassion satisfaction was moderate and did not change during the COVID-19 outbreak compared to before the COVID-19 outbreak. Sampling was taken during two different times (before and during the epidemic) but the study of Trumello et al. (2020) was conducted during the epidemic. Zhou et al. (2021) showed that compassion satisfaction among healthcare professionals (nurse and physician) was moderate to high during the COVID-19 outbreak. Compassion satisfaction had a positive relationship with hand hygiene (Zhou et al., 2021) because compassion satisfaction was moderate during the COVID-19 outbreak, which is consistent with the present study. Dwyer et al. (2021) reported low levels of compassion fatigue and burnout, but moderate levels of compassion satisfaction among participants. Compassion satisfaction was notably higher than prior literature in the present study. The reason for inconsistency may be that in the present study, the scores of compassion satisfaction and compassion fatigue did not change during the COVID-19 outbreak compared to before the COVID-19 outbreak. On the other hand, the participants in the present study basically had high levels of compassion satisfaction (before the COVID-19 outbreak).

Ruiz-Fernández et al. (2020b) showed that healthcare professionals (physicians, nurses, etc.) had moderate to high levels of compassion fatigue and burnout during the COVID-19 epidemic in Spain. Physicians had higher scores of compassion fatigue and burnout, while nurses had higher compassion satisfaction scores (Ruiz-Fernández et al., 2020b). Ruiz-Fernández et al. (2020b) found that nurses' scores of compassion satisfaction were moderate during the COVID-19 outbreak, which supported the present study. Ruiz-Fernández et al. (2020b) also showed that nurses' scores of compassion fatigue were high during the COVID-19 outbreak, which did not support the present study. Maramis and Cong (2019) studied the relationship between nurses' hardiness personality

TABLE 1 | Comparison of the demographic characteristics of the participants before the COVID-19 and during the COVID-19.

Group Variables	Before COVID-19 (n = 266)				During COVID-19 (n = 242)			
	n (%)	Compassion satisfaction	Compassion fatigue	Hardiness	n (%)	Compassion satisfaction	Compassion fatigue	Hardiness
Gender								
Male	50 (18.8)	$t = -0.77$ (0.43)	$t = 0.30$ (0.75)	$t = -0.18$ (0.85)	68 (28.1)	$t = -1.08$ (0.28)	$t = 1.34$ (0.18)	$t = 2.06$ (0.04)
Female	216 (81.2)				174 (71.9)			
Marital status								
Unmarried /Widowed /Divorce	47 (17.7)	$t = -1.30$ (0.19)	$t = -0.40$ (0.68)	$t = 2.46$ (0.01)	59 (24.4)	$t = -0.12$ (0.90)	$t = 0.44$ (0.65)	$t = -0.67$ (0.50)
Married	219 (82.3)				183 (75.6)			
Educational level								
Bachelor	237 (89.1)	$t = 0.41$ (0.67)	$t = -1.09$ (0.27)	$t = -0.22$ (0.82)	223 (92.1)	$t = 0.61$ (0.54)	$t = -1.02$ (0.30)	$t = 0.33$ (0.73)
Master's	29 (10.9)				19 (7.9)			
Income (Million Riyal)								
<3	106 (39.8)	$F = 0.19$ (0.82)	$F = 0.89$ (0.40)	$F = 1.92$ (0.14)	28 (11.6)	$F = 0.78$ (0.45)	$F = 3.07$ (0.04)	$F = 1.11$ (0.33)
3–5	141 (53.1)				177 (73.1)			
>5	19 (7.1)				36 (15.3)			
Type of employment								
Hired	164 (61.7)	$t = 1.97$ (0.04)	$t = 0.56$ (0.57)	$t = -0.73$ (0.42)	161 (66.5)	$t = -0.46$ (0.64)	$t = 2.29$ (0.02)	$t = 0.33$ (0.73)
Contract recruiters ^a /Committed ^b	102 (38.3)				81 (33.5)			
Work experience (year)								
>5	73 (27.4)				87 (36.0)			
5–10	120 (45.1)	$F = 2.89$ (0.03)	$F = 1.95$ (0.12)	$F = 2.80$ (0.04)	67 (27.7)	$F = 0.83$ (0.47)	$F = 0.66$ (0.57)	$F = 0.95$ (0.41)
11–15	40 (15.0)				38 (15.7)			
>15	33 (12.4)				50 (20.7)			
Ward								
Critical/intensive	76 (28.6)				89 (36.8)			
Emergency	44 (16.5)	$F = 1.22$ (0.94)	$F = 0.35$ (0.78)	$F = 1.82$ (0.14)	65 (26.9)	$F = 2.09$ (0.10)	$F = 1.84$ (0.14)	$F = 1.57$ (0.19)
Medical	90 (33.8)				59 (24.4)			
Others	56 (21.1)				29 (12.0)			
Shift								
Fixed	26 (9.8)	$t = 0.98$ (0.32)	$t = -1.87$ (0.06)	$t = 0.72$ (0.46)	23 (9.5)	$t = 0.01$ (0.98)	$t = 0.22$ (0.82)	$t = -0.99$ (0.32)
Rotational	240 (90.2)				219 (90.5)			
Working hours (h) per month								
<150	46 (17.3)				46 (19.0)			
150–160	100 (37.6)	$F = 0.96$ (0.40)	$F = 0.83$ (0.47)	$F = 1.47$ (0.22)	108 (44.6)	$F = 1.23$ (0.29)	$F = 0.38$ (0.76)	$F = 4.14$ (0.007)
161–170	80 (30.1)				49 (20.2)			
>170	40 (15.0)				39 (16.1)			

Data were presented numerically (%). *t*, Independent *t* test; *F*, Analysis of variance test.

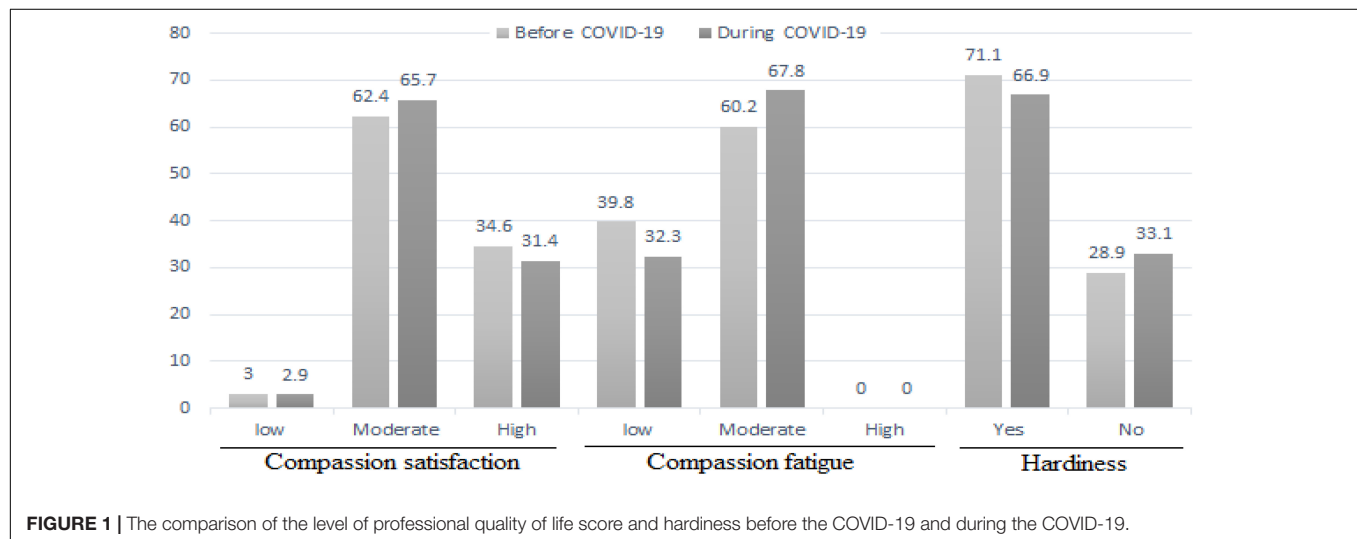
^aAnnually contracted with payment similar to hired nurses.

^bIt is obligatory to work for government for 2 years at a lower rate of pay.

TABLE 2 | Comparison of the professional quality of life score among the participants before and during the COVID-19.

Group Variables	Before COVID-19 (n = 266)			During COVID-19 (n = 242)			Independent t test	Effect size	P value
	Median	Mean	SD	Median	Mean	SD			
Compassion satisfaction	39.50	38.78	6.57	38.00	38.19	6.52	1.02	0.13	0.31
Compassion fatigue	48.00	47.87	9.81	49.00	49.70	11.35	-1.94	0.17	0.06

SD, Standard Deviation.

**FIGURE 1 |** The comparison of the level of professional quality of life score and hardiness before the COVID-19 and during the COVID-19.**TABLE 3 |** Comparison of the level of hardiness among the nurses before the COVID-19 and during the COVID-19.

Group Variables	Before COVID-19 (n = 266)			During COVID-19 (n = 242)			Independent t test	Effect size	P value
	Median	Mean	SD	Median	Mean	SD			
Control	15.00	14.31	2.28	15.00	14.20	2.52	0.49	0.05	0.62
Challenge	17.00	16.65	2.73	17.00	16.90	2.69	-1.05	0.09	0.29
Obligation	16.00	15.96	2.75	16.00	15.73	2.89	0.92	0.08	0.35
Hardiness	47.00	46.92	7.05	47.50	46.84	7.14	0.13	0.01	0.89

SD, Standard Deviation.

and burnout before the COVID-19 outbreak. In this study, nurses caring for inpatients had a high level of hardiness personality (Maramis and Cong, 2019).

Vagni et al. (2020a) showed that hardiness reduced stress, burnout and increased personal accomplishment among emergency workers during the COVID-19 outbreak. Park et al. (2018) showed that hardiness had an impact on the mental health of nurses during the MERS-CoV epidemic (Park et al., 2018). Park et al. (2018) found that the mean score of hardiness among nurses was lower than the mean score of hardiness among nurses in the present study. Hardiness, as shown in other studies (Bartone, 2006; Bartone et al., 2008), allows the individual to promote active attitudes, be committed to a goal, and perceive external situations, even negative ones, as opportunities to challenge. Hardiness can be a protective factor

against the effects of stress and burnout (Vagni et al., 2020a). Hardiness, like other studies on health care workers involved during the COVID-19 outbreak, reduces the stress that predicts secondary trauma (Vagni et al., 2020b) and burnout (Vagni et al., 2020a). In the present study, hardiness was moderate during the COVID-19 outbreak and was an important predictor of compassion fatigue.

Frontline healthcare providers (physicians and nurses) not only experience mental health problems during an epidemic, but also their quality of professional life deteriorates long after the initial outbreak (Nathiya et al., 2021). It is important to monitor the mental health of health care providers, especially during this epidemic (Ortega-Galán et al., 2020). Compassion is an indicator of psychological well-being that includes cognitive and emotional functions with both voluntary and behavioral

TABLE 4 | The comparison of multiple regression analysis summary for compassion satisfaction, compassion fatigue and hardiness before COVID-19 and during COVID-19.

Variable	Multivariate regression									
	Before COVID-19 (n = 266)					During COVID-19 (n = 242)				
	Variable	B	95% confidence interval for B	P value	R ²	Variable	B	95% confidence interval for B	P value	R ²
Compassion satisfaction	Hardiness	0.16	0.04–0.26	0.007	11%	Hardiness	0.52	0.37–0.57	<0.001	26%
	Job history	0.12	0.02–1.66	0.043		Gender	0.13	0.41–3.59	0.014	
Compassion fatigue	Hardiness	−0.13	−0.35 to −0.02	0.026	3%	Hardiness	−0.19	−0.51 to −0.11	0.002	6%
	Job history	−0.17	−3.30 to −0.21	0.026		Type of employment	−0.17	−7.07 to −1.10	0.008	
	Type of employment	−0.13	−5.69 to 0.36	0.084		Gender	−0.13	−6.59 to −0.27	0.033	
Hardiness	Marital status	−0.15	−4.97 to −0.55	0.014	1%	Working hours per month	−0.15	−2.08 to −0.23	0.014	3%
	–	–	–	–		Gender	−0.12	−3.93 to 0.02	0.053	

Data were presented as multiple regression analysis. Gender (male = 1 and female = 2); Job history (>5 = 1, 5–10 = 2, 11–15 = 3, and >15 = 4); Type of employment (Hired = 1 and Others Contract recruiters/Committed = 2); Working hours per month (<150 = 1, 150–160 = 2, 161–170 = 3, and >170 = 4); Marital status (Unmarried/Widowed/Divorce = 1 and married = 2).

aspects (Zhang et al., 2018). Compassion satisfaction refers to the positive feelings and attitudes that people have toward their job (Zakeri et al., 2020). Compassion fatigue leads to avoidance or fear of dealing with certain patients, a decreased ability to empathize with patients or families, and mood swings (restlessness, irritability, hypersensitivity, anxiety, and anger), gastrointestinal, cardiovascular symptoms and sleep disorders (Zhang et al., 2018). In this specific situation, nurses could use their inherent motivation to care for patients as a means of gaining compassion satisfaction (Ruiz-Fernández et al., 2020b). The community's genuine appreciation for the nurses' efforts can strengthen the compassion of professionals who compromise their lives to help patients with COVID-19 (Alharbi et al., 2020). Continuing education programs (Zakeri and Dehghan, 2021) and compassion skills programs should be implemented to reduce compassion fatigue and improve compassion satisfaction and quality of life among professionals, as they can improve the patient quality of care and safety (Kim and Lee, 2020).

Hardiness, work experience, type of employment and gender were the variables that predicted compassion fatigue before and during the COVID-19. Zakeri et al. (2020) found that only clinical competence and job satisfaction were associated with compassion fatigue before the COVID-19. In Cetrano et al. (2017), study ergonomic problems and impact of work on life predicted higher levels of both compassion fatigue and burnout. Consistent with the results of the present study, Ruiz-Fernández et al. (2020b) showed that occupation and gender were associated with compassion fatigue during the COVID-19. We did not find further studies to compare these variables before and during the COVID-19 disease. Therefore, caution must be taken when interpreting the results. The outbreak of COVID-19 disease may have destructive effects on the condition

of nurses. For the first time, the current study focused on the role of hardiness in compassion fatigue before and during the COVID-19. Hardiness is characterized by innate personality traits (Park et al., 2018). Gito et al. (2013) showed that hardy nurses had better mental health and hardiness was inversely related to stress. With good social support and proper stress management, healthcare workers in the COVID-19 unit should be more flexible (Nathiya et al., 2021) to achieve higher levels of hardiness in order to reduce compassion fatigue. However, managers should pay attention to the factors that affect hardiness and then try to increase the nurses' hardiness using different modalities. Due to the small local sample and specific Iranian culture, it is necessary to consider these results in future studies and to conduct more detailed studies in larger groups and different cultures.

The main limitation of this study was that the data were obtained from a cross-sectional study, which did not allow for the examination of continuous variation of variables. Adaptation to conditions as well as measures currently being taken to adapt the workplace to new conditions (such as providing protective equipment or increasing the number of health care professionals, etc.) can affect these factors. Therefore, a follow-up study is essential over the next few months.

This study was performed on a small sample of local nurses in a center in southern Iran, so caution should be taken when interpreting the results. Comparison of these nurses with frontline nurses in other centers can be useful. Due to the lack of similar studies, it is necessary to be careful in interpreting the results and further studies on these variables is needed. Finally, the explained variance for compassion satisfaction and compassion fatigue is low (11 and 6%, respectively); therefore, more studies with a larger sample size are recommended to confirm the present study results.

CONCLUSION

This study found that compassion satisfaction and compassion fatigue did not change among nurses during the COVID-19 outbreak compared to before the COVID-19. Scores of hardiness and its dimensions (commitment, control, and challenge) did not change significantly during the COVID-19 outbreak compared to before COVID-19. Due to the stressful situations among nurses who are in direct contact with COVID-19 patients, their mental health is important to provide health care in the COVID-19 epidemic. The study results show that we can be acquainted with the levels and changes in the variables of compassion satisfaction, compassion fatigue, and hardiness among nurses during the COVID-19 pandemic. Although, the present study did not show significant changes in these variables before and after the outbreak of COVID-19 pandemic, due to the lack of similar studies, further studies need to pay more attention to the factors affecting these variables. Policymakers need effective strategies to improve mental health and cope with critical situations as well as to increase the productivity of hospital staff. Efforts to strengthen nurses' hardiness increase compassion satisfaction and reduce compassion fatigue. However, these results should be considered in future studies, especially in crises such as the COVID-19, which can have different effects on groups and communities, and future studies must address this crisis comprehensively and find ways to reduce these destructive effects. Therefore, the study of variables before and after pandemics can provide a different perspective toward selecting different interventions and strategies for improving compassion satisfaction, and hardiness and reducing compassion fatigue among nurses.

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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 Rafsanjan University of Medical Sciences. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MZ and MD designed the study, provided critical feedback on the study and statistical analysis, and inputted to the draft of this manuscript. MZ, ER, FS, HG, and MD wrote the manuscript. HG collected the data. All authors have read and approved the final manuscript.

ACKNOWLEDGMENTS

This study is part of the research project. We would like to thank the authorities of the Social Determinants of Health Research Centre, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

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- 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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Prioritizing Positivity, Styles of Rumination, Coping Strategies, and Posttraumatic Growth: Examining Their Patterns and Correlations in a Prospective Study

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OPEN ACCESS

Edited by:

Mariela Di Tella,
University of Turin, Italy

Reviewed by:

Magdalena Błazek,
Medical University of Gdansk, Poland
Ezgi Ulu,
Near East University, Cyprus

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 24 December 2021

Accepted: 10 January 2022

Published: 25 February 2022

Citation:

Zięba M, Wiecheć K, Wójcik NE and
Zięba MJ (2022) Prioritizing Positivity,
Styles of Rumination, Coping
Strategies, and Posttraumatic
Growth: Examining Their Patterns
and Correlations in a Prospective
Study.
Front. Psychol. 13:842979.
doi: 10.3389/fpsyg.2022.842979

Objectives: A growing number of studies indicate that coping with the experience of a crisis event, which causes a breach in the individual's fundamental beliefs regarding the world and his/her place in it, can result in posttraumatic growth. Positive emotions can have an undoing effect on negative emotional arousal and broaden an individual's scope of action, and they can foster posttraumatic growth. This study aimed to examine relations between prioritizing positivity, styles of rumination, coping strategies, and posttraumatic growth.

Methods: One hundred and sixty-four Polish adults took part in the study, filling out questionnaires to measure prioritizing positivity, hope, and self-efficacy. Twelve to fifteen months later, 104 of them accepted the invitation to the second part of the study. The participants reported the intensity of rumination associated with the most critical event in their lives, which took place between the first and second stages of the study and the coping strategies they used. Posttraumatic growth and life satisfaction were also measured.

Results: Results from hierarchical regressions found that higher levels of prioritizing positivity, deliberate ruminations, and religious coping and lower level of intrusive ruminations were associated with posttraumatic growth. The results also indicate that self-esteem was a significant predictor of life satisfaction.

Conclusions: The results of the prospective study confirm that individual differences in prioritizing positivity can relate to a process of posttraumatic growth. Prioritizing positivity was associated with the use of an active coping strategy and deliberate but not intrusive ruminations. Previous studies on the role of prioritizing positivity have focused on the impact on the level of wellbeing of seeking positive emotions in everyday life. Our results show the importance of prioritizing positivity in coping with stress and trauma. These results can be used to design effective psychological intervention techniques to support people experiencing trauma and psychological crises. The results also indicate that life satisfaction has different predictors from posttraumatic growth.

Keywords: prioritizing positivity, posttraumatic growth, life satisfaction, hope, hierarchical regression analysis

INTRODUCTION

A growing number of studies indicate that the process of coping with the experience of a traumatic or crisis event, which causes a breach in the individual's assumptive world and fundamental beliefs (Janoff-Bulman, 1992, 2004), can result in posttraumatic growth (Linley and Joseph, 2004; Tedeschi et al., 2018; Taku et al., 2021). Posttraumatic growth has been defined as positive psychological changes experienced as a result of the struggle with the aftermath of a highly stressful and potentially traumatic life event that may be observed in five domains: increasing the sense of personal strength, improving relationships with other people, discovering new opportunities, heightening appreciation for life, and spiritual and existential changes (Taku et al., 2008; Shakespeare-Finch et al., 2013; Tedeschi et al., 2017, 2018). The theoretical model of posttraumatic growth (Tedeschi et al., 2018) includes pre-trauma factors (demographic characteristics, individual differences, mental status and pre-trauma assumptive world, and core beliefs), characteristics of the potentially disruptive (seismic) event, challenges to core beliefs, ruminative thoughts, managing emotional stress and coping, and self-disclosure. All these elements are interconnected and can interact.

The authors of the concept of posttraumatic growth refer to the definition of trauma presented by Janoff-Bulman (1992) as an event that represents significant challenges to individuals' ways of understanding the world and their place within it (Tedeschi and Calhoun, 2004). Such an event undermines person's previously positive core beliefs that the world is benevolent and meaningful and that the self is worthy. Therefore, the direct result of a seismic event is at least a temporary questioning of beliefs with which the experience of trauma is inconsistent. Faced with such an experience, a person puts effort into cognitive processing. Joseph and Linley (2005) and Payne et al. (2007) propose that the Piagetian terms "assimilation" and "accommodation" could be used to describe the after-trauma cognitive processes. Assimilation occurs when an event is interpreted as substantially consistent with a person's existing cognitive schemas, so no significant change in these schemas is necessary. Among the assimilation processes, Joseph and Linley (2005) also include attempts to ignore the event and avoid thinking about it. Accommodation means the process of changing one's core beliefs under the influence of an event. These changes can be positive or negative, leading to posttraumatic growth or posttraumatic depreciation (Baker et al., 2008; Cann et al., 2010; Taku et al., 2021).

Tedeschi and Calhoun (2004) and Tedeschi et al. (2018) use the term "ruminations" to describe the cognitive efforts to deal with the discrepancy in assessing a traumatic event and fundamental beliefs, distinguishing between two types: intrusive and deliberate ruminations (Cann et al., 2011), and assigning to each of them a different role in the process of posttraumatic growth. In the initial stage of posttraumatic re-adaptation, ruminations are automatic and intrusive, affecting the persistence of tension and stress (Cann et al., 2010, 2011). For many people, these ruminations gradually become more reflective (deliberate). A cognitive engagement replaces intrusive

thoughts with reflective thinking about the traumatic experience and its consequences—what happened and what it can mean. Deliberate (reflective) ruminations result from efforts to understand and reinterpret the trauma, and they are to a greater extent conscious and often intentional. The intensity and persistence of intrusive rumination are predictors of posttraumatic depreciation and deliberate rumination of posttraumatic growth (Tedeschi et al., 2018; Ogińska-Bulik and Michalska, 2021; Taku et al., 2021).

Neither posttraumatic growth nor depreciation result from experiencing trauma or a crisis event. The development of posttraumatic growth could result from emotional and cognitive coping with a traumatic experience and its impact on the functioning of a person. An essential element of the posttraumatic growth process is managing emotional distress, which may be fostered by cognitive involvement in the processing of the experience, the use of adequate coping strategies (Bussell and Naus, 2010; Rajandram et al., 2011), and above all, disclosure and use of social support (Calhoun and Tedeschi, 2013; Nordstrand et al., 2020). The positive changes perceived by the trauma survivor seem to be related to assessing the person's actions in the face of the trauma. A sense of increased personal strength is more likely to occur when someone judges that they have coped, perhaps better than they might previously have guessed, with a trauma or crisis event and its consequences. Positive changes in terms of discovering new opportunities, amplifying appreciation for life, and improving relationships with other people, seem possible when a person makes appropriate changes in their daily functioning. Spiritual and existential changes may concern people who use religious coping. Different coping strategies may support posttraumatic growth differently in its different areas. However, it should also be remembered that even the most effective coping with stress does not lead directly to the development of posttraumatic growth.

Many studies show that inducing positive emotions when confronted with severe life challenges and crises supports coping strategies (Folkman and Moskowitz, 2000a,b; Fredrickson, 2004; Tugade et al., 2004; Folkman, 2008; Leloir et al., 2010, 2012). According to the Fredrickson's broaden-and-build theory (Fredrickson 1998, 2001; Fredrickson and Branigan, 2005), positive emotions effectively reduce tension and stress, broaden the scope of one's attention and thinking, and build personal resources, such as adequate coping strategies. Moreover, the results of a longitudinal study conducted by Fredrickson et al. (2003) suggest that a high level of positive emotions before the traumatic event predicts posttraumatic growth. According to Norlander et al. (2005), too, a high level of positive emotions in daily life is associated with posttraumatic growth. Personality traits, such as high levels of extraversion and low neuroticism, are a factor in how often people experience positive emotions in their daily lives (Costa and McCrae, 1980; Steel et al., 2008). Moreover, prioritizing positivity, defined as an individual difference that reflects the ability to seek pleasant states in everyday activities, can also relate to experiencing positive emotions (Catalino et al., 2014; Catalino and Boulton, 2020; Machlah and Zięba, 2021).

The role of fundamental beliefs about oneself, other people and the world in the process of posttraumatic growth is complex. On the one hand, these beliefs challenged by the experience of trauma, and then they rebuilt (Janoff-Bulman, 2004; Tedeschi et al., 2018). On the other hand, pre-trauma beliefs can influence one's ability to manage a traumatic experience. Positive beliefs about the future, such as optimism and hope, are understood in psychology in many different ways. Not all kinds of such positive expectations are conducive to adaptation to a life crisis (Aspinwall and Tedeschi, 2010). Among the positive beliefs that can play a particularly positive role in the process of posttraumatic growth, it is worth mentioning hope (Snyder, 2002) and basic trust (Trzebiński and Zięba, 2004). According to Snyder (2000, 2002) and Snyder et al. (1991), hope is a motivational state based on two interrelated beliefs—agency and pathways. Agency is a goal-directed determination and the perceived ability to reach desired goals. Pathways thinking is the perceived ability to produce plausible routes to the goals. Agency and pathways components enhance one another and are affected by each other (Snyder, 2000). Hope is related to positive affect and more positive thoughts (Snyder, 2002), psychological adjustment (Kwon, 2002), and the use of adaptive coping strategies (Gum and Snyder, 2002). Basic trust is a fundamental assumption that the world has unchangeable order and meaning and is generally positive toward human beings (Trzebiński and Zięba, 2004). The results of previous studies on oncology patients indicate that level of basic trust is positively related to the posttraumatic growth (Trzebiński and Zięba, 2013).

This study aimed to examine relations between prioritizing positivity, styles of rumination, coping strategies, and posttraumatic growth. According to the previous studies, prioritizing positivity is associated with a high overall level of life satisfaction and less depression, better positive relationships with others, ego-resilience, self-compassion, and mindfulness (Catalino et al., 2014; Catalino and Boulton, 2020; Machlah and Zięba, 2021). It is known from the research results presented above that prioritizing positivity is conducive to taking active measures that increase the probability of experiencing positive emotions. Based on current knowledge about the role of positive emotions in posttraumatic growth, we consider that prioritizing positivity can act as a personal resource. When struggling with life crises, people with a high level of prioritizing positivity experience positive emotions more often. This, in turn, may affect the use of more adaptive coping strategies and the cognitive processing of difficult life experiences. Positive emotions can contribute to a higher openness to finding solutions and discovering new ways of acting and interpreting experience. However, no studies have so far been carried out to check the potentially positive role of prioritizing positivity in the context of traumatic or crisis experiences. The study also aimed to check whether and to what extent the potentially positive effect of prioritizing positivity on posttraumatic growth is mediated by the intensification of deliberate ruminations and the use of adaptive coping strategies. The hypothesis that the positive role of prioritizing positivity in the process of posttraumatic readaptation is related to the level of hope and basic trust

was also subject to empirical verification. We further checked to what extent the paths leading to posttraumatic growth and experiencing life satisfaction differ.

MATERIALS AND METHODS

Participants

The participants of the first study stage were 164 adult residents of Poznań (a large city in the western part of Poland) and the surrounding area who responded to a request to participate in a research project on life events. The invitation was spread on local websites and leaflets distributed throughout the city. In the period from 12 to 16 months later, we recontacted the participants to recruit them for the next stage of the study. A portion of the first stage sample could not be reached by email because addresses were unavailable or no longer valid (11 of 164, or 6.7%). Of the others, 120 expressed an interest in participating and 104 of them eventually did so, representing a 63.4% response rate. The second stage study participants ($N=104$) did not differ from those who did not participate ($n=60$) in age, sex, or any of the variables reported in the first stage of the study. The eventual sample included 66 women and 38 men with ages ranging from 19 to 62 years ($M=30.98$, $SD=9.66$). In terms of marital status, 38 were single, 45 in an informal relationship, 16 married, four divorced, and one not reported. Fifty-three participants finished school beyond the high school level, 48 finished high school and three reported an education level of "other". Ninety-one (87.5%) participants were currently employed. The variety of occupations in the sample was large, and none of the occupational groups included more than a few participants.

Procedure

The data analyzed in this paper come from a larger research project carried out at the Research Center for Trauma, Crisis and Growth (Poland). This project includes three stages over several years. Its main scientific goal is to verify the hypotheses regarding the impact of the narrative representation of experience on coping with trauma or difficult life events. At each stage of the study, participants take part in a psychological interview. At the first meeting, an interview was conducted in the Life Story Interview (McAdams, 2007). The interviewees related eight important scenes they selected from their lives. At the next meetings, interviews concerned traumatic or crisis events that took place between the first and second stages of the study and their influence on the fundamental beliefs of the interviewee. In the present article, we do not analyze the data collected in the interviews but focus on quantitative data.

The presented data come from two stages of the study. In the first, the participants filled out questionnaires measuring prioritizing positivity, basic trust, hope, and self-esteem. About half of the questionnaire sets were completed in the laboratory in a paper-and-pencil version. Due to the limitations resulting from the COVID-19 pandemic, data collection was then continued online on the Qualtrics platform.

The second stage of the study took place after 12 to 15 months. Firstly, the participants talked about their most difficult life events during that period. The events reported were 17.3% relationship problems (e.g., betrayal or breakup; $n=18$), 14.4% serious medical event or injury ($n=15$), 10.6% serious medical event or injury for close other ($n=11$), 10.6% COVID-19 pandemic (lockdown, quarantine; $n=11$), 10.6% family problems ($n=11$), 9.6% problems at work ($n=10$), 7.7% job loss ($n=8$), 5.8% unexpected death of close other ($n=6$), and 13.5% various others ($n=14$).

Within days of the interview, study participants completed questionnaires to measure their coping strategies and ruminations related to the previously reported event. Then they filled out scales to measure various aspects of the impact of that event and coping with it on their current functioning: anxiety and depression experienced in the last weeks, life satisfaction, and posttraumatic growth. The measurement was conducted online on the Qualtrics platform.

The participants had received information about the procedure and the Informed Consent Form before the interview, and they could withdraw from the study at any time. The university ethical committee approved the study. For participation in each stage of the study, participants received remuneration in the form of a shopping voucher worth PLN 50 (about EUR 12).

Measures

Measures in the First Stage of the Study

Prioritizing Positivity

We used the Polish version (Machlah and Zięba, 2021) of the Prioritizing Positivity Scale (Catalino and Boulton, 2020). This scale includes five statements that measure whether people organize their time to maximize their positive emotions. The Cronbach's α of the questionnaire in the study was 0.77.

Basic Trust

Basic trust was measured using an eight-item scale (Trzebiński and Zięba, 2004). Participants indicated their belief in two world characteristics: its higher-order and sense, and its general positivity toward human beings. Participants provided their ratings using a five-point scale (1 = strongly disagree, 5 = strongly agree). Cronbach's α for the scale was 0.81.

Hope

We used the Polish version (Łaguna et al., 2005) of the Adult Dispositional Hope Scale (Snyder et al., 1991), which measures hope in terms of how people perceive themselves when pursuing a goal in different situational contexts. This questionnaire contains eight statements—four measure agencies and the other four measure pathways thinking. Each of the items was rated on an eight-point Likert scale ranging from “1 = definitely false” to “8 = definitely true.” Cronbach's α for the scale was 0.87.

Self-Esteem

Self-esteem was measured using the Polish version (Łaguna et al., 2007) of the scale of Rosenberg (1965). The questionnaire

consists of 10 items that pertain to individual self-worth and self-acceptance, with a 4-point response scale ranging from “1 = strongly disagree” to “4 = strongly agree.” Cronbach's α for the scale was 0.82.

Measures in the Second Stage of the Study

Styles of Rumination

Intrusive and deliberate ruminations in the aftermath of the trauma were measured using the Event-Related Rumination Inventory (ERRI: Cann et al., 2011). The scale included 10 items assessing intrusive rumination and 10 items assessing deliberate rumination using a four-point scale from 0 to 3. Participants responded to two versions of each part of the scale. Firstly, they were asked about their ruminations during the weeks immediately after the trauma. Next, they responded to the same questions but about ruminations in the past 2 weeks. Cronbach's α for intrusive rumination immediately after the event was 0.95, for intrusive rumination recently was 0.97, for deliberate rumination immediately after the event was 0.89, and for deliberate rumination recently was 0.95.

Coping Strategies

Coping with stress strategies was measured with the Brief Cope Scale (Carver, 1997). We asked the participants to identify their coping strategies for dealing with the traumatic experience they related in the interview. The questionnaire contains two items to measure each of the following 14 strategies: Self-Distraction, Active Coping, Denial, Substance Use, Use of Emotional Support, Use Of Instrumental Support, Behavioral Disengagement, Venting, Positive Reframing, Planning, Humor, Acceptance, Religion, and Self-Blame. Each of the items was rated on four-point response scale ranging from 1 (“I have not been doing this at all”) to 4 (“I have been doing this a lot”).

Symptoms of Anxiety and Depression

The presence and severity of anxiety and depression symptoms in the past week were assessed using the Hospital Anxiety Depression Scale (HADS: Zigmond and Snaith, 1983), a self-rating scale consisting of two subscales: HADS-A, comprising seven anxiety-related items and HADS-D, comprising seven depression-related items. Responses were given using a 0–3 scale. Cronbach's α for the anxiety scale was 0.88, and for the depression scale was 0.81.

Life Satisfaction

Life satisfaction was measured using the Satisfaction with Life Scale (SWLS: Diener et al., 1985), adapted to Polish by Jankowski (2015). The measure asks the subject to agree or disagree, using a 7-point Likert-type scale (1 = strongly disagree, 7 = strongly agree), with five statements regarding the overall satisfaction with one's life. Cronbach's α for the scale was 0.90.

Posttraumatic Growth

In the study, we used the Polish translation of the Posttraumatic Growth Inventory (PTGI-X: Tedeschi et al., 2017). The scale

consists of 25 items to be answered on a 6-point Likert scale, with values ranging from 0 (“I did not experience this change as a result of my crisis”) to 5 (“I experienced this change to a very great degree as a result of my crisis”), and assesses positive changes aftermath trauma on five areas: relating to others (seven items), new possibilities (five items), personal strength (four items), spiritual and existential change (six items), and appreciation of life (three items). Cronbach's α for the PTGI-X was 0.95.

RESULTS

Preliminary Analyses

In the first step of the analysis, we examined whether prioritizing positivity correlated with other study variables measured in the first stage. We also considered relationships between dependent variables: posttraumatic growth and life satisfaction.

As **Table 1** shows, prioritizing positivity was moderately positively correlated with positive self-beliefs, i.e., hope and self-esteem. These results are consistent with previous cross-sectional studies (Catalino et al., 2014; Catalino and Boulton, 2020; Machlah and Zięba, 2021). Prioritizing positivity was also positively related to basic trust. Among the variables relating to a subject's functioning in the period in which the second stage of the study was conducted, correlations between symptoms of depression and anxiety were shown, and moderately negative associations of these variables with life satisfaction. We found no significant associations between depression, anxiety and posttraumatic growth, which is consistent with the results of studies showing that PTG and symptoms of distress or disorder can, but do not always co-occur (Linley and Joseph, 2004; Shakespeare-Finch and Lurie-Beck, 2014). Posttraumatic growth, as in previous studies (Linley and Joseph, 2004; Durkin and Joseph, 2009) was positively associated with life satisfaction.

Prioritizing Positivity and Positive Beliefs as Predictors of Posttraumatic Growth and Satisfaction With Life

The results of the correlation analysis presented in **Table 1** indicate relationships between the levels of variables measured

before difficult events and the impact of these experiences on later participants' functioning. Hope and self-esteem, i.e., positive beliefs about oneself, were negatively related to symptoms of depression and anxiety. These results seem to be consistent with many previous studies, which indicate that hope (Snyder, 1999, 2002; Gum and Snyder, 2002; Gallagher et al., 2020) and self-esteem (Watson et al., 1988; Łaguna et al., 2007) are conducive to experiencing positive emotions and reducing negative emotions. We obtained no results indicating a relationship between prioritizing positivity and the symptoms of depression and anxiety, and life satisfaction. However, in previous cross-sectional studies, prioritizing positivity showed positive correlations with satisfaction with life and negative relationships with depression and anxiety (Catalino et al., 2014; Machlah and Zięba, 2021). On the other hand, the level of prioritizing positivity measured before the traumatic or crisis experience seems to predict posttraumatic growth. In order to investigate the direct impact of prioritizing positivity and beliefs on the level of posttraumatic growth measured in the second stage of the study, we conducted linear regression analysis. The results are summarized in **Table 2** and indicate that only prioritizing positivity was a significant predictor of posttraumatic growth among the analyzed variables.

Posttraumatic growth is a multidimensional construct and includes five areas of positive changes that may result from trauma (Tedeschi et al., 2018). Therefore, we performed additional linear regression analyzes in which the same variables as presented in **Table 2** were predictors of specific posttraumatic growth's areas. It turned out that prioritizing positivity was a statistically significant predictor of new possibilities: $\beta=0.29$, $t=2.68$, $p=0.009$; and appreciation of life: $\beta=0.25$, $t=2.34$, $p=0.021$. Additionally, hope was the predictor of spiritual and existential changes: $\beta=0.29$, $t=2.24$, $p=0.028$.

Styles of Rumination and Coping Strategies as Predictors of Posttraumatic Growth and Satisfaction With Life

The results of the correlation analysis presented in **Table 3** show that intrusive ruminations, both during the weeks immediately after the difficult event and recently, were negatively associated with life satisfaction, which is consistent with the results of previous studies (Triplett et al., 2012;

TABLE 1 | Means, standard deviations, and correlations for pre-event and outcome variables.

Variable	M	SD	1	2	3	4	5	6	7
1. Prioritizing positivity	34.23	6.16							
2. Basic trust	29.98	5.45	0.27**						
3. Hope	48.33	8.16	0.23**	0.35**					
4. Self-esteem	28.83	4.65	0.20*	0.26**	0.58**				
5. Depression	5.12	3.86	0.02	0.07	-0.07	-0.26**			
6. Anxiety	8.59	4.60	-0.06	-0.00	-0.20*	-0.30**	0.70**		
7. Satisfaction with life	20.48	6.69	0.09	-0.00	0.31**	0.39**	-0.48**	-0.49**	
8. Posttraumatic growth	56.08	30.33	0.29**	0.19	0.16	0.01	-0.17	-0.15	0.28**

* $p<0.05$; ** $p<0.01$.

M and SD are used to represent mean and standard deviation, respectively.

TABLE 2 | Regression results using posttraumatic growth as the criterion.

Predictor	<i>b</i>	<i>b</i> 95% CI (LL, UL)	β	β 95% CI (LL, UL)	<i>sr</i> ²	<i>sr</i> ² 95% CI (LL, UL)	<i>r</i>	Fit
Constant	−1.64	(−53.75, 50.48)						
Prioritizing positivity	1.20*	(0.19, 2.21)	0.25	(0.04, 0.47)	0.06	(−0.03, 0.15)	0.28**	
Basic trust	0.50	(−0.71, 1.71)	0.09	(−0.13, 0.32)	0.01	(−0.03, 0.04)	0.18	
Hope	0.50	(−0.48, 1.48)	0.14	(−0.13, 0.41)	0.01	(−0.03, 0.05)	0.14	
Self-esteem	−0.84	(−2.43, 0.75)	−0.14	(−0.39, 0.12)	0.01	(−0.03, 0.05)	0.01	
								<i>R</i> ² = 0.106*
								95% CI (0.00, 0.20)

p* < 0.05; *p* < 0.01.

A significant *b*-weight indicates the β -weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. β indicates the standardized regression weights. *sr*² represents the semi-partial correlation squared. *r* represents the zero-order correlation. LL and UL indicate the lower and upper limits of a confidence interval, respectively.

Morgan et al., 2017). Deliberate ruminations, as in previous studies (Cann et al., 2011; Triplett et al., 2012; David et al., 2021; Taku et al., 2021), were positively associated with posttraumatic growth (overall result) and with posttraumatic growth experienced in the following areas: new possibilities, appreciation of life, and spiritual and existential changes.

As **Table 3** shows, some of the coping strategies were related to outcome variables. Active coping and positive reframing were positively correlated with life satisfaction and posttraumatic growth. Acceptance and seeking for emotional support seemed to predict life satisfaction, but not predict posttraumatic growth. On the other hand, religious coping was positively associated with posttraumatic growth but did not correlate with life satisfaction. Those results are partially in line with the results of meta-analysis by Prati and Pietrantonio (2009), according to which religious coping and positive reappraisal were strongly related to posttraumatic growth.

The results indicate that the role of specific coping strategies differs depending on which of the posttraumatic growth areas is concerned. The use of emotional social support was positively associated with the experience of posttraumatic growth only in the area of relationships with other people. Positive reframing seems to be related to an increasing sense of personal strength and spiritual and existential changes. Furthermore, the experience of posttraumatic growth in the area of new opportunities was fostered by using strategies that are usually considered maladaptive (Lazarus and Folkman, 1984; Carver et al., 1989): denial, substance use, and behavioral disengagement.

Prioritizing Positivity and Positive Beliefs as Predictors of Styles of Rumination and Coping Strategies

The next step in the analysis was to check whether the prioritizing positivity, hope, basic trust, and self-esteem, measured before the difficult event, predicted engaging in deliberate and intrusive ruminations about a stressful experience and the use of particular coping strategies.

The results of the correlation analysis presented in **Table 4** show that prioritizing positivity was positively associated with deliberate ruminations, both immediately after a difficult event and later. This seems to be consistent with the broaden-and-build

theory of Fredrickson (1998, 2001) of positive emotions and with much previous evidence according to which induced positive emotions broaden the scope of thinking (Isen et al., 1987, 1991; Estrada et al., 1997; Fredrickson and Branigan, 2005). Prioritizing positivity was also related to active coping. This result can be explained because positive emotions have an undoing effect on negative emotional arousal and broaden an individual's scope of action (Fredrickson, 2000, 2001).

Hope was positively related to coping with stress through positive reframing, which is consistent with the theory of hope of Snyder (2002). According to previous evidence, hope has a unique role in shaping positive appraisals of adversity and benefit finding from trauma or crisis (Snyder, 1999; Tennen and Affleck, 1999; Gum and Snyder, 2002). Hope was also positively related to religious coping. However, the results of study by Park (2006) did not confirm any connection between hope and religious coping, or between hope and stress-related growth.

Styles of Rumination and Coping Strategies as Mediators of Beneficial Effect of Prioritizing Positivity and Positive Beliefs on Posttraumatic Growth and Life Satisfaction

We hypothesized that using adaptive coping strategies and deliberate ruminations would mediate the effect of prioritizing positivity, hope, basic trust, and self-efficacy on outcome variables. The results of the correlation and regression analysis presented earlier confirmed only some of our expectations regarding the relationship between predictors, coping strategies and styles of rumination, and the level of posttraumatic growth and life satisfaction. Therefore, in subsequent analyzes, we tested 12 mediation models for those variables for which we found significant correlations between predictors and outcome variables and between predictors and mediators. Using model 4 in the PROCESS macro, we examined the mediation hypotheses with bootstrap methods (Hayes, 2017). In each of the tested models, adding a particular style of rumination or coping strategy to the model as a potential mediator of the impact of the predictor

TABLE 3 | Means, standard deviations, and correlations between ruminations, coping strategies and outcome variables.

Variable	<i>M</i>	<i>SD</i>	SWL	PTG	PTG-PS	PTG-RO	PTG-NP	PTG-AL	PTG-SE
Intrusive ruminations 1	3.12	0.95	−0.20*	0.09	−0.66	0.18	0.14	0.05	0.34
Deliberate ruminations 1	3.47	0.80	−0.06	0.35*	0.21*	0.35*	0.36*	0.28*	0.28*
Intrusive ruminations 2	2.53	1.01	−0.29**	0.00	−0.19	0.06	0.05	0.00	0.04
Deliberate ruminations 2	2.89	0.99	−0.15	0.24*	−0.02	0.18	0.30**	0.30**	0.26*
Active coping	2.72	0.89	0.20*	0.37**	0.34**	0.32**	0.34**	0.29**	0.30**
Planning	2.70	0.84	0.11	0.30**	0.23*	0.25*	0.28**	0.23*	0.29**
Positive reframing	2.60	0.86	0.31**	0.24*	0.29**	0.18	0.12	0.16	0.28**
Acceptance	2.84	0.76	0.27**	0.12	0.15	0.07	0.01	0.09	0.18
Humor	2.09	0.97	0.23*	−0.12	−0.03	−0.10	−0.17	−0.09	−0.10
Religion	1.59	0.86	0.17	0.41**	0.33**	0.26*	0.35**	0.35**	0.51**
Use of emotional support	2.70	0.96	0.20*	0.16	0.14	0.26*	0.09	0.06	0.07
Use of instrumental support	2.60	0.97	0.18	0.13	0.16	0.20	0.06	0.02	0.06
Self-distraction	2.48	0.73	0.00	0.21*	0.10	0.23*	0.24*	0.19	0.13
Denial	1.54	0.71	−0.23*	0.06	−0.13	−0.02	0.22*	0.01	0.12
Venting	2.43	0.83	0.07	0.18	0.18	0.24*	0.18	0.11	0.06
Substance use	1.60	0.85	−0.07	0.05	−0.06	0.06	0.21*	−0.01	−0.01
Behavioral disengagement	1.74	0.75	−0.31**	0.08	−0.09	0.02	0.24*	−0.02	0.12
Self-blame	2.31	0.92	−0.26**	0.06	−0.05	0.04	0.19	0.01	0.04

* $p < 0.05$; ** $p < 0.01$.

M and *SD* are used to represent mean and standard deviation, respectively. SWL, satisfaction with life; PTG, posttraumatic growth; PTG-PS, personal strength; PTG-RO, relations to others; PTG-NP, new possibilities; PTG-AL, appreciation of life; and PTG-SE, spiritual and existential changes.

on the level of posttraumatic growth or life satisfaction increased the size of the explanatory variance of the dependent variable but did not result in a statistically significant reduction in the direct impact of the predictor on the outcome variable. Therefore, none of the mediation hypotheses was confirmed.

In the next step of the analysis, we conducted three hierarchical linear regression analyzes for models that included: prioritizing positivity, hope, basic trust, self-efficacy, styles of ruminations, and coping strategies, as predictors for posttraumatic growth and life satisfaction. The results of these analyzes are presented in **Tables 5, 6**.

According to the results of many previous studies, the predictors of posttraumatic growth in the study seems to be a relatively high intensity of deliberate rumination (in this case: immediately after the crisis event) and low intensity of intrusive rumination (in this case: during the last 2 weeks before the measurement, a few to several months after the crisis event). Researchers of posttraumatic growth argue that it is beneficial for the course of the posttraumatic re-adaptation process to gradually replace intrusive ruminations, the intensity of which is usually highest immediately after a traumatic event, with more reflective thinking characterizing deliberate ruminations (Cann et al., 2011; Tedeschi et al., 2018). The study results suggest that a higher level of posttraumatic growth was experienced by the respondents, who were more involved in reflective thinking in the initial period of coping with a crisis event and its consequences. Posttraumatic growth was also positively related to the relatively low intensity of recent intrusive thoughts.

The hierarchical linear regression analysis results in **Table 5** suggest that a significant predictor of posttraumatic growth was prioritizing positivity measured before the crisis event. As already mentioned, the impact of prioritizing positivity was

not mediated by any style of ruminations or coping strategy controlled in the study.

The results of the regression analysis presented in **Table 6** indicate that life satisfaction had different predictors from posttraumatic growth. A significant predictor of life satisfaction was self-esteem. This is consistent with many previous studies relating positive associations between self-esteem, fulfillment of needs, achievement of life goals, and general satisfaction with life (Diener et al., 1985, 1999, 2003; Strobel et al., 2011). In the case of life satisfaction, the influence of recent intrusive thought was also significant, the higher intensity of which decreased the level of life satisfaction. The result may be explained by the fact that intrusive ruminations are associated with negative emotions, which may affect the assessment of life satisfaction (Cann et al., 2011).

DISCUSSION

The results of the prospective study presented and discussed above confirm that individual differences in prioritizing positivity can relate to a process of posttraumatic growth. Prioritizing positivity was associated with using an active coping strategy and deliberate but not intrusive ruminations. The mediation analysis results did not confirm the hypotheses that the impact of prioritizing positivity on posttraumatic growth is mediated by the intensification of deliberate ruminations and the use of adaptive coping strategies. Moreover, adding these variables to the model significantly improved the model's fit but did not decrease the impact of prioritizing positivity on the variance of posttraumatic growth. Therefore, the question of how prioritizing positivity influences the course and outcome of the posttraumatic growth process remains open.

TABLE 4 | Means, standard deviations, and correlations between pre-event variables, ruminations and coping strategies.

Variable	Prioritizing positivity	Basic trust	Hope	Self-esteem
Intrusive ruminations 1	-0.05	0.11	-0.05	-0.09
Deliberate ruminations 1	0.20*	0.18	0.00	-0.16
Intrusive ruminations 2	0.14	0.25**	-0.05	-0.19
Deliberate ruminations 2	0.27**	0.25*	-0.02	-0.15
Active coping	0.24*	0.17	0.23*	0.17
Planning	0.08	0.09	0.16	0.07
Positive reframing	0.04	0.13	0.26**	0.21*
Acceptance	-0.17	0.00	0.11	0.13
Humor	0.02	-0.10	0.13	0.29**
Religion	0.09	0.16	0.21*	0.08
Use of emotional support	0.03	-0.03	-0.03	-0.02
Use of instrumental support	-0.04	-0.01	0.09	0.00
Self-distraction	0.02	0.12	-0.02	-0.05
Denial	0.04	-0.01	0.04	-0.12
Venting	0.03	0.08	-0.01	-0.06
Substance use	0.09	-0.12	-0.16	-0.14
Behavioral disengagement	0.08	0.12	-0.02	-0.19
Self-blame	-0.04	0.05	-0.09	-0.29**

* $p < 0.05$; ** $p < 0.01$.

Previous studies on the role of prioritizing positivity have focused on the impact of seeking positive emotions in everyday life on the level of wellbeing (Catalino et al., 2014). Our results show that prioritizing positivity is an important personal resource in coping with stress and trauma. However, in the study, we did not control the extent to which differences in prioritizing positivity influenced the frequency and intensity of experiencing positive and negative emotions when the participants experienced a difficult or traumatic event and in the following weeks and months. Therefore, we do not know whether any differences occurred in the initial stage of posttraumatic adaptation, which is usually characterized by the highest intensity of stress and tension (Cann et al., 2011; Lelorain et al., 2012), and in later stages of dealing with the consequences of trauma. Arousing positive emotions in the first period could support the process of posttraumatic growth by reducing distress (Fredrickson et al., 2003) and thus lowering the intensity of automatic, intrusive thoughts. This would allow more reflective, deliberate cognitive processes that predict posttraumatic growth (Cann et al., 2011; Triplett et al., 2012). People with a high level of prioritizing positivity are characterized by the fact that they actively seek opportunities to experience positive emotions (Catalino et al., 2014; Catalino and Boulton, 2020). Prioritizing positivity, especially in the later stages of posttraumatic adaptation, could increase the readiness to see new opportunities to enjoy life and undertake new types of activities. That possibility is suggested by the obtained data, which show that prioritizing positivity was a predictor of positive changes mainly in these two areas of posttraumatic growth: new possibilities and appreciation of life. According to Van Cappellen et al. (2018), people who have a high level of prioritizing positivity may be better motivated to change their activity. Among the factors to consider when analyzing posttraumatic growth Jayawickreme et al. (2021) indicate the stability of behavior's patterns. A traumatic experience

can disrupt an individual's habits and support discovering new ways of thinking and acting. However, those changes are rather temporary due to the tendency of most people toward the stability of habits. Therefore, prioritizing positivity may increase the readiness to change existing habits and behavior patterns by inducing positive emotions (Fredrickson, 2000, 2001; Fredrickson and Branigan, 2005). It could be conducive to developing and stabilizing positive posttraumatic changes in the long term. The aim of future research, which could be carried out using the diary research procedure, should therefore be to check the dynamics of changes in the area of experiencing positive emotions while coping with the consequences of trauma, as well as the possible impact of individual differences on prioritizing positivity.

Previous research shows that prioritizing positivity is positively associated with good relationships with other people (Catalino et al., 2014; Machlah and Zięba, 2021). Our results do not indicate that those study participants with a higher level of prioritizing positivity were more likely to seek social support as a coping strategy. Nonetheless, many studies show that social support is an effective and beneficial coping strategy (Carver et al., 1989; DeLongis and Holtzman, 2005; Aldwin, 2007). However, in the theoretical model of posttraumatic growth, the importance of a specific type of interpersonal relationship is emphasized, enabling positive disclosure rather than seeking social support to reduce stress symptoms (Calhoun and Tedeschi, 2013; Tedeschi et al., 2018). It will be worth conducting future research to check whether people with a high level of prioritizing positivity and thus having good interpersonal relationships use them to self-disclose and tell stories about their difficult experiences, favoring posttraumatic growth.

This study has limitations that must be taken into account. Firstly, the study group was quite diverse regarding the types of life event that participants reported as traumatic for them. In the study, we did not measure the level of posttraumatic stress symptoms or how the respondents rated the severity of the event. Only a small number of the participants in the first stage of the study (fewer than ten people) refused to participate in the second stage, claiming that they had suffered no traumatic experience during this period. The other participants indicated their most difficult life events from the last 12 to 15 months. Perhaps not all of them would meet the definition of a seismic traumatic event used in the theory of posttraumatic growth (Tedeschi and Calhoun, 2004; Tedeschi et al., 2018). However, we followed the principle that what is traumatic varies from an individual point of view. Nevertheless, the study results should be interpreted bearing in mind that they relate to dealing with the consequences of difficult life events of varying severity.

Secondly, due to the study procedure, we could not control the influence of potential predictors of posttraumatic growth on decisions and choices made directly while dealing with trauma. The study's strength is that the levels of prioritizing positivity, hope and basic trust were measured before the traumatic event. Thanks to this, we avoided some limitations typical of cross-sectional studies (Helgeson et al., 2006). However, potential mediators of the impact of these predictors on the level of posttraumatic growth, i.e., rumination and coping strategies, were

TABLE 5 | Hierarchical regression results for posttraumatic growth.

Variable	B	B 95% CI (LL, UL)	SE B	β	R ²	ΔR^2
Constant	9.37	(−24.71, 43.45)	17.14		0.08	0.08
Prioritizing positivity	1.33	(0.36, 2.29)	0.49	0.28**		
Constant	−17.50	(−56.16, 20.86)	19.12		0.15	0.07
Prioritizing positivity	1.07	(0.12, 2.02)	0.48	0.23*		
Deliberate ruminations—immediately	10.39	(2.90, 17.89)	3.77	0.28**		
Constant	−15.17	(−52.59, 22.24)	18.82		0.19	0.04
Prioritizing positivity	1.10	(0.17, 2.04)	0.47	0.23*		
Deliberate ruminations—immediately	14.38	(6.03, 22.73)	4.20	0.37***		
Intrusive rumination—recent time	−6.73	(−13.37, −0.08)	3.34	−0.22*		
Constant	−26.10	(−61.75, 9.55)	17.93		0.30	0.11
Prioritizing positivity	1.05	(0.17, 1.92)	0.44	0.22*		
Deliberate ruminations—immediately	12.48	(4.57, 20.39)	3.98	0.34**		
Intrusive rumination—recent time	−6.32	(−12.56, −0.07)	3.14	−0.21*		
Religious coping	11.33	(4.96, 17.70)	3.20	0.33***		

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

CI, confidence interval; LL, lower limit; and UL, upper limit.

TABLE 6 | Hierarchical regression results for life satisfaction.

Variable	B	B 95% CI (LL, UL)	SE B	β	R ²	ΔR^2
Constant	4.44	(−2.99, 11.87)	3.75		0.16	0.16
Self-esteem	0.55	(0.29, 0.80)	0.13	0.39***		
Constant	10.15	(1.78, 18.52)	4.22		0.21	0.06
Self-esteem	0.49	(0.24, 0.74)	0.13	0.35***		
Intrusive rumination—recent time	−1.60	(−2.76, −0.41)	0.60	−0.24**		
Constant	7.74	(−0.57, 16.06)	4.19		0.27	0.05
Self-esteem	0.42	(0.17, 0.66)	0.12	0.30***		
Intrusive rumination—recent time	−1.72	(−2.87, −0.56)	0.58	−0.26**		
Positive reframing	1.84	(0.49, 3.20)	0.68	0.24**		

** $p < 0.01$; *** $p < 0.001$.

CI, confidence interval; LL, lower limit; and UL, upper limit.

only measured retrospectively in the second stage of the study, at the same time as the dependent variables.

It is also worth noting that the study participants reported as a traumatic event both events that were relatively distant in time, taking place about a year before the second stage of the study, and events that had taken place just a few months or weeks ago. Therefore, some of them may not have developed yet all the symptoms of posttraumatic growth (Bostock et al., 2009).

Furthermore, the study participants were diverse in age. Our results did not show statistically significant differences in the level of the analyzed variables due to age. Nevertheless, Manne et al. (2004) study showed an inverse relationship between age and posttraumatic growth. The ability to see the positive aspects of difficult experiences seems to increase with age. Moreover, the results of one study (Littman-Ovadia and Russo-Netzer, 2019) suggest age differences in the adaptive role of prioritizing positivity. Prioritizing positivity was more negatively associated with negative emotions for younger adults, but it was associated with more positive emotions among older individuals. It is also possible that different pathways in different age groups lead to posttraumatic growth or depreciation. Hence, an important direction in future researches may be exploring individual differences between younger adults and older adults in the process of posttraumatic growth.

Despite the limitations mentioned above, the study results provide new knowledge on the role of regulation of emotions in the process of posttraumatic growth and open up new research perspectives. These results can also be used to design effective psychological intervention techniques to support people experiencing trauma and psychological crises. As is known from recent research results, prioritizing positivity can be effectively developed through suitable microintervention (Van Cappellen et al., 2020). An essential purpose of clinicians supporting patients after experiencing trauma is to reduce the symptoms of posttraumatic stress. The current study results, like many other studies (Dickinson, 2021), also suggest the need to support positive changes after adversity. Clinicians should be open to the possibility of their patients perceiving positive consequences of trauma and support (not force) their occurrence. In psychoeducation, which is an element of therapy, knowledge should be shared about the role of positive emotions in dealing with the consequences of trauma and openness to new. Supporting the tendency to look for opportunities to experience positive emotions seems to be a remarkable opportunity to develop personal resources that increase people's level of wellbeing and support them in the face of difficult and traumatic life events.

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 Ethics Committee of SWPS University of Social Sciences and Humanities, Campus in Poznań. The participants provided their written informed consent to participate in this study.

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AUTHOR CONTRIBUTIONS

MZ conceptualized the study and led the manuscript writing. NW and KW contributed to the study design, collected and analyzed the data, and wrote. MJZ contributed to the study design, analyzed the data, and wrote the manuscript. All authors contributed to the article and approved the submitted version.

FUNDING

This study was supported by the grant 2013/10/E/HS6/00502 from the National Science Center, Poland, awarded to MZ.

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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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Adjustment Processes After the First Wave of the COVID-19 Pandemic: A Grounded Theory Study Based on Clinical Psychologists' Experience

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OPEN ACCESS

Edited by:

Marialaura Di Tella,
University of Turin, Italy

Reviewed by:

Agata Benfante,
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Daniela Marchetti,
University of Studies G. d'Annunzio
Chieti and Pescara, Italy

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 14 January 2022

Accepted: 16 February 2022

Published: 04 March 2022

Citation:

Lamiani G, Borghi L, Bonazza F,
Rebecchi D, Lazzari D and
Vegni E (2022) Adjustment Processes
After the First Wave of the
COVID-19 Pandemic: A Grounded
Theory Study Based on Clinical
Psychologists' Experience.
Front. Psychol. 13:854745.
doi: 10.3389/fpsyg.2022.854745

Background: Anxiety, depression, and post-traumatic stress have been reported among the general population during the first wave of the COVID-19 pandemic. However, the adjustment after the emergency phase remains under-investigated. This study aims to understand the adjustment processes of the population after the emergency phase of the pandemic.

Methods: We conducted a grounded theory based on the experience of 24 clinical psychologists who provided extensive support to the population during the pandemic in different Italian regions. Three online focus groups were conducted. The transcripts of the focus groups were analyzed through a process of open, axial, and selective coding. Data collection terminated once thematic saturation was reached.

Results: Repositioning emerged as the evolutionary task people were confronted with in the face of a New Reality. Repositioning meant dealing with and integrating unpleasant Emotional Experiences deriving from the lockdown and reopening (i.e., unsafety, emotional exhaustion, loneliness, uncertainty, loss, and disconnection) through different Coping Strategies. Repositioning was facilitated or hindered by contextual and individual Intervening Conditions and led to two Adjustment Outcomes: growth or block.

Conclusion: Results suggest that repositioning was the core task people had to face after the emergency phase of COVID-19. Proactive psychological interventions may support the population in repositioning in order to prevent maladjustment and encourage post-traumatic growth.

Keywords: clinical psychology and health, adjustment (psychology), COVID-19, qualitative research and analysis, population

INTRODUCTION

The COVID-19 pandemic was declared by WHO a public health emergency of international interest on January 30th, 2020. Since then, it spread rapidly nationwide, affecting over 312,173,462 and 222 countries (World Health Organization, 2022). Italy was the first Western country to be severely affected, with 7,971,068 confirmed cases and 139,872 deaths (Italian Ministry of Health, 2022). At the outbreak of the COVID-19 pandemic, several countries implemented confinement measures such as nationwide lockdowns and quarantines to contain the virus. Because of these measures, people were confronted with several stressors, such as physical isolation, forced cohabitation, impossibility to hold funeral rituals, suspension of schools and social activities, economic losses, and excessive workloads (Pfefferbaum and North, 2020). A large body of research assessed the impact of the COVID-19 pandemic and lockdown measures on the mental health of the population. Quantitative studies and reviews reported a prevalence of anxiety, depression, and post-traumatic stress among the general population, with variations depending on the psychological and contextual resources (Castelli et al., 2020; Morales-Vives et al., 2020; Wang et al., 2020; Prati and Mancini, 2021). For example, Rossi et al. (2020), who explored the psychological stress caused by the pandemic and the lockdown among the Italian population, observed the presence of post-traumatic stress symptoms and adjustment disorders in one-third and one-quarter of the sample, respectively. Similarly, Lenzo et al. (2020) showed that about a third of Italian respondents reported moderate to extremely severe depression, anxiety, and stress.

As many other countries, during the summer of 2020, Italy entered a reopening phase during which business, services, and activities gradually resumed. Reopening was a challenge not only from an epidemiological point of view but also from a psychological standpoint. According to previous studies (Young et al., 2002), in the recovery phase of an emergency, the prevalence of psychological and mental disorders may increase. Despite individual resources and resilience, people may find it difficult to adapt to the new circumstances and integrate the traumatic events into a new narrative with meaning (Kazlauskas and Quero, 2020). Studies from previous epidemics such as HIV, SARS, and Ebola have shown that fear, panic, and stigma might endure among the population even when the disease is normalized (Strong, 1990; Hong et al., 2009; Ji et al., 2017). Despite this evidence, little attention has been paid so far to the adjustment processes of the population after the first wave of the COVID-19 pandemic.

Adjustment has been described as the process through which human beings modify attitudes and behaviors in response to environmental demands or unexpected conditions (American Psychological Association, 2020). In other words, adjustment may be seen as the attempts to maintain a balance between own needs and the circumstances that may impede their satisfaction. The pandemic onset and the subsequent lockdowns have dramatically altered the individuals' environment worldwide: they radically changed everyday life and challenged the satisfaction of basic human needs, such as physiological, safety,

belongingness, and self-actualization needs (Maslow, 1954). A US study (Suh et al., 2021) that analyzed web searched interactions for 14 months starting from January 6, 2020 revealed an increased expression of physiological needs during the pandemic onset compared to the pre-pandemic period. Shifts in the expression of needs were also observed in the period after the lockdowns (Suh et al., 2021). Therefore, it is possible that adjustment processes may have been triggered during the lockdown as well as after the emergency period.

This study aims to understand the adjustment processes of the population after the first wave of the COVID-19 pandemic in Italy. For this purpose, we conducted a grounded theory study involving clinical psychologists who worked in community and hospital psychological services nationwide during the pandemic. We involved clinical psychologists due to their privileged perspective on the population's psychological distress and their expertise in assessing psychological adjustment processes.

MATERIALS AND METHODS

Research Methodology

We used the grounded theory method (Glaser and Strauss, 1967) to understand the adjustment process after the first wave of the COVID-19 pandemic based on clinical psychologists' experience. Grounded theory is a qualitative method based on an inductive process through which a theory is derived from the data (Strauss and Corbin, 1990). For this reason, grounded theory is a particularly useful method for understanding unexplored social processes or phenomena, where there is no theory or model to explain them. As the adjustment processes of the population after the first wave of the COVID-19 pandemic remain unknown, grounded theory was chosen as a particularly suitable method for studying this process.

Participants

The participants were clinical psychologists with training in psychotherapy. Clinical psychologists were recruited nationwide through the National Boards of Psychologists and the regional Departments of Mental Health. The recruiting followed the principles of theoretical sampling (Draucker et al., 2007). Theoretical sampling, as opposed to probability sampling, aims to include information rich cases for in-depth study. As we aimed to explore the adaptation process of the general population after the first wave of COVID-19 pandemic, we selected psychologists with extensive experience in emergency psychology and in providing psychological support during the pandemic. In order to capture the variability of the adaptation processes, we selected psychologists to account for a broad variety of characteristics such as the population they work with (e.g., children and adolescents, families, adults, and chronic patients), the region of Italy they work in, their responsibility role at work, and their psychotherapeutic approach.

Data Collection

The sampling and data collection were carried out simultaneously. Given the necessary safety measures, the data collection was

conducted online. Psychologists interested in the research were sent a link to SurveyMonkey platform where they could express their consent and complete a socio-demographic questionnaire. After completion of the questionnaire, participants were e-mailed an invitation to join a focus group *via* Microsoft Teams. The focus group lasted an hour and a half and was open to 8–10 participants.

Three focus groups involving different participants were held in July 2020 by the first (GL) and second author (LB) and were audio-recorded. During the focus groups, GL presented the research, facilitated the participants' introduction, and led the group discussion. LB co-facilitated and wrote memos of the most salient aspects emerging from the discussion and from personal reflections. During the focus groups, the participants were asked to share their experiences and opinions on two questions: "What are the main psychological challenges that you are now observing in the population you work with?" and "What do you think are the protecting or risk factors of these challenges?" As the data collection and data analysis were conducted simultaneously, three focus groups were held, after which data saturation was achieved.

Data Analysis

The audio-recordings were transcribed verbatim. All details relating to patients or places were removed. Two researchers (GL, LB) analyzed the anonymized transcripts according to grounded theory principles (Strauss and Corbin, 1990). The analysis was conducted in three stages: open, axial, and analytic coding. In the open coding stage, the researchers independently examined the focus group transcripts for salient categories, applying descriptive codes to the text. The aim of this stage was to fragment the data and delineate an initial list of codes with maximum flexibility and with no theoretical assumptions. The language of the participants guided the development of the codes' labels. During axial coding, the codes were progressively aggregated into broader categories. In this stage, the researchers met several times to organize the categories by making connections among them and clarifying their relationships (Strauss and Corbin, 1990). To help with this task, Corbin and Strauss (1990) developed a coding paradigm composed of six categories, which are: the phenomenon under investigation, its causal condition, the intervening conditions, the contextual factors that moderate its occurrence, the strategies to deal with it, and the consequences. These categories help ensure that the researchers have fully explored the process under investigation. The relationships between the categories were verified through an iterative process of going back and forth from the data to the coding and vice versa. Once the axial coding was completed, the researchers engaged in selective coding. In this stage of analysis, researchers usually generate a theory from the data. This abstract level of coding requires the identification of a core category that is the pivotal concept that articulates the whole process under investigation. In this phase, a graphical model was created to illustrate the relationship between the core category and the other categories. At the end of each coding stage, the researchers (GL and LB) met with the research team (FB, DR, and EV) through periodical

online meetings to discuss the coding and receive feedback on the reliability of the findings.

Ethics

The study was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Ethics Committee of the University of Milan (study reference number 74.20, approved on June 29th 2020). Informed consent was obtained electronically from all participants involved in the study.

RESULTS

Participants

A total of 24 psychologists participated in three focus groups. Their socio-demographic and professional characteristics are reported in **Table 1**. The participants were mainly females (87.5%), with a mean age of 47 years and with an average of 21 years of clinical experience. Most participants (71%) worked in regions of northern Italy.

Grounded Theory

The adjustment process after the first wave of the COVID-19 pandemic is presented in **Figure 1**. The analysis revealed that, in the face of a New Reality, repositioning was the core evolutionary task that people had to face in order to resolve the adjustment process. Repositioning required an inner process of integration of the Emotional Experiences caused by the New Reality through Coping Strategies. Repositioning was facilitated or hindered by contextual and individual Intervening Conditions and led to two different Adjustment Outcomes: growth or block. The categories of the model are described below, along with some quotes, by way of example, taken from the transcripts of the focus groups. Quotes are followed by the focus group number in which emerged and by the identification number of the participant [e.g., FG1, participant (part) 1].

The New Reality

The COVID-19 outbreak and the consequent safety measures introduced to limit the contagion shaped a new reality and new habits. This new reality has been described "*as though it were a big stone weighing on everyone, even on those who were not directly involved*" (FG1, part 3). According to the participants' experience, the prolonged lockdown and isolation, physical distancing, reopening, and uncertainty toward the future were all aspects of the new reality that caused suffering among the population and triggered the need for repositioning in the face of the new normal: "*From an organisational perspective, it is a very complex period now, because the answer is no longer just 'no, it's not possible, the service is closed', but it is 'yes, but on the condition that you respect a whole series of protection rules' and therefore the stress is increased*" (FG 2, part 3).

TABLE 1 | Characteristics of the study participants.

Characteristics	n (%)
Gender	
Female	21(87.5%)
Male	3(12.5%)
Age	
Mean (SD)	47.08(8.77)
Range	32–63
Years of experience	
Mean (SD)	20.96(9.5)
Range	4–41
Psychotherapy orientation	
Dynamic	8(33.3%)
Systemic	5(20.8%)
Cognitive Behavioral	5(20.8%)
Humanistic	2(8.3%)
Other (i.e., Gestalt psychotherapy)	4(16.8%)
Italian region	
Lombardia	6(25%)
Piemonte	3(12.5%)
Veneto	2(8.3%)
Trentino-Alto Adige	2(8.3%)
Emilia Romagna	4(16.7%)
Umbria	3(12.5%)
Sardinia	4(16.7%)
Working Context	
Public	20(83.3%)
Association	4(16.7%)
Working Location	
Hospital	15(62.5%)
Territory	9(37.5%)
Population target (more than one option possible)	
Children/Adolescents	12(50%)
Adults	20(83.3%)
Families	10(41.7%)
Chronic patients	10(41.7%)
Responsibility role	
Director	5(20.8%)
Employee	19(79.2%)
Number of COVID-19 patients supported	
0–10	1(4.2%)
10–30	6(25%)
> 30	17(70.8%)
Psychological intervention provided to the population (more than one option possible)	
Face-to-face psychological support	13(54.1%)
Online psychological support	19(79.1%)
Face-to-face psychotherapy	2(8.3%)
Online psychotherapy	2(8.3%)

“There are cancer patients, especially older ones, who complain because their children, who are worried about them, no longer bring their grandchildren and this is a source of great suffering” (FG2, part 2).

Repositioning

The disruption of the old reality caused several unpleasant emotional experiences, which people attempted to manage through coping strategies with the aim of repositioning themselves within their lives. *“There is this experience of not finding yourself again, not finding your own centre” (FG 2, part 2).* Repositioning emerged as the challenge of giving meaning to the emotional experiences in order to *“readjust after the lockdown, and project*

into the future, which is not the same as it was before and is still uncertain” (FG2, part 7).

Emotional Experiences

The emotional experiences described were mainly unpleasant. Lack of safety, fear, and anxiety were frequently reported by the population and chronic patients who *“are returning to hospital slowly and reluctantly, still seeing the hospital as dirty, with some degree of danger” (FG1, part 6).* *“Many report fear of sociality, fear in regulating distances, fear to resume a new normal and leave that safe place that is the house to go out to make some errands or to go to work” (FG3, part 5).* Fear of this invisible virus and of the possibility of infecting grandparents was observed among children. Dread that the emergency was not over was also observed among healthcare professionals.

Another emotional experience that emerged was the feeling of physical and emotional exhaustion. Exhaustion was observed among healthcare workers and among caregivers of children, people with disabilities, or chronic patients, who did not receive any support during the lockdown: *“Family members of people with cognitive impairments had to manage situations of increased caregiving burden with a subsequent exhaustion of physical and psychological resources” (FG1, part 2).*

The lockdown experience and physical distancing fostered an experience of loneliness in the population that persisted after the lockdown. Many healthcare professionals lived far from their families for months. Caregivers *“had to manage complex situations without the help of a relative going to do the errand, without being able to have a break, without the closeness of the professional, the healthcare operator” (FG 1, part 2).*

Problems related to experiences of loss emerged among the population. During the first pandemic wave, many suffered the death of loved ones *“without the possibility of saying goodbye, without having funeral rituals, practical support, and physical contact. We saw families who suffered multiple losses. Sometimes losses happened at distance because the patient was transferred to another hospital. Other times the loss of a family member happened when the patient was unconscious and s(he) learned that the wife or the husband had died one month later” (FG 1, part 1).* Some experienced economic, financial, and job losses. The *“feeling that something was lost” (FG2, part 4)* was also present among chronic patients, who felt they were put in a secondary position and among children and adolescents, who felt deprived of the possibility of celebrating the end of a school cycle or the milestone of a graduation.

Another common experience was the feeling of uncertainty, which was not only related to the resurgence of the pandemic but was described as the dramatic experience of existential uncertainty. The pandemic seemed to have deconstructed the sense of omnipotence of medicine but also of life: *“People experienced first-hand that we get sick, and we still die nowadays” (FG 1, part 6).*

Finally, another commonly reported experience was feeling disconnected or extraneous when returning to ordinary life. For many people, the eruption of a new reality, physical isolation, and, in some cases, hospitalization yielded to the sense of

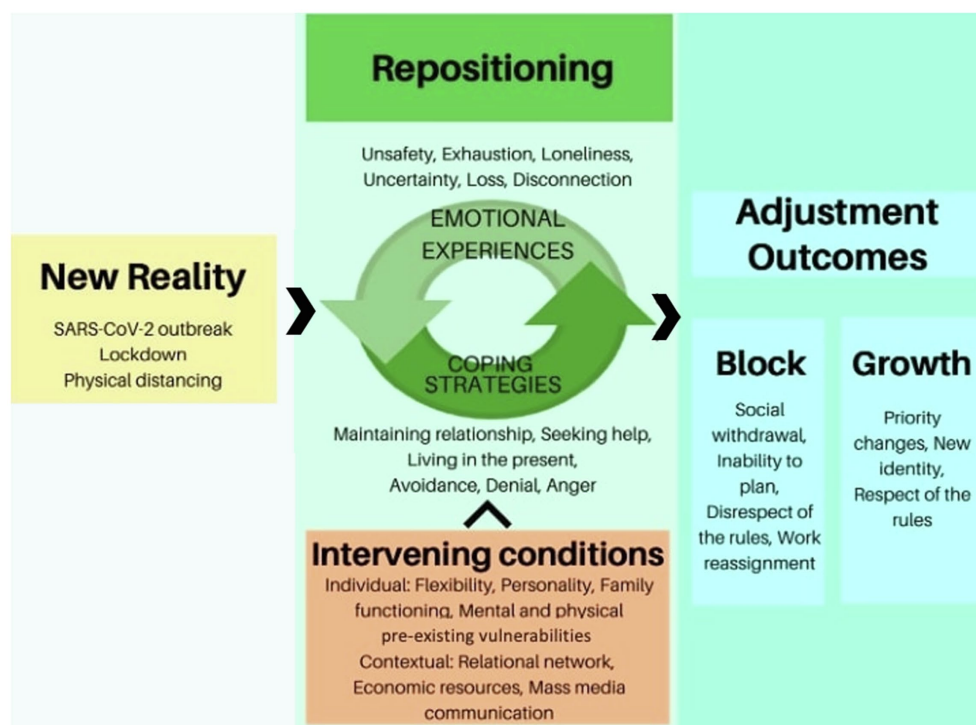


FIGURE 1 | The adjustment process after the first wave of the COVID-19 pandemic.

disconnection from their relationships and their habits: “Some patients, especially the oldest ones, are disoriented. Family members are also disconnected because they have not seen each other for three or four months” (FG2, part 2).

Coping Strategies

People used several adaptive and maladaptive strategies to cope with unpleasant emotional experiences. Adaptive strategies included maintaining relationships, seeking help, living in the present, being creative, and integrating past and present experiences. Many people succeeded in reconnecting or maintaining relationships with family members, friends, healthcare professionals, and psychologists despite the physical distancing, thus mitigating the feeling of loneliness. In addition, “the capacity to reach out for help made the difference. The people who called our (psychological) unit were not feeling well. However, as they were supported, their suffering and its evolution was modulated over time” (FG3, part 5). The capacity of being in the present and being creative, within the imposed restrictions, was also observed as a positive strategy: “I noticed that people’s ability to be in the present and to understand that not everything can be controlled was a resource. Some people and families lived more in the present and tried to make sense of this time that has stopped. I am thinking of families who had to stop medically assisted procreation paths or young adolescents who had planned studies abroad” (FG2, part 3). The possibility of integrating past and present experiences into a narration with meaning emerged as fundamental in order to reconstruct the continuity of self. “Especially those patients who were in intensive

care for a long time, with gaps in their memory, need to rebuild what happened by collecting memories of others and putting the pieces back together” (FG1, part 7).

Some of the most common maladaptive strategies adopted to protect the self against unpleasant emotional experiences consisted of outward expression of anger, avoidance, denial, controlling behaviors, and alcohol abuse. “I have seen a lot of anger directed against the institution or on what is external, on the population, on those who did not follow the rules, as if people were looking for a scapegoat on which to offload all this anguish because they did not know what to cling to” (FG1, part 7). Some people increased controlling behaviors in order to manage anxiety related to the contagion. Others denied the reality of the situation or tried to avoid contact with unpleasant emotional experiences: “Many clinicians struggle to face death as they have experienced life-threatening situations. Many ask to change jobs” (FG 3, part 6).

Intervening Conditions

Several intervening factors contributed to facilitating or challenging repositioning in the face of a new reality. Some factors were contextual, such as relational networks, economic resources, and mass media communication. The endurance of relationships and social networks, the availability of healthcare services, the timely and proactive support from the psychological services, and the cohesiveness of the teamwork were described as protective factors. For example, for COVID-19, patients having experienced holding and handling relationships with healthcare professionals was crucial: “There were patients at

the field hospital who said ‘those nurses are Russian, they do not speak our language but they massage our feet and we feel taken care of’ (FG1, part 3). The availability of economic and cultural resources was recognized as a protective factor: “The more the contexts were rich in personal, structural, family, affective and also economic resources, the more resilience there was” (FG 1, part 6). In addition, mass media communication exposure was described as having an important role in inflating or deflating the perceived severity of the situation: “When the media started to say that the figures were promising, fear calmed down” (FG1, part 8).

Other factors were individual, such as personality structure, family functioning, and pre-existing psychological or medical problems. Resilience and psychological flexibility influenced repositioning in the face of the new reality: “Great resources such as flexibility allowed people not to develop psycho-pathological symptoms. However, there were personality structures that did not hold strong in this phase” (FG3, part 5). Family functioning and the presence of previous psychological or medical problems modulated the capacity of the population to adapt to the challenges imposed by the pandemic: “More fragile patients with pre-existing diseases (e.g., cancer or cardiac patients) are now experiencing increased suffering” (FG3, part 2).

Adjustment Outcomes

The capacity of repositioning offered people a chance to grow. For some people, this meant changing their priorities and/or assuming a new professional identity: “For some healthcare professionals the pandemic was a challenge that made them grow, but also redefine their professional identity” (FG 3, part 2). For other people, adjusting to the new reality meant accepting and respecting the rules to prevent the virus circulation and changing lifestyles.

On the contrary, difficulties in repositioning led people to be stuck in a new present without the capacity of making plans and projecting into a future. Some people reported blocks in their professional activities out of fear or due to unprocessed traumatic experiences: “I have in mind a patient with excellent motor recovery, who must return to work in a slaughterhouse but has developed the belief that he got the disease directly from the pigs and he cannot ask for a change of role” (FG 3, part 3). Blocks in social relationships also emerged, with frequent withdrawal. At the same time, oppositional behaviors or non-adherence to the rules emerged, particularly among adolescents: “Young people continue to stay indoors and to use social media to communicate or play group games” (FG1, part 2). “We are also seeing non-adaptive behaviours, such as getting drunk or non-respecting restrictive rules” (FG 2, part 6).

Finally, failure in repositioning led some people to remain stuck in their previous dysfunctional conditions, such as victims of domestic violence or conflicting families: “We see women who have great hesitation in following up on complaints. They rethink it or go back, as though the reopening has facilitated the dispersion of that acute conflict that was present in their relationships before and during the lockdown” (FG 2, part 6).

DISCUSSION

Although the literature has warned about a possible increase in adjustment disorders as a result of the COVID-19 pandemic (Kazlauskas and Quero, 2020), no research has been conducted to explore the adjustment processes after the emergency phase of the pandemic. This study aimed to understand the adjustment processes after the first wave of COVID-19 pandemic drawing on the experience of clinical psychologists who provided support to the Italian population.

The adjustment process revolved around the core category of repositioning. Repositioning emerged as the evolutionary task that people had to face after being confronted with a disruption of their old reality caused by the COVID-19 outbreak and the lockdown experience. According to adaptation models (Murray Parkes, 1971; Janoff-Bulman, 1989), challenging conditions force people to rebuild their assumptions about the world and the self, consequently transforming the way they interpret the past and expect the future (Janoff-Bulman, 1989). Rebuilding meaning after a traumatic event (de Jong et al., 2020) has been reported as being fundamental to facilitating adjustment. In our study, repositioning was described as an inner work that consisted of integrating and giving meaning to the unpleasant emotional experiences generated by the new reality in order to adjust and move on in life.

Among the unpleasant emotional experiences, anxiety, depressive symptoms, and post-traumatic stress have been widely reported among the general population (Rossi et al., 2020; Favieri et al., 2021) and healthcare professionals (Lamiani et al., 2021; Lasalvia et al., 2021). However, our findings captured some deeper emotional experiences, including feeling unsafe, fear, exhaustion, loneliness, sense of loss, uncertainty, and disconnection. As suggested by other authors (Šakan et al., 2020; Levine et al., 2022), these unpleasant emotions may be a consequence of the frustration of basic psychological needs that occurred during the pandemic. The outbreak of the COVID-19 pandemic and the subsequent lockdown have hindered the satisfaction of the needs of safety, belongingness, and self-actualization threatening the self and its continuity in time, reminding people of their mortality and impotence, and imposing limitations on people's freedom. Interestingly, these unpleasant emotional experiences did not necessarily develop into psycho-pathological symptoms or maladjustment outcomes thank to individual effective coping strategies or to other intervening factors.

In terms of coping strategies (Lazarus and Folkman, 1984), our findings showed that denial, avoidance, expressing anger, and alcohol abuse were observed by psychologists along with other more functional strategies, such as maintaining relationships, living in the present, being creative, and seeking help. Our findings are consistent with other quantitative studies conducted on the general population, which found that positive thinking, balanced time perspective, active coping style, and social support were positive predictors of psychological well-being during COVID-19 pandemic (Yu et al., 2020; Budimir et al., 2021; Ceccato et al., 2021). Psychological interventions to promote these coping strategies

and life skills could be helpful in order to facilitate repositioning and prevent maladjustment outcomes.

Besides individual coping strategies, our findings highlighted that several intervening factors also influenced the capacity of repositioning. Among individual factors, suffering from a chronic or mental health condition before the pandemic and having a rigid personality structure challenged the repositioning work. Our results are consistent with the findings of other recent quantitative studies which found that some personality traits, such as neuroticism and avoidance, and a preoccupied attachment style, are associated with higher psychological distress among the general population and the healthcare professionals (Di Crosta et al., 2020; Mazza et al., 2021). Additionally, one of the most influential factors identified by psychologists in our study was family functioning. An Italian study (Tintori et al., 2020) confirmed that collaboration, affection, and healthy family relationships provided a safe and protective environment during the pandemic. Among contextual factors, we found that mass media exposure, limited economic resources, and the lack of relationships and networks in which people could feel cared for and connected challenged repositioning. On the contrary, the maintenance of family or caring relationships, even *via* the Internet, and the presence of psychological offerings emerged as pivotal factors for preventing maladjustment outcomes.

The success or failure of repositioning in the face of the new reality led to two different adjustment outcomes: growth or block. In line with the literature on post-traumatic growth (Calhoun and Tedeschi, 2001), we know that stressful or traumatic life events may be an opportunity for some people to grow. In our study, the data suggested that as a result of repositioning, some people changed their life priorities, accepted the rules, and resumed their life plans within the limits imposed by the pandemic. On the contrary, others seemed to be blocked in their individual, social, and planning dimensions. Some people did not respect the rules, denying the pandemic situation, others struggled to resume future planning and social relationships, and others still struggled to resume work and asked to be reassigned. Like other stressful events (Murray Parkes, 1971), this pandemic can be conceptualized as a turning point for better or worse psycho-social adjustment. People may have experienced fear, loneliness, uncertainty, loss, and disconnection and may not have been able to make sense of what has happened and to integrate it into their lives. Our findings showed that if such unpleasant emotional experiences are not recognized and integrated, repositioning is challenged and adaptation will probably be inhibited.

This study is qualitative and therefore, its findings have limited generalizability. Moreover, the study is based on the psychologists' experience in supporting the population and not on the population's direct experience. We chose to interview psychologists because of their professional knowledge and privileged point of view on the population's distress and adaptation during the pandemic. However, we are aware that reporting biases may exist. Finally, most participants worked in regions more severely affected by the first wave of the COVID-19 pandemic. This could have created a different psychological impact on the population and on psychotherapists' experience.

Despite these limitations, our findings may help mental health professionals to proactively plan psychological interventions to prevent maladjustment outcomes. Based on our findings, supportive and therapeutic interventions for the population could facilitate repositioning by encouraging contact with emotional experiences and reinforcing functional coping strategies. Psycho-educational and supportive interventions could be proactively promoted to reach some population targets, such as adolescents, chronic patients, or healthcare professionals, in order to prevent maladjustment (Leone et al., 2020). The results of this study could assist in implementing evidence-based strategies to facilitate the adaptation process during the recovery phase.

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 Ethics Committee of the University of Milan (study reference number 74.20, approved on June 29th 2020). The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

GL, EV, and DR were involved in the study conceptualization and methodology development. DR involved in the project administration and participants' recruitment. GL, LB, and FB were involved in data curation and data collection and wrote the original draft of the manuscript. GL, LB, DR, and EV conducted the data analysis. DR, EV, and DL reviewed and edited the manuscript. EV and DL supervised the project. All authors contributed to the article and approved the submitted version.

FUNDING

The open access publication was supported by a grant by the University of Milan, Department of Health Sciences (PSR2020_DIP_013_VEGNI).

ACKNOWLEDGMENTS

This work is dedicated to the loving memory of our colleague Marinella Sommaruga, who initiated this work with us. The authors wish to thank Alessia Rapacchi for her assistance in transcribing the focus groups and the psychologists who participated in this research project for their time and generosity in sharing their experience.

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Trauma Exposure and Mental Health Prevalence Among First Aiders

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OPEN ACCESS

Edited by:

Mariakura Di Tella,
University of Turin, Italy

Reviewed by:

Agata Benfante,
University of Turin, Italy
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Xiamen University, China
Rassamee Chotiparnvithayakul,
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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 29 November 2021

Accepted: 14 January 2022

Published: 07 March 2022

Citation:

Rowe C, Ceschi G and
Boudoukha AH (2022) Trauma
Exposure and Mental Health
Prevalence Among First Aiders.
Front. Psychol. 13:824549.
doi: 10.3389/fpsyg.2022.824549

Introduction: First aiders are commonly exposed to different forms of traumatic event (TE) during their duties, such as Chronic Indirect Vicarious Exposure which refers to an indirect exposure to aversive details of the trauma (APA, 2013). If the psychopathological impact of TE is well documented, the mental health of first aiders remains neglected. Therefore, our main objectives are (i) to study the link between exposure to traumatic events and psychopathological outcomes and (ii) to quantify the rates of mental health disorders among first aiders.

Method: Our sample comprised of 53 volunteer first aiders (21 females and 32 males) with an average age of 32.4 years ($SD = 13.6$ years). Traumatic event exposure and mental health were assessed through a set of validated questionnaires completed online.

Results: Rates of mental health outcomes were higher than within the general population. Females showed higher scores of post-traumatic stress disorder (PTSD) than males. PTSD scores were significantly correlated with all mental issues scores, apart from tobacco use and eating disorders scores. There was a significant correlation between the number of traumatic events and the years of experience. Exposure to traumatic events only correlated with nicotine dependency. No other correlation reaches statistical significance.

Discussion: The scores of all mental health outcomes were high; a surprising result, as volunteer first aiders are thought to be recruited for their strong dispositional cognitive and emotional abilities. The high levels of post-traumatic stress disorder and burnout, along with the prevalent anxiety and depression, highlight the need for greater psychosocial support. Resilience training and peer support would be useful interventions in this group.

Keywords: trauma, mental health, first aiders, PTSD, comorbidity

HIGHLIGHTS

- Compared to community samples, first aiders show high levels of mental health issues, although they are considered to be more resilient in the face of traumatic situations than the general population.
- The high prevalence of mental health problems among first aiders highlights the need to develop screening tools and prevention and intervention protocols specifically adapted to their needs.

INTRODUCTION

The literature on mental health after single or multiple traumatic events (TE) strongly suggests that direct or vicarious exposure to such TE can lead to or interfere with many symptom categories. In a range of studies conducted across a variety of communities, these have been described in the context of post-traumatic stress disorder (PTSD; Jeon et al., 2007), of major depressive disorder (MDD; Salcioglu et al., 2007), of general anxiety disorder (GAD; Karatzias et al., 2019), of substance misuse including alcohol and nicotine dependence (Breslau et al., 2003), of eating disorders (Scharff et al., 2021), of obsessive-compulsive disorder (Ceschi et al., 2011) or of dissociative disorders (Schimmenti, 2018).

The community prevalence of MDD is 4.9% (Knoll and MacLennan, 2017) and has been found to be highly comorbid to trauma and PTSD (Kendler et al., 1998). Anxiety often goes hand in hand with depression. The prevalence of GAD in the general population is between 1.9 and 5.1% (Wittchen, 2002) and that of OCD is 3.0% (Cilliçilli et al., 2004). GAD and OCD have been found to be highly correlated with depression (Fierman et al., 1993; Cromer et al., 2007). Ceschi et al. (2011) showed that obsessive-compulsive symptom severity is predicted by exposure to adverse events. Eating disorders have been linked with sexual trauma (Vanderlinden et al., 1993) and other traumatic events (Brewerton, 2007). Lifetime prevalence estimates of The Diagnostic and Statistical Manual of Mental Disorders (fifth ed.; DSM-5; American Psychiatric Association, 2013) of anorexia nervosa, bulimia nervosa and binge eating disorder are up to 9% (Smink et al., 2012).

Alcohol abuse (Green et al., 1985) and nicotine dependence (Anda et al., 1999) have been studied in trauma-exposed populations. The prevalence of alcohol abuse in a community sample is 4.65% (Grant et al., 2004) and that of nicotine dependence 24% (Breslau et al., 2001). Finally, dissociative disorders are strongly related to trauma exposure and PTSD (Briere, 2006). The prevalence of dissociative disorders has been estimated at 9.7% in the general population (Johnson et al., 2006), including depersonalization disorder (0.8%), dissociative amnesia (1.8%), dissociative identity disorder (1.5%) and dissociative disorder not otherwise specified (4.4%).

If the prevalence of mental disorders following a direct or an indirect exposure to trauma seems to be well known in the general populations, less is known among first aiders. This highlights two problems; first, that the PTSD diagnostic criteria changed with the most recent version of the DSM (American Psychiatric Association, 2013), which added two new forms of trauma exposure (learning that a relative or close friend was exposed to trauma); Indirect exposure to adverse details of trauma, usually in the course of professional duties (e.g. first responders and medics). Little research has been devoted to the impact of those last two forms of trauma exposure and less is known about their impact in terms of the prevalence of mental disorders. Research has shown that the more frequent the exposure to traumatised individuals, the higher the risk of vicarious trauma (Saakvitne and Pearlman, 1996). Understanding psychopathological processes allow us to better

prevent, diagnose and treat trauma-related mental ill health (Al Falasi et al., 2021).

The second problem concerns the latest form of trauma exposure, the Chronic Indirect Vicarious Exposure, which is particularly frequent among first aiders, as it is considered in some studies as a risk factor for burnout (Boudoukha et al., 2013; Ordway et al., 2020). Burnout is a mental issue among workers characterised by three set of symptoms: exhaustion, cynicism and low efficacy (Maslach et al., 2001). Studies show that burnout, depression and PTSD are correlated and that burnout can either precede or succeed the exposure to or multiple TE among workers (Van Der Ploeg and Kleber, 2003; Mitani et al., 2006; Ehring et al., 2011). The prevalence of mild burnout in the general working population is 25% and severe burnout 2.7% (Honkonen et al., 2006). Consequently, the prevalence of all mental issues following a TE deserves further studies among first aiders. For example, Del Ben et al. (2006) consider that MDD is possibly higher in first responder cohorts.

Many studies have been devoted to the psychological outcomes among people who have been directly exposed to traumatic events; however, the mental health of caregivers, particularly first aiders, such as the volunteer rescuers, remains fairly neglected. In fact, very little research has been carried out on the mental and physical health of first aiders and post-traumatic outcomes after major traumas.

In contrast, studies of PTSD in professional healthcare workers have exploded, particularly in the face of pandemics, such as COVID-19, or Ebola and natural disasters, such as earthquakes.

A review looking at frontline medical staff in the face of COVID-19 (Benfante et al., 2020) found that their female population was more likely to be affected by post-traumatic stress symptoms. It would, therefore, be interesting to see whether this gender bias is present in our sample. Additionally, the study showed that those with less experience showed more symptoms of PTSD during the pandemic; thus, we will look at the role of experience in our study. Ambulance workers suffer from myriad mental health problems, including 11% with PTSD symptoms and 15% showing anxiety and depression (Petrie et al., 2018). Frontline workers in pandemics (Ebola, SARS, H1N1, COVID-19 etc.) similarly show symptoms of PTSD, burnout, anxiety and depression and stress (Busch et al., 2021). We can therefore postulate that first aiders will show similar levels of psychopathology.

Our current study is inspired by this body of work to look at volunteer first aiders. First aiders exposed to vicarious or secondary TE can develop a tendency to blame victims, creating a distance between themselves and those experiencing primary direct TE and become cynical towards their work. Palm et al. (2004) also suggested that first aid responders working with those directly affected by trauma can show changes in self-identity, worldview, spirituality and general psychological functioning. This is a direct contradiction with the role of a first responder (Palm et al., 2004).

In the course of their duties, all civilian volunteers may be directly or vicariously exposed to multiple traumatic events

(Palm et al., 2004). In light of these sporadic but alarming facts, a better understanding of first aid volunteers' mental health seems to be required. Our study looks at the *Protection Civile*, the leading French association of first responder volunteers (with the exception of firefighters). This service recruits 32,000 members in 98 departments, both in mainland France and overseas territories. The *Protection Civile* undertakes three main tasks: teaching first aid techniques to the general public, providing first aid at major sporting and cultural events and being available to provide frontline assistance during major disasters.

Through this study, we will look to quantify levels of mental ill health in the voluntary first aiders group who experience chronic vicarious traumatic events in the course of their volunteering. The link between the traumatic events exposure and psychological outcomes will be studied in order to provide precious information to improve early assessment and better inform those designing training and mentoring primary and secondary prevention programmes.

MATERIALS AND METHODS

Participants

The questionnaire from which our results were extrapolated was distributed among five departmental branches of the French *Protection Civile* service. As we are relying on third party dissemination, it is impossible for us to know how many first aiders were approached and are therefore unable to calculate a response rate.

Fifty-three first aiders (21 females and 32 males; *Mean* age = 32.4 years, *SD* = 13.6 years) were enrolled in our study. Volunteers were presented with an ethical consent form before being provided with an anonymous code. Participants reported on average 11 years of work experience as first aiders (*SD* = 8.79 years). Of the sample, 67.9% were single, widowed or divorced, and 32.1% were married or coupled, 52.9% had a high school diploma or less, whereas 47.2% had completed tertiary education courses.

A total of 58.5% of the sample reported having been exposed to at least one traumatic event in the course of their volunteering duties. According to the frequency of trauma encounters reported, we create two groups: the *more exposed* participants (reporting 10 or more traumas corresponding to the third quartile of the distribution; 26.4% of the total sample) and the *less exposed* participants (reporting fewer than 10 events; corresponding to the first quartile of the distribution; 73.6% of the total sample).

Measures

Traumatic Events—IET

The inventory of traumatic events (IET; Ouagazzal and Boudoukha, 2019) is an inventory that allows the identification of the occurrence of 26 different traumatic events within four categories—catastrophes (e.g. floods, fires or explosions), accidents (e.g. car accidents, other transport accidents or serious accidents at work), voluntary violence (e.g. sexual violence with penetration, armed aggressions or war and combat-based trauma) and death (e.g. homicide, the suicide of another individual or the brutal death of a close family member).

By reference to each event, the respondent is asked to evaluate its current distress on an 11-point scale from 0 (no current distress) to 10 (extreme distress). The inventory permits to differentiate between trauma in private life and professional trauma.

PTSD—Checklist for DSM-5 (PCL-5)

The PCL-5 is a 20-item self-report measure that assesses the 20 DSM-5 symptoms of PTSD and therefore examines intrusions, avoidance, negative alterations in mood and cognitions and hyperarousal (Weathers et al., 2013). By referencing each item, participants are required to rate their distress on 4-point Likert scales from 0 (not at all) to 4 (extremely). A cut-off score of 31 was used following the French validation of the PCL-5 (Ashbaugh et al., 2016). In the current sample, Cronbach's α is 0.90.

Dissociative Experience Scale

The Dissociative Experience Scale (DES; Bernstein and Putnam, 1986) was adapted for digital use giving a scale for each question of 0–10. There are 28 questions, and the total DES scores were calculated by taking the average score and multiplying it by 10. Scores over 30 were considered as clinically significant in concordance with a French validation (Darves-Bornoz et al., 1999) and the α = 0.97.

Hospital Anxiety and Depression Scale

This scale originally developed by Zigmond and Snaith (1983) and provides two sub-scores—HADS-A, which measures anxiety and HADS-D, which measures depression. It comprises 14 questions (seven per sub-score) with multiple choice. Each question can be answered on a 4-point scale whose meaning can vary between questions e.g., “I feel happy”, possible answers between 3 (Not at all) and 0 (Most of the time). The French validation was demonstrated in a working population (Bocéréan and Dupret, 2014), and a score equal or superior to eight on each scale is seen as clinically significant and the α = 0.77 for hospital anxiety and depression scale (HADS)-A and α = 0.77 for HADS-D.

Alcohol Use Disorder Identification Test

The alcohol use disorder identification test (AUDIT) is a screening instrument for alcohol misuse developed by the WHO (Saunders et al., 1993). It comprises 10 multiple-choice questions with answers ranging from 0 (no consumption of alcohol) to 4 (signs of alcohol abuse). A threshold of eight was used following the original validation article as this provides the highest sensitivity. The French validation was used (Gache et al., 2005), that in this study shows a good internal consistency (α = 0.72).

Tobacco Use—Fagerström Test for Nicotine Dependence

This screening tool (Heatherton et al., 1991) comprises six questions with a total possible score of 10. The cut-off divides respondents into five groups—no dependence for those scoring lower than 2, low dependence for scores of 3 or 4, medium dependence for scores of 5 or 6, high dependence for 7–8 and very high dependence for those scoring 9 or 10. A French validation was used (Pomerleau et al., 1994) with an α = 0.74.

Burnout—Oldenberg Burnout Inventory

The Oldenberg Burnout Inventory (OLBI; Demerouti et al., 2003) measures exhaustion and disengagement on two subscales of eight items with a total burnout score available by adding the two. Each question has four possible answers ranging from 1 (totally disagree) to 4 (totally agree). Following the French validation (Angenot and Hansez, 2013), there were three groups—low (under 30/64), medium (between 30 and 45/64) and high burnout (45 or more/64). The internal consistency is $\alpha=0.89$.

Eating Disorders—The Sick, Control, One Stone, Fat, Food Questionnaire

The Sick, Control, One Stone, Fat, Food (SCOFF) questionnaire (Morgan et al., 1999) is comprised of five yes/no questions covering anorexia nervosa and bulimia nervosa symptomatology. A score of 2 or more is indicative of a clinically significant problem. A French validation was used (Garcia et al., 2010). The internal consistency was poor ($\alpha=0.33$).

Obsessive Compulsive Disorder—Maudsley Obsessive Compulsive Inventory (Abbreviated; MOCI-20)

This scale is a French validation (Hantouche et al., 2003) of a 20-item version of the MOCI-30. The inventory is comprised of 20 yes/no questions with a total possible score of 20. A score of 6 or higher is indicative of obsessive-compulsive symptomatology. Cronbach's alpha was satisfactory at $\alpha=0.80$.

Procedure

Email contact was sought with all *Protection Civile* departmental sections whose email address was available. Five sections responded and forwarded our invitation letter to their first aiders. Their participation was entirely voluntary, and no monetary reward was given. The questionnaires were all digitised and available on a Lime Survey site. The first aiders form a subpopulation of emergency workers, and it is therefore impossible to calculate the attrition rate. Ethical approval was given to this study by the University of Nantes (SY/GD/CB 2021 DRPI n°143).

Data were analysed with The jamovi project (2021). Due to the non-normality of the sample, we used a series of non-parametric tests, primarily Spearman's rho for correlations as well as Mann-Whitney's U for the sex variable and high/low reporters. In addition, we performed a series of X^2 in order to compare a small selection of mental health variables (PTSD, burnout, alcohol and eating disorders) to the general population.

RESULTS

Mental Health of First Aiders

Females showed higher scores of PTSD than males (respectively, $Mdn\text{-}female=19$ $Mdn\text{-}male=7$; $U=208.0$, $p=.02$). No other gender difference in mental health outcomes, levels of education and marital status was found. Age was correlated with nicotine dependence ($r_s=0.622$, $p=.023$) with older participants reporting heavier use of cigarettes, and with obsessive-compulsive symptom

(OCS) severity, ($r_s=-.330$, $p=.016$) with younger participants reporting more severe OCS. As expected, age and experience positively correlated ($r=.805$, $p<.001$).

Correlations between mental health outcomes are reported in **Table 1**. PCL-5 scores were significantly correlated with all variables apart from the Fagerström Test for Nicotine Dependence (FTND) and the SCOFF. HADS-A statistically significant correlation with all the variables apart from FTND and HADS-D.

Trauma Exposure and Mental Health

There was no correlation between the absolute frequency of traumatic events reported and any of the mental health measures. A series of individual samples tests (Mann-Whitney's U) was performed, comparing the high event reporters and low event reporters with no significant differences between the two groups for any of the psychopathology outcomes. There was a significant correlation between the number of traumatic events reported and the years of experience, $r_s=.315$, $p=.022$.

The intensity of the traumatic event per traumatic event was also not significantly correlated with any of the mental health outcome variables. Experience was correlated significantly with the measures of obsessive-compulsive disorder (MOCI), $r_s=-.281$, $p=.041$ and nicotine dependence (FTND), $r_s=.710$, $p=.007$.

There were moderately strong relationships between the PCL-5 and the HADS-A, $r_s=.540$, $p<.001$, and the DES, $r_s=.536$, $p<.001$. Similarly, the HADS-A shares a moderately strong correlation between the MOCI, $r_s=.594$, $p<.001$, and the OLBI, $r_s=.553$, $p<.001$. Finally, there is also a moderately strong relationship between the HADS-D and the OLBI, $r_s=.590$, $p<.001$, and between the MOCI and the DES, $r_s=.451$, $p<.001$. Descriptive statistics of mental health variable scores are given in **Table 1**.

Prevalence rates of mental health disorders screened for using the scales used in this study were calculated using the cut-offs specified in the methods section of this article and can be seen in **Table 1** and can be found alongside their prevalence in the general population in **Table 2**.

DISCUSSION

Mental health among first aiders: a 'not so strong' population?

All mental health disorder prevalence levels gleaned from our study were higher than those expected in a community sample. The prevalence of PTSD (11.3% vs. 2.32% in the general population; Ohayon and Shapiro, 2000), $X^2(1, N=236)=11.9$, $p<.001$ is high enough to warrant further study. It is possible that the PTSD refers to traumas experienced in their private lives and full-time occupations, but if that were the case, one would expect the prevalence to be close to that of the general population. Therefore, it is probable that we either have an accumulation of micro-traumas as detailed before or a self-selected population with higher levels of psychopathology. This suggests that first-aid volunteers present an important level of mental health symptoms. Given the design of the current study, however, a general response bias cannot be excluded. Further studies with control measures that are not expected to be affected in our sample are therefore suited. It is also important to bear in mind the small sample size. It was a

TABLE 1 | Descriptive statistics, Cronbach's α and Spearman's rho correlations between mental health measures.

S. No.	N	Mean (SD)	α	Clinical prevalence	1	2	3	4	5	6	7	8
1. HADS-A	53	6.51 (2.60)	.77	30.2%	–							
2. HADS-D	53	4.42 (3.44)	.77	15.1%	.198	–						
3. PCL-5	53	13.1 (11.2)	.90	28.3%	.540***	.362***	–					
4. SCOFF	53	.91 (.99)	.33	28.3%	.354**	.309*	.155	–				
5. MOCI	53	2.30 (2.79)	.80	11.3%	.954***	.216	.536***	.334*	–			
6. AUDIT	30	5.03 (3.35)	.72	23.3%	.390*	.130	.374*	.133	.291	–		
7. FTND	13	2.85 (2.48)	.74	53.9%	.095	–.114	.261	.060	.049	.035	–	
8. DES	53	14.4 (17.6)	.97	13.2%	.281*	.291*	.536***	.257	.451***	.229	.251	–
9. OLB	53	35.7 (8.97)	.89	Medium 64.6% High 13.2%	.533***	.590***	.330*	.413	.398**	.332	.320	.145

* $p < .05$; ** $p < .01$; and *** $p < .001$.

case of convenience sampling, and there were a high number of dropouts on the questionnaire due to its length, so it is equally probable that we have a small self-selected population. It is impossible to calculate an attrition rate as they are a subpopulation of a larger study, and we are unable to extrapolate the drop-out level.

The female population showed higher scores of PTSD than their male counterpart. This is consistent with previous research (Benfante et al., 2020).

There was a moderately high correlation between the risk of experiencing a predisposition to dissociative symptoms and PTSD, as can be expected, but it is interesting to note the link between dissociation and OCD. This has been previously documented and is found to be most strongly linked to checking compulsions and obsessive intrusions (Watson et al., 2004). Anxiety was correlated with almost all the variables except depression, which is surprising. The lack of correlation between depression and anxiety is possibly due to the fact that these two scores are measured by two orthogonal dimensions and are therefore not correlated. Anxiety was particularly strongly linked to OCD, which is concordant given that both conditions (GAD and OCD) were present with high levels of anxiety; OCD and GAD have been found to be strongly comorbid and are probably convergently correlated. Indeed, the moderately strong correlation between anxiety and burnout can also be explaining by an overlap in symptoms, as patients with burnout have a lower ability to cope with anxiety (Diestel and Schmidt, 2010). The large amount of correlations across mental health outcomes is indicative of trans-diagnostic processes, such as cognitive biases and avoidance (Fusar-Poli et al., 2019).

Addiction and OCD: coping and emotion regulation among first aiders.

Alcohol abuse is highly prevalent [23.3% vs. 4.65% in the general population, $X^2(1, N=236)=4.1, p<.001$] and moderately strongly correlated to both anxiety and PTSD. Therefore, the theory can be put forward that alcohol plays a role in self-medication (Robinson et al., 2009). The prevalence of eating disorders is three times that of the community sample [28.3% vs. 9%; $X^2(1, N=236)=1,165, p<.001$]. The SCOFF screens for anorexia nervosa and bulimia nervosa. The cut-off is very low (two or more items out of five) and while this has been found to be highly specificity and low sensitivity in a previous study (Solmi et al., 2015), causing a large number of false negatives, it is possible that our sample has low specificity (false positive) and high sensitivity (false negative). Therefore, a higher cut-off score would be advisable.

Age and experience are highly correlated, as can be expected, and it is therefore not surprising that they are both correlated only with obsessive-compulsive symptomatology and nicotine dependence.

In the case of nicotine dependence, as it is not correlated with any other psychopathological outcomes, one can postulate that it is a social activity rather than a coping mechanism. Therefore, it is possible that this increases with experience and familiarity. An increase in the prevalence of OCD with age has been previously documented (Cath et al., 2017). Experience was significantly correlated with the number of traumatic events reported, due probably to the accumulation of traumatic events over time.

TABLE 2 | Prevalence of mental health outcomes in our study and in the general population.

Mental health outcome	Prevalence in our study	Prevalence in general population
PTSD	11.3%	2.32% (Ohayon and Shapiro, 2000)
Anxiety	30.2%	5.1% (Wittchen, 2002)
Depression	15.1%	4.9% (Blazer et al., 1994)
OCD	11.3%	3% (Cilliçilli et al., 2004)
Eating disorder	28.3%	9% (Smink et al., 2012)
Dissociation	13.2%	9.7% (Johnson et al., 2006)
Alcohol dependence	23.3%	4.65% (Grant et al., 2004)
Nicotine dependence	53.9%	9.7% (Breslau et al., 2001)
Burnout (severe)	13.2%	2.7% (Breslau et al., 2001)

Chronic Indirect Vicarious Exposure at work: to depressive and burnout outcomes?

We must also look further at the high levels of burnout [64.2% with a medium level of burnout and 13.2% a high level vs. 25 and 2.7% r^2 (2, $N=236$) = 11.9, $p < .001$ in the general population]. Equally, the moderately strong link between depression and burnout is not surprising, as there is an overlap between those mental issues (Bianchi et al., 2015), given that the emotional exhaustion is common to both disorders. It has been suggested that depression is a consequence of untreated burnout (Boudoukha, 2020). This burnout reflects high levels of emotional exhaustion and disengagement and needs to be studied from a voluntary organisational viewpoint. Either there is not enough psychosocial support being provided, working conditions are unsatisfactory or both. It is surprising that burnout is not correlated with age or experience and shows that it is not just linked to an accumulation of traumatic events, in direct contradiction. When considering burnout, one must remember that these are volunteers. It has been reported that working as first aiders during an emergency, a serious disaster or a major crisis can be accompanied by a sense of empowerment and coping potential for the individual. This has been considered a coping strategy and a means of achieving personal growth in the face of adversity (McFarland and Alvaro, 2000). Jaffe et al. (2012) showed that occasional first aiders (such as volunteers) who were not motivated by belonging to a certain social group were more prone than other volunteers to develop symptoms of post-traumatic stress disorder (PTSD). This result is consistent with the idea that social support is a protective factor in the face of adversity. In contrast, volunteering motivated by a desire for professional advancement or to improve one's self-esteem is associated with a greater occurrence of psychopathological symptoms (El-Gabalawy et al., 2020).

Limitations

It is surprising that not one mental health outcome correlated with the total number of traumatic events reported. It is possible that this is due to the small number of participants reporting a traumatic event as well as the extreme range of responses (0–294). As the prevalence of PTSD is so high, it is likely that some sort of trauma is being experienced. It is probable that there is a phenomenon of both under and over-reporting.

It is also possible that the volunteers have an accumulation of 'micro-traumas' (Seides, 2010)—rather than large scale traumatic events—which would not be picked up by our inventory.

It is essential to mention the current pandemic and how it affects the results. Although first aiders were not on the frontline, they still volunteered in vaccination centres, working on logistics. It would have been interesting to have a pre- and post-pandemic measures.

CONCLUSION

While the current study indicates that mental illness is prevalent among first aiders, a longitudinal study is necessary in order to draw more firm conclusions on whether trauma has a latency period before causing symptoms and thus be correlated with mental health outcomes. Looking at the high level of PTSD and burnout (as well as anxiety and depression, which are highly prevalent in this population) highlights the need for more psychosocial support with the potential to introduce the role of a liaison psychologist trained in trauma and first responder populations. There is also a role to play in peer support and creating cohesive teams through training, especially in mental health first aid, already taught in relation to possible patients but which could also be introduced to peer support, such as in the case of Pekevski (2013) who introduced psychological first aid to frontline staff.

While bearing in mind the limitations of the current study, it shows that volunteer first aiders are a neglected group with significant levels of psychopathology. There is a need for improved training and sustained support of this vulnerable group. It would also be interesting to introduce a module on resilience training to increase a shared organisational identity and develop and maintain leadership roles.

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 CERNI (Ethical and Non Interventional Research Committee of the University of Nantes) DRPI N°143. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CR: data analysis and writing of draft manuscript. GC: proofreading of manuscript and statistical advice. AB: ethical approval and supervision. All authors contributed to the article and approved the submitted version.

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Long-Term Posttraumatic Growth in Victims of Terrorism in Spain

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OPEN ACCESS

Edited by:

Mariakura Di Tella,
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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 01 January 2022

Accepted: 25 February 2022

Published: 23 March 2022

Citation:

Fausor R, Sanz J,
Navarro-McCarthy A, Gesteira C,
Morán N, Cobos-Redondo B,
Altungy P, Marqueses JMS,
Sanz-García A and García-Vera MP
(2022) Long-Term Posttraumatic
Growth in Victims of Terrorism
in Spain. *Front. Psychol.* 13:847099.
doi: 10.3389/fpsyg.2022.847099

Background: Scientific literature on posttraumatic growth (PTG) after terrorist attacks has primarily focused on persons who had not been directly exposed to terrorist attacks or persons who had been directly exposed to them, but who were assessed few months or years after the attacks.

Methods: We examined long-term PTG in 210 adults directly exposed to terrorist attacks in Spain a mean of 29.6 years after the attacks (range: 2–47 years). The participants had been injured by a terrorist attack (38.6%) or were first-degree relatives of people who had been killed or injured by a terrorist attack (41.4% and 20%, respectively). They completed diagnostic measures of emotional disorders and measures of PTSD and depression symptomatology, optimism, and PTG.

Results: Multiple regression analyses revealed gender differences (women reported higher levels of PTG than did men) and a positive linear relationship between PTG and cumulative trauma after the terrorist attack. Some PTG dimensions were significantly associated with PTSD symptomatology, these associations being linear, not curvilinear. However, PTG was not associated with depression symptomatology, diagnosis of emotional disorders, age, elapsed time since the attack, or optimism. In comparison with survivors assessed 18 years after the 1995 Oklahoma City bombing, Spanish victims of terrorism showed higher levels of appreciation of life, but lower levels of relating to others and spiritual change.

Conclusion: The findings underscore the influence of gender on PTG and provide support to the hypothesis that some emotional distress may be a necessary condition of PTG. Future studies on PTG after terrorist attacks should take into consideration the characteristics of the terrorist attack itself and the contexts of violence and threat in which it occurred. The political, social, and cultural characteristics of the community affected by it and the profile and characteristics of other traumatic events suffered after the attack should also be taken into account in further research.

Keywords: posttraumatic growth, PTSD, psychological consequences, terrorism, victims, depression, optimism

INTRODUCTION

The scientific literature has revealed that a significant percentage of the people who have suffered a terrorist attack can show different psychological disorders and symptoms because of it. In particular, victims can develop posttraumatic stress disorder (PTSD) or major depressive disorder (MDD). These mental health problems can be exhibited short, medium, and long term after the terrorist attack (García-Vera et al., 2021; Sanz and García-Vera, 2021). This can be seen in the systematic review conducted by García-Vera et al. (2016), where a year after suffering a terrorist attack, the prevalence of PTSD among direct adult victims was 33–39%. Among family members of the deceased or those who had been injured in the attacks, the prevalence was between 17 and 29%, and 4% among the general population belonging to the area that was affected by the attack. In the systematic review conducted by Salguero et al. (2011), it was estimated that the prevalence of MDD among direct adult victims was between 20 and 30%, and of 4–10% among the general population belonging to the area that was affected by the attack.

Nevertheless, as it can be inferred by the previously presented percentages, not all people exposed to a terrorist attack will come to show mental disorders or symptoms. In fact, it is estimated that a high percentage of direct victims, between 60 and 70%, will not develop any kind of mental disorder months after suffering the attack (García-Vera et al., 2021; Sanz and García-Vera, 2021).

Furthermore, a growing scientific literature has proven that, after a terrorist attack, people can experience positive reactions. For example, people can develop strengths and new abilities, increase their altruistic behaviors, strengthen the presence of positive emotions, and show positive changes in cognitive schemas about humankind, the world or oneself (Vázquez et al., 2008). These positive reactions are encompassed in the construct of posttraumatic growth (PTG), which has been defined as “positive psychological change experienced as a result of the struggle with highly challenging life circumstances” (Tedeschi and Calhoun, 2004, p. 1). This construct has mainly been assessed by the Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996). The PTGI provides a global score of posttraumatic growth, as well as scores of five of its different components or dimensions: Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and New Appreciation of Life. In fact, both the full version and the short form of the PTGI, the PTGI-SF (Cann et al., 2010), are the most used assessment tools for PTG. These assessment tools are used in studies included in various meta-analyses, such as the ones published by Vishnevsky et al. (2010), Liu et al. (2017), and Wu et al. (2019).

Studies included in the meta-analyses mentioned above have examined that PTG can appear after suffering different types of traumatic events, such as natural disasters, traffic accidents, severe health conditions, and sexual or physical assault. However, hardly any of these studies address that PTG can develop after suffering a terrorist attack. To be precise, none of the 63 studies in the meta-analysis conducted by Liu et al. (2017), or the 26 studies in the meta-analysis conducted by Wu et al. (2019), examined the appearance of PTG after a terrorist attack. Out of the 70 studies

included in the Vishnevsky et al. (2010) meta-analysis, only five cover this topic. In fact, a search was conducted on December 14, 2021, using the bibliographic database PsycInfo, with the words “posttraumatic growth” or “post-traumatic growth” and “terrorist” or “terrorism.” These words were searched for in the document title or abstract fields. The search revealed 51 publications, out of which only 26 reported an empirical research study on PTG after a terrorist attack (excluding three that were qualitative studies or case studies and did not offer quantitative data on PTG).

Seventy-seven percent of the 26 studies were either (1) focused on people who had not been directly exposed to a terrorist attack, meaning they had not been injured, nor did they know people who had been wounded or killed by it (e.g., Butler et al., 2005; Páez et al., 2007; Park et al., 2008, 2012; Rimé et al., 2010), or (2) focused on people who had been directly exposed to a terrorist attack but had been evaluated a few months after the attack, or 1 or 2 years after at most (e.g., Blix et al., 2016; Ikizer and Ozel, 2021). However, there are not many studies that examine PTG in victims of terrorism who have been evaluated many years after being directly exposed to the attack. In fact, only six studies were found in the search that was mentioned in the previous paragraph, and four of them were based on the same two samples of survivors (Tucker et al., 2016, 2018; Spano, 2018; Cárdenas Castro et al., 2019; Glad et al., 2019, 2020).

The research of PTG in that type of population is essential, given that different studies have found that a greater level of posttraumatic stress symptoms is associated with a greater level of PTG (see the meta-analysis of Liu et al., 2017). In this sense, given that people directly exposed to a terrorist attack show a greater prevalence of PTSD than people indirectly affected by it (García-Vera et al., 2016, 2021; Sanz and García-Vera, 2021), it is presumed that people directly exposed to a terrorist attack will show very high levels of PTG. In contrast, some studies have found that the relationship between posttraumatic stress symptoms and PTG is not linear, but curvilinear. Specifically, the relationship has the shape of an inverted U, meaning highest levels of PTG would be associated with moderate levels of posttraumatic stress symptoms, not with high or low levels of posttraumatic stress symptoms (see the meta-analysis of Shakespeare-Finch and Lurie-Beck, 2014). Consequently, the matter is not settled yet and requires further research. It would be beneficial to conduct more studies examining the presence of PTG in people who have been directly exposed to a terrorist attack, as this population shows greater variability in posttraumatic stress symptoms. Therefore, these kinds of studies would help examine more fully the relationship between PTG and posttraumatic stress symptoms.

Previous studies have also found a relationship between the level of PTG and the elapsed time since the traumatic event (Linley and Joseph, 2004; Wu et al., 2019). For instance, the meta-analysis conducted by Wu et al. (2019) found that the presence of moderate levels of PTG was associated with the elapsed time since the traumatic event. This meta-analysis showed that a shorter elapsed time since the traumatic event (less than 6 months) was associated with a greater degree of moderate-high PTG. That being said, most studies (60%) included in the meta-analysis conducted by Wu et al. (2019) assessed the presence of PTG

between a day and 24 months after the traumatic event. Only five studies (16.7%) assessed the presence of PTG after six or more years since the occurrence of the traumatic event. For this reason, it might be possible to find a curvilinear relationship when examining longer periods of time. In particular, the relationship between elapsed time and PTG could be similar to the inverted U shape found in studies on posttraumatic stress symptomatology and PTG.

There is still no agreement on what is understood by long-term PTG. In the context of people who have had cancer, Lelorain et al. (2010) consider that long-term PTG is that which appears 5 years after being diagnosed with cancer. This time limit seems a bit arbitrary, but taking it as a starting point, several studies in the field of cancer have shown the existence of long-term PTG after 5–8 years of cancer diagnosis (Lechner et al., 2006), after 10 years (Mols et al., 2009), or after 5–15 years (Lelorain et al., 2010). Concerning other traumatic events, the existence of long-term PTG has been proven even after longer periods, for example, 11–24 years after the Vietnam War (Fontana and Rosenheck, 1998) or even 52 years after the Dresden bombing during World War II (Maercker and Herrle, 2003). However, as the meta-analysis by Wu et al. (2019) has shown, most research has examined PTG in the short to medium term, that is, within the first 5 years since the traumatic event.

Out of the six studies on long-term PTG in people directly exposed to a terrorist attack, two studies examined PTG in teenagers or young people (Glad et al., 2019, 2020), one study examined PTG in a very small sample of adults ($n = 7$; Spano, 2018), and one study examined PTG in adults exposed to a very specific type of terrorism such as state terrorism (Cárdenas Castro et al., 2019). Therefore, only the two studies conducted by Tucker et al. (2016, 2018) seem relevant for the purposes of the present study. Both studies, as well as the present one, have examined long-term PTG in a sufficiently large sample of adults who have been directly exposed to a similar type of terrorism.

Tucker et al. (2016, 2018) used the PTGI-SF to assess the PTG level of 138 terrorism survivors 18.5 years after the 1995 Oklahoma City bombing. The results showed a relationship of PTG with the variables sex, education level, and posttraumatic stress symptoms, but not with the variables age, marital status, or depressive symptoms. In particular, a higher level of posttraumatic stress symptoms, being a woman or being a graduate student was associated with a higher PTG. The results also indicated that many years later, more than 30% of the survivors showed high or very high levels of PTG in seven of the 10 items that compose the PTGI-SF. In fact, averaging the percentages obtained in the 10 items, it could be estimated that 32.3% of the survivors showed high or very high levels of PTG, and 55% showed moderate, high, or very high levels.

Showing moderate, high, or very high levels of PTG in any item of the PTGI or the PTG-SF means that the score is equal to or greater than 60% of the highest possible score of the item. This criterion, applied to individual items or to the total score of any other PTG measurement instrument, was the one that Wu et al. (2019) used in their meta-analysis on the prevalence of moderate to high levels of PTG after any type of traumatic event. After reviewing 26 studies that evaluated a total of 10,181 people, Wu et al. (2019) found that the prevalence of moderate-high PTG

ranged between 10% and 77.3%, with a mean prevalence of 52.6%. This percentage is similar to that found by Tucker et al. (2016) in survivors 18.5 years after suffering a terrorist attack (55%). This suggests that, even after directly suffering a traumatic event as devastating as a terrorist attack and even after many years since the attack, a significant percentage of people report PTG.

The general objective of the present study was to extend the scarce existing research on PTG in people who have been directly exposed to a terrorist attack a long time ago. To do so, we assessed PTG in a large sample of survivors and close relatives of people who had been killed or injured in terrorist attacks in Spain. The assessment took place between 2 and 47 years after having suffered the attack. Spain has a long history of terrorist attacks, starting in the 60s of the 20th century. Since this date, at least 1,431 people have lost their lives at the hands of various terrorist organizations. Most of these deaths—about 857—and most of the terrorist attacks were caused by a terrorist organization called ETA. ETA's terrorist activity lasted for 50 years, between 1961 and 2011, although it was particularly intense between the late 1970s and early 1990s. It is in 2011 when ETA announced the definite cessation of its armed activity (Sanz and García-Vera, 2021).

The specific objectives of the present study were to: (1) examine the prevalence of long-term PTG in people directly exposed to a terrorist attack; (2) compare this prevalence with that found in the only previous studies that have examined long-term PTG in a similar sample of participants, that is, the studies by Tucker et al. (2016, 2018); (3) examine the linear and curvilinear relationship between PTG and posttraumatic stress, and between PTG and the elapsed time since the terrorist attack; and (4) test the associations between PTG and other variables that the scientific literature has already proven to be linked with, such as the sex of the person (Vishnevsky et al., 2010), depressive symptoms (Long et al., 2021), and optimism (Prati and Pietrantonio, 2009).

MATERIALS AND METHODS

Participants

A sample of 210 adults was recruited to carry out the present study. They had all been directly exposed to a terrorist attack and were members of the Association of Victims of Terrorism (AVT) of Spain. They were also part of a larger study on the long-term psychological consequences of terrorist attacks. The selection of this sample of participants was carried out in two phases. In the first phase, 791 adults belonging to the AVT were contacted by telephone. Out of them, 390 completed a psychological interview by telephone, while 38 participants requested to be interviewed in person. In a second phase, the 428 victims interviewed in the first phase were invited to undergo a more comprehensive face-to-face psychological assessment. This assessment included various psychopathological questionnaires, including the PTGI, and a structured diagnostic interview for emotional disorders. Out of the 428 people invited, 210 performed this second face-to-face psychological evaluation.

The average age of this final sample of participants was 53.48 years (range = 18–84; $SD = 12.78$) and 49.5% of them were women. Out of these participants, 38.6% had been injured in a

terrorist attack, 41.4% were close relatives of a person who had been killed in a terrorist attack, and the remaining 20% were close relatives of a person who had been injured in a terrorist attack. The terrorist attacks suffered by the participants had occurred an average of 29.61 (range = 2–47; $SD = 11.02$) years before they participated in this study, and most of them had been carried out by ETA (89.5%). Concerning education, 44.2% of the participants had secondary education, 31.3% had university studies, 23.5% had primary education, and 1% had no formal studies. The majority of participants (66.2%) were married or living with a stable partner and were working at the time of assessment (55.7%). The results of the diagnostic interview indicated that 46.55% of the participants suffered from an emotional disorder, the most frequent being MDD (17.6%), PTSD (16.3%), specific phobia (8.2%), panic disorder (8.1%), and generalized anxiety disorder (7.1%).

Instruments

Structured Clinical Interview for Axis I Disorders of the DSM-IV, Clinician Version (SCID-I CV; First et al., 1997; Spanish version in First et al., 1999). The SCID-I CV evaluates the presence of diagnosable mental disorders according to the DSM-IV. In the present research, only modules A (affective episodes) and F (anxiety and other disorders) were applied for the diagnosis of PTSD, MDD, or other emotional disorders (e.g., anxiety disorders). The diagnostic measures of SCID-I CV have good psychometric properties, including good inter-rater reliability and test–retest indices for the diagnosis of both PTSD and MDD (Zanarini et al., 2000; Lobbetael et al., 2011).

Beck Depression Inventory-II (BDI-II; Beck et al., 1996; Spanish adaptation in Beck et al., 2011). The BDI-II is a self-report instrument designed to assess the presence of depressive symptoms and their severity. It consists of 21 items that are scored from 0 to 3, offering a range of scores from 0 to 63. The BDI-II presents, both in its original version and in its Spanish adaptation, good indices of reliability and validity (Beck et al., 1996, 2011; Sanz et al., 2005). In the terrorism victim sample of the present study, the BDI-II obtained an internal consistency index (alpha) of 0.95.

PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013; Spanish adaptation in Sanz et al., under review¹). The PCL-5 consists of 20 items that evaluate symptoms of PTSD according to the DSM-5. Each item is answered with five-point Likert scales and scored from 0 to 4, offering a range of scores from 0 to 80. Both the original version of the PCL-S and its Spanish adaptation have good indices of reliability, convergent validity, and diagnostic validity (Blevins et al., 2015; see text footnote 1). Participants in this study were asked to complete the PCL-5 bearing in mind their experience with the terrorist attack they had suffered. Their scores on the PCL-5 obtained an internal consistency index (alpha) of 0.95.

Life Orientation Test-Revised (LOT-R; Scheier et al., 1994; Spanish adaptation in Otero et al., 1998). The LOT-R is an

instrument designed to measure dispositional optimism. It consists of 10 items, answered with five-point Likert scales and with its scores ranging from 0 to 4. A total score of dispositional optimism can be obtained from six out of the 10 items and can range between 0 and 24. Both the original version of the LOT-R and the Spanish adaptation have good indices of reliability and validity (Scheier et al., 1994; Ferrando et al., 2002). In the terrorism victim sample of the present study, the LOT-R obtained an internal consistency index (alpha) of 0.80.

Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996). The present study used the Spanish adaptation of Vázquez et al. (2006). The instructions of this adaptation specifically ask respondents to indicate their “reaction after the terrorist attack.” The PTGI is an instrument designed to assess positive psychological changes that can be experimented after a traumatic or highly stressful life event. The PTGI consists of 21 items that are answered with six-point Likert scales. These scales range from “I did not experience this change” (scored 0) to “I experienced this change to a very great degree” (scored 5). This instrument offers a global score of PTG that can range between 0 and 105. Based on the results of various factor analyses (Tedeschi and Calhoun, 1996; Taku et al., 2008), the PTGI can also be used to measure five different dimensions of PTG through the following five subscales: Relating to Others, Appreciation of Life, New Possibilities, Spiritual Change, and Personal Strength. The total scores, as well as the scores of these subscales, show good indices of reliability and validity (Tedeschi and Calhoun, 1996; Taku et al., 2008). In the terrorism victim sample of the present study, the total scores of the PTGI obtained an internal consistency index (alpha) of 0.95, while the scores of the PTGI subscales obtained the following indices: 0.82 (Relating to Others), 0.89 (New Possibilities), 0.84 (Personal Strength), 0.74 (Appreciation of Life), and 0.81 (Spiritual Change). The total score of the 10 items that constitute the PTGI-SF (Cann et al., 2010) was also calculated, since this version was used in the studies of Tucker et al. (2016, 2018). The PTGI-SF total score can range between 0 and 50. In the terrorism victim sample of the present study, the total scores of the PTGI-SF showed an internal consistency index (alpha) of 0.89.

Procedure

Every participant's verbal informed consent was obtained prior to the telephone interview. During the face-to-face interview, they also signed an informed consent form to take part in a larger study on the long-term psychological consequences of terrorism. Subsequently, a psychologist assessed the psychological consequences derived from the attack or attacks. To do so, the following instruments were administered in this order: SCID-I VC, BDI-II, PCL-S, PTGI, and LOT-R. All psychologists who acted as evaluators had been specifically trained in conducting the assessments through a university diploma focused on psychological care for victims of terrorist attacks. They were also trained by observing assessments, conducting supervised assessments, and conducting weekly clinical sessions.

¹ Sanz, J., Altungy, P., Reguera, B., Navarro, R., Gesteira, C., Sanz-García, A., et al. (2021). *Psychometric Validation of the Spanish Version of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5)*. Under review.

Data Analysis

Statistical analyses were carried out with SPSS, version 25, and with the online calculators of SciStat.com (MedCalc Software Ltd., Ostend, Belgium). The mean of the PTGI and PTGI-SF scores were calculated, as well as the prevalence of moderate to very high levels of PTG. These means and prevalence were compared with the results obtained in previous studies (Tucker et al., 2016, 2018; Wu et al., 2019) with Student's *t*-tests for independent samples and with chi-square tests for independent samples, respectively.

To analyze the factors that are related to the presence of long-term PTG, the Pearson correlations of the PTG measures with the measures of the following sociodemographic, clinical, and attack-related characteristics were calculated: sex (1 = women; 0 = men), age, level of education (without studies, primary, secondary and university studies), marital status (married or living as a couple vs. single, divorced, separated or widowed), posttraumatic stress symptoms, depressive symptoms, PTSD diagnosis, MDD diagnosis, anxiety disorder diagnosis, absence of diagnosed emotional disorders, elapsed years since the attack, age at the time of the attack, number of attacks suffered, number of traumatic events suffered after the terrorist attack, having been injured in the attack (vs. relative of the deceased or injured in the attack), and being a relative of the deceased in the attack (vs. injured in the attack or relative of the injured in the attack).

Subsequently, multiple regression analyses were performed on each of the measures of PTG using as predictors the variables that would have shown a statistically significant correlation ($p < 0.05$) in the present study. As a prior step before the regression analyses, the possible existence of collinearity problems among the predictors was tested by calculating the tolerance rates and variance inflation factors (VIF). It was taken into account that tolerance rates below 0.20 are indicative of potential collinearity problems, and that indices below 0.10 indicate serious problems. Furthermore, VIFs above 12 also suggest a problem of collinearity (Martínez Arias et al., 2015).

To examine the presence of inverted U-shaped curvilinear relationships between PTG and the sociodemographic, clinical, and attack-related continuous variables, the scores on these variables were first mean-centered (subtracting the mean from each score) and then squared to create the quadratic term for those variables. Hierarchical regression analyses were performed for each PTG measure. In each analysis, the linear effect or term of each variable (the mean-centered variable) was included in Step 1, and the quadratic effect or term (the squared mean-centered variable) in Step 2. Thus, it was examined whether the inclusion of the quadratic term implied a statistically significant increase in the explained variance of the PTG measure.

RESULTS

Posttraumatic Growth in Victims of Terrorist Attacks

The mean total PTGI score for the sample of participants was 41.78 ($SD = 27.32$), indicating that, on average, the participants reported experiencing positive psychological changes of mild

intensity. The presence of moderate-high PTG can be defined with the criterion of a score equal to or greater than 60% of the maximum score (Wu et al., 2019), which translates into a score equal to or higher than 63 in the PTGI. Based on this criterion, 25.2% of the sample of victims of terrorism that took part in the present study reported moderate-high levels of PTG. This percentage was significantly lower than that found by Wu et al. (2019) in their meta-analysis on the prevalence of moderate-high PTG in victims of all types of traumatic events (25.2% vs. 52.6%; $\chi^2 = 61.88, p < 0.0001$).

Even more relevant is the comparison with the results obtained by Tucker et al. (2016) with survivors of the Oklahoma City terrorist attack 18.5 years after the attack. These survivors completed the PTGI-SF. When averaging the percentage of participants in the present study who reported experiencing moderate, high or very high positive psychological changes in every one of the 10 PTGI-SF items, 44% of the participants showed moderate-high levels of PTG. This percentage was also significantly smaller than that estimated from the study by Tucker et al. (2016) (44% vs. 55%; $\chi^2 = 4.03, p < 0.045$). Consistently, the mean total score on the PTGI-SF of the participant sample (20.53; $SD = 13.08$) was significantly lower than that obtained by Tucker et al. (2018) in the survivors of the Oklahoma City terrorist attack [20.53 vs. 23.98, $t(346) = 2.45, p < 0.015$], with the difference being considered small (Cohen's $d = 0.27$).

Tucker et al. (2016, 2018) obtained a mean score of the sample of survivors of the Oklahoma City terrorist attack in each of the PTGI-SF items. They also obtained the percentage of survivors who in each item answered having experienced great or very great positive psychological changes. **Table 1** shows these mean scores and percentages, comparing them with those obtained with the sample of victims of terrorism in the present study. The results of the *t*-tests for the comparison of means indicated that, in the two PTGI-SF items that measure spiritual changes, the victims of terrorism in the present study showed significantly lower mean scores, with differences being considered between small and moderate (Cohen's $d = 0.39$ and 0.49). Furthermore, the results of the chi-square tests for the comparison of percentages indicated that a significantly lower percentage of people in the present study had experienced great or very great changes in one of these two items ("I have a stronger religious faith"), (17.9 vs. 31.2; see **Table 1**). The victims of terrorism in this study also showed significantly lower mean scores in one of the PTGI-SF items that measure changes in personal strength and in one of the PTGI-SF items that measure changes in relating to others, with small and moderate differences, respectively (Cohen's $d = 0.34$ and 0.59) (see **Table 1**). In addition, in that last item ("I learned a great deal about how wonderful people are"), the sample of participants in this study also had a significantly lower percentage of people who had experienced great or very great changes, almost half compared to the percentage found in the sample of survivors of Tucker et al. (2016) (23.1 vs. 40.6) (see **Table 1**). In the remaining six items of the PTGI-SF, no statistically significant differences were found between the mean scores or between the percentages, except in one of the items. This item measures changes in the appreciation of life ("I changed my priorities about what is important in life"), and in this case, the percentage of participants in this study who showed great or very great changes

TABLE 1 | Mean scores and percentages of “great/very great degree” responses in the PTGI-SF items: Oklahoma City bombing survivors ($N = 138$; Tucker et al., 2016) vs. victims of terrorism in Spain ($N = 210$).

PGTI-SF items	Oklahoma City bombing survivors			Victims of terrorism in Spain			Mean differences		Chi-square test for proportion differences
	Mean	SD	% of great/very great degree	Mean	SD	% of great/very great degree	Student's t-test	Cohen's <i>d</i>	
Appreciation of life									
1. I changed my priorities about what is important in life.	2.7	1.6	34.1	2.83	1.93	50.5	0.657	−0.07	9.064*
2. I have a greater appreciation for the value of my own life.	2.8	1.7	38.4	2.66	1.88	46.4	−0.706	0.08	2.165
New possibilities									
3. I am able to do better things with my life.	2.2	1.7	24.6	1.78	1.77	22.5	−2.199	0.24	0.205
6. I established a new path for my life.	1.8	1.8	26.1	2.03	1.89	30.0	1.132	0.12	0.620
Spiritual change									
4. I have a better understanding of spiritual matters.	2.4	1.9	34.1	1.65	1.91	24.8	−3.591*	0.39	3.525
8. I have a stronger religious faith.	2.2	1.9	31.2	1.29	1.79	17.9	−4.527*	0.49	8.250*
Relating to others									
5. I have a greater sense of closeness with others.	2.2	1.7	23.2	1.71	1.83	23.5	−2.513	0.28	0.004
10. I learned a great deal about how wonderful people are.	2.8	1.6	40.6	1.80	1.80	23.1	−5.295*	0.59	12.100*
New possibilities									
7. I know better that I can handle difficulties.	2.7	1.6	34.1	2.11	1.84	28.7	−3.079*	0.34	1.135
9. I discovered that I'm stronger than I thought I was.	2.4	1.8	36.2	2.62	1.96	44.0	1.058	−0.11	2.090

*Statistically significant at $p < 0.05$ level with Bonferroni correction ($p < 0.005$ without Bonferroni correction).

was significantly higher than that found among the survivors of Tucker et al. (2016) (50.5% vs. 34.1%; see **Table 1**).

The sample of participants included in the study conducted by Tucker et al. (2016) and the sample included in the present study differ in the time elapsed since the terrorist attack. The time elapsed in the present study ranged between 2 and 47 years. For this reason, the previous comparison analyses between both studies were repeated, but this time, using a subsample formed by participants that had suffered the terrorist attack between 10 and 25 years (both included) before taking part in this study ($n = 47$). This subsample's time span is more similar to the one found in the study conducted by Tucker et al. (2016), where a mean of 18.5 years had elapsed since the Oklahoma City terrorist attack. The results pattern obtained with the subsample was similar to the one found with the complete sample, but given that the size of the subsample is much smaller, some differences were not statistically significant. Taking this into account, within the subsample of 47 participants, 48.93% of them showed moderate-high levels of PTG. This percentage was smaller than the one obtained in the study carried out by Tucker et al. (2016), although the difference was not statistically significant (48.9% vs. 55%; $\chi^2 = 0.52, p = 0.474$). Consistently, the mean total PTGI-SF score found in the subsample of 47 participants (22.04; $SD = 10.90$) was smaller than the one obtained by Tucker et al. (2016, 2018),

but the difference was not statistically significant [22.04 vs. 23.98; $t(183) = 0.95, p = 0.345$; Cohen's $d = 0.16$]. Nevertheless, there were statistically significant and moderate differences in one of the two PTGI-SF items that assess spiritual changes, and also in one of the items that assess changes in relating to others (Cohen's $d = 0.55$ and 0.56 , respectively; see **Table 2**). Furthermore, the subsample of participants also obtained a significantly smaller percentage of people who had experienced high or very high change regarding both items of the PTG-SF (respectively, 10.7% and 19.1% vs. 31.2% and 40.6%; see **Table 2**). This being said, these differences were not statistically significant once the Bonferroni correction was performed to control the making of multiple comparisons. Finally, the percentage of the subsample that reported high or very high changes in one of the items that assesses change in the appreciation of life was significantly higher than the one reported by the survivors in the study conducted by Tucker et al. (2016) (63.8% vs. 34.1%) (see **Table 2**).

Variables Related to Posttraumatic Growth: Linear Relationship

Table 3 presents the linear correlations of the six measures of PTG—total scale and five subscales of PTGI—with the sociodemographic, clinical, and attack-related variables assessed

TABLE 2 | Mean scores and percentages of “great/very great degree” responses in the PTGI-SF items: Oklahoma City bombing survivors ($N = 138$; Tucker et al., 2016) vs. victims of terrorism in Spain who suffered a terrorist attack 10–25 years ago ($n = 47$).

PGTI-SF items	Oklahoma City bombing survivors			Victims of terrorism in Spain			Mean differences		Chi-square test for proportion differences
	Mean	SD	% of great/very great degree	Mean	SD	% of great/very great degree	Student's <i>t</i> -test	Cohen's <i>d</i>	
Appreciation of life									
1. I changed my priorities about what is important in life.	2.7	1.6	34.1	3.32	1.67	63.8	2.269	−0.38	12.657**
2. I have a greater appreciation for the value of my own life.	2.8	1.7	38.4	3.04	1.64	55.3	0.843	−0.14	4.071
New possibilities									
3. I am able to do better things with my life.	2.2	1.7	24.6	1.83	1.62	21.3	−1.304	0.22	0.210
6. I established a new path for my life.	1.8	1.8	26.1	2.43	1.85	36.2	2.058	−0.34	1.740
Spiritual change									
4. I have a better understanding of spiritual matters.	2.4	1.9	34.1	1.79	1.92	27.6	−1.896	0.32	0.672
8. I have a stronger religious faith.	2.2	1.9	31.2	1.21	1.67	10.7	−3.177**	0.55	7.618*
Relating to others									
5. I have a greater sense of closeness with others.	2.2	1.7	23.2	1.91	1.65	21.2	−1.018	0.17	0.080
10. I learned a great deal about how wonderful people are.	2.8	1.6	40.6	1.91	1.60	19.1	−3.294**	0.56	7.072*
New possibilities									
7. I know better that I can handle difficulties.	2.7	1.6	34.1	2.15	1.60	23.4	−2.035	0.34	1.854
9. I discovered that I'm stronger than I thought I was.	2.4	1.8	36.2	2.45	1.88	40.4	0.163	−0.03	0.263

*Statistically significant at $p < 0.05$ level with Bonferroni correction ($p < 0.005$ without Bonferroni correction).

**Statistically significant at $p < 0.10$ level with Bonferroni correction ($p < 0.01$ without Bonferroni correction).

in the present study. As can be seen in **Table 3**, the only variable that showed statistically significant correlations with all the six PTG measures was sex, with coefficients between small and almost medium that ranged between 0.17 (with spiritual change) and 0.29 (with personal strength). These coefficients indicated that women presented higher PTG than men, both globally and in each of its dimensions. The number of traumatic events a person has been exposed to after suffering a terrorist attack showed statistically significant correlations with five out of the six measures of PTG. The correlations were small, ranging between 0.17 (for new possibilities) and 0.21 (for a new appreciation of life). These coefficients indicate that an increase in the number of traumatic events a person has been exposed to was associated with a greater degree of global PTG, as well as all of its dimensions except for spiritual growth. Two variables, marital status and posttraumatic stress symptoms, showed statistically significant correlations with two of the PTG dimensions, but not with the remaining four PTG measures. Being married or living as a couple was associated with a lower level of positive changes in relating to others and personal strength, although the association was small in both cases ($r = -0.14$). On the other hand, a higher level of posttraumatic stress symptoms was associated with a higher level of appreciation of life and spiritual change.

These associations were small in both cases ($r = 0.16$ and 0.13 , respectively). Three variables presented statistically significant correlations with a single PTG measure: age, the absence of diagnosed emotional disorders, and the number of attacks experienced by the victim. Older people, those with a diagnosed emotional disorder, and those who had been exposed to a greater number of attacks presented higher levels, respectively, of personal strength, appreciation of life, and positive changes in relating to others, although the associations were small in size in all three cases ($r = 0.16$, -0.14 , and 0.15 , respectively). The remaining variables evaluated in the present study—education level, depressive symptoms, diagnosis of PTSD, diagnosis of MDD, diagnosis of anxiety disorders, number of elapsed years since the attack, age at the time of the attack, having been injured in an attack, and being a close relative of someone who had been killed in an attack—did not show any statistically significant correlation with any of the six PTG measures of the PTGI.

Multiple Regression Analyses on Posttraumatic Growth

The eight variables that significantly correlated with some or with all of the PTGI measures were included in the multiple

TABLE 3 | Correlations of the post-traumatic growth measures of the PTGI with the sociodemographic, clinical and attack-related variables.

Variable	Posttraumatic growth measures					
	PTGI total score	Relating to others	New possibilities	Personal strength	Appreciation of life	Spiritual change
Sex (1 = women; 0 = men)	0.24***	0.21**	0.19**	0.29***	0.19**	0.17*
Age	0.10	0.08	0.06	0.16*	0.02	0.10
Education level	−0.60	−0.02	−0.03	−0.10	−0.05	−0.05
Marital status	−0.12	−0.14*	−0.09	−0.14*	−0.03	−0.12
Optimism (LOT-R)	0.04	−0.02	0.09	0.14*	−0.01	−0.03
Depressive symptoms (BDI-II)	0.03	0.05	0.001	−0.04	0.11	0.10
Posttraumatic stress symptoms (PCL-5)	0.10	0.10	0.07	−0.01	0.16*	0.13*
PTSD	−0.005	−0.02	0.03	−0.04	0.06	0.03
MDD	0.02	0.03	0.03	−0.06	0.12	0.09
Anxiety disorder	0.05	0.03	0.01	0.08	0.06	0.005
No emotional disorder	−0.05	−0.06	−0.03	0.01	−0.14*	−0.07
No. of years elapsed since the attack	−0.04	−0.05	−0.05	0.001	−0.09	0.01
Age at the time of the attack	0.10	0.09	0.06	0.13	0.06	0.06
No. of terrorist attacks	0.13	0.15*	0.07	0.11	0.08	0.03
No. of traumatic events after the attack	0.20**	0.19**	0.17*	0.18*	0.21**	0.03
Injured vs. relative	−0.06	−0.05	−0.05	−0.12	−0.04	−0.008
Relative of deceased vs. injured or relative of injured	0.004	−0.006	0.01	0.009	0.03	0.06
Relating to others	0.93***	—	—	—	—	—
New possibilities	0.92***	0.79***	—	—	—	—
Personal strength	0.88***	0.77***	0.81***	—	—	—
Appreciation of life	0.79***	0.67***	0.67***	0.62***	—	—
Spiritual change	0.68***	0.59***	0.59***	0.49***	0.45***	—

*Statistically significant correlation at $p < 0.05$.**Statistically significant correlation at $p < 0.01$.***Statistically significant correlation at $p < 0.001$.

regression analyses on PTG, and the results are shown in **Table 4**. These results indicated that sex was the only variable that was significantly associated with all PTGI measures after the effects of the other predictors were controlled. The number of traumatic events experienced after suffering a terrorist attack also showed a consistent association with PTG, given that there is a significant association with five out of the six measures of PTG.

Concerning total scores in the PTGI, the regression model with the eight predictors explained 14.7% of the variance of those scores ($R^2 = 0.147$, $F = 4.15$, $p < 0.001$), but only the sex of the victim, the number of terrorist attacks a person has experienced and the number of traumatic events a person has been exposed to were significantly associated with the total scores of PTGI. The size and sign of the beta coefficients and the partial correlations gathered in **Table 4** indicated that sex was the most important variable when it came to explaining the variance in global PTG (partial $r = 0.22$), followed by the number of traumatic events a person has been exposed to (partial $r = 0.19$) and the number of terrorist attacks a victim has suffered (partial $r = 0.15$). Taking this into account, being a woman, having suffered more traumatic events since the terrorist attack, and having lived more terrorist attacks, in this order, were associated with a higher degree of global PTG.

The complete regression model explained 13.2% of the variance of the scores in the PTGI subscale of relating to others

($R^2 = 0.132$, $F = 3.72$, $p < 0.001$), and, once again, the variables sex, number of terrorist attacks, and number of traumatic events were significantly associated with said scores. The number of terrorist attacks a person has experienced (partial $r = 0.19$) was the most important variable when explaining the variance in positive changes when relating to others. This variable was followed, in order, by the number of traumatic events a person has suffered (partial $r = 0.188$) and his/her sex (partial $r = 0.18$). This means that experiencing a greater number of traumatic events, suffering a greater number of terrorist attacks, and being a woman were more strongly associated with the PTG dimension of relating to others.

Regarding the PTG dimension of new possibilities, the complete regression model significantly explained 10.1% of the variance of the scores of said dimension ($R^2 = 0.101$, $F = 2.75$, $p < 0.007$), but only sex and the number of terrorist attacks a person has suffered after the terrorist attack were significantly associated with said scores (see **Table 4**). Sex was the most relevant variable when explaining the variance of the dimension of new possibilities (partial $r = 0.17$), followed by the number of traumatic events one has experienced (partial $r = 0.16$). This means that being a woman and having suffered a greater number of traumatic events after the terrorist attack, in this order, were associated with a higher degree to the dimension of new possibilities.

TABLE 4 | Multiple regression analyses on posttraumatic growth (PTG) measures.

PTG measure/Predictor	Beta	t	p	Partial r
PTGI total score				
Sex	0.223	3.07	0.002	0.216
Age	0.112	1.67	0.097	0.120
Marital status	−0.052	−0.73	0.467	−0.053
Optimism (LOT-R)	0.080	1.01	0.314	0.073
Posttraumatic stress (PCL-5)	0.150	1.64	0.102	0.118
No emotional disorder	0.044	0.49	0.624	0.035
No. of terrorist attacks	0.150	2.17	0.031	0.155
No. of traumatic events after the attack	0.188	2.77	0.006	0.196
Relating to others				
Sex	0.186	2.56	0.011	0.180
Age	0.087	1.29	0.198	0.092
Marital status	−0.082	−1.17	0.245	−0.083
Optimism (LOT-R)	−0.011	−0.14	0.892	−0.010
Posttraumatic stress (PCL-5)	0.118	1.29	0.199	0.092
No emotional disorder	0.049	0.54	0.586	0.039
No. of terrorist attacks	0.188	2.72	0.007	0.191
No. of traumatic events after the attack	0.182	2.67	0.008	0.188
New possibilities				
Sex	0.179	2.42	0.016	0.171
Age	0.081	1.18	0.239	0.084
Marital status	−0.032	−0.453	0.651	−0.032
Optimism (LOT-R)	0.146	1.81	0.072	0.128
Posttraumatic stress (PCL-5)	0.157	1.68	0.094	0.119
No emotional disorder	0.038	0.41	0.682	0.029
No. of terrorist attacks	0.083	1.19	0.236	0.085
No. of traumatic events after the attack	0.153	2.22	0.028	0.157
Personal strength				
Sex	0.277	3.92	0.001	0.271
Age	0.178	2.73	0.007	0.193
Marital status	−0.052	−0.76	0.450	−0.054
Optimism (LOT-R)	0.138	1.79	0.075	0.127
Posttraumatic stress (PCL-5)	0.063	0.71	0.481	0.051
No emotional disorder	0.046	0.53	0.597	0.038
No. of terrorist attacks	0.143	2.13	0.034	0.152
No. of traumatic events after the attack	0.171	2.59	0.010	0.183
Appreciation of life				
Sex	0.177	2.44	0.016	0.171
Age	0.035	0.53	0.599	0.038
Marital status	0.024	0.34	0.734	0.024
Optimism (LOT-R)	0.082	1.03	0.304	0.073
Posttraumatic stress (PCL-5)	0.177	1.91	0.050	0.135
No emotional disorder	−0.037	−0.41	0.683	−0.029
No. of terrorist attacks	0.099	1.43	0.155	0.101
No. of traumatic events after the attack	0.204	3.00	0.003	0.209
Spiritual change				
Sex	0.152	2.04	0.042	0.144
Age	0.109	1.57	0.118	0.111
Marital status	−0.068	−0.94	0.348	−0.067
Optimism (LOT-R)	0.039	0.48	0.633	0.034
Posttraumatic stress (PCL-5)	0.197	2.06	0.041	0.146
No emotional disorder	0.055	0.59	0.554	0.042
No. of terrorist attacks	0.047	0.66	0.510	0.047
No. of traumatic events after the attack	0.019	0.27	0.790	0.019

Statistically significant predictors at $p < 0.05$ are displayed in italics.

Concerning the PTG dimension of personal strength, the complete regression model significantly explained 18.7% of the variance of the scores of said dimension ($R^2 = 0.187$, $F = 5.58$, $p < 0.001$). Sex, age, the number of traumatic events a person has experienced after the terrorist attack, and the number of terrorist attacks one has been exposed to, were significantly associated with personal strength (partial $r = 0.27$, 0.19, 0.18, and 0.15, respectively). This implies that being a woman, being older, having suffered more traumatic events after the terrorist attack, and having experienced more terrorist attacks, in this order, were associated with a greater level of personal strength.

The complete regression model significantly explained 12.3% of the variance of the scores of the PTG dimension of new appreciation of life ($R^2 = 0.123$, $F = 3.46$, $p < 0.001$). The number of traumatic events one has experienced, sex, and posttraumatic stress symptoms were significantly associated with the dimension of new appreciation of life (partial $r = 0.21$, 0.17, and 0.13, respectively). This implies that having suffered more traumatic events after the terrorist attack, being a woman, and experiencing more posttraumatic stress symptoms, in this order, were associated with a greater level of a new appreciation of life.

Finally, the complete regression model significantly explained 7% of the variance in spiritual change scores ($R^2 = 0.070$, $F = 2.11$, $p = 0.044$), but, once again, only sex and posttraumatic stress symptoms were significantly associated with spiritual change (partial $r = 0.14$ in both cases). These associations indicated that being a woman and a greater degree of posttraumatic stress symptoms were associated with greater PTG in spiritual change.

All these regression analysis results were not affected by collinearity issues, given that, in each analysis, all tolerance rates were higher than 0.52 and all VIFs were lower than 1.93.

Variables Associated With Posttraumatic Growth: Curvilinear Relationship

Table 5 shows the results of the hierarchical regression analysis that were carried out to examine the possible curvilinear relationship between the PTG measures and continuous variables that were assessed in this study. These include sociodemographic and clinical variables, as well as variables related to the attack. The inclusion of the quadratic term of these variables (e.g., posttraumatic stress symptoms) did not imply a statistically significant increase in the percentage of explained variance of any of the PTG when contrasted with a model that initially only included a linear term of any of the given variable. For this reason, none of the predictors' quadratic components were statistically significant, meaning that there were no significant curvilinear relationships between the PTG measures and sociodemographic, clinical, and terrorist attack-related variables that are shown in Table 5.

DISCUSSION

The main objective of this study was to examine the presence of long-term PTG in people who have been directly exposed to a terrorist attack. To our knowledge, there are only two published

studies that have addressed a similar objective with a large enough sample to obtain solid results and conclusions. In addition, both studies were based on the same sample of survivors of the 1995 Oklahoma City terrorist attack (Tucker et al., 2016, 2018). The present study was conducted using a sample of people who had been directly exposed to a terrorist attack in Spain, 29.6 years ago on average. The results obtained in this study indicate that after suffering a terrorist attack, approximately 25–44% of people will show moderate or high levels of long-term PTG. In other words, even after so many years and even after having directly suffered such a devastating event as a terrorist attack, a significant amount of people will experience PTG.

However, this percentage is significantly smaller than that found in the meta-analysis conducted by Wu et al. (2019), where 53% of people who had been exposed to different types of traumatic events experienced moderate-to-high PTG. The difference between these percentages can be explained by the specific characteristics of the traumatic event assessed in the present study. In fact, Wu et al. (2019) found in their meta-analysis differences in the prevalence of PTG according to the type of traumatic event people had suffered. Terrorist attacks are considered more devastating than other disasters or types of violence for the following reasons: (a) they deliberately intend to cause harm to others; (b) they target large social groups or society itself; and (c) there is a constant threat without a clear ending, reason for which no one can be sure if the worst is yet to come (Vázquez et al., 2008). The difference could also be justified by the amount of time elapsed since the occurrence of the traumatic event. In the meta-analysis conducted by Wu et al. (2019), a shorter amount of time passed since the experience was associated with a higher prevalence of moderate-to-high PTG. However, when the results of the present study are compared to the ones obtained in the studies carried out by Tucker et al. (2016, 2018), those two explanations seem insufficient.

Tucker et al. (2016, 2018) also used a sample of people who had been directly exposed to terrorist attacks many years before being evaluated. The prevalence of moderate-to-high PTG was also significantly lower in the present study compared to the one conducted by Tucker et al. (2016). In fact, the mean level of PTG found in the victims of terrorism included in the present study was significantly lower than the one found amongst the survivors of the 1995 Oklahoma City terrorist attack (Tucker et al., 2018).

Taking this into consideration, another possible explanation for the statistically significant differences between samples has to do with the political, social, and cultural context in which the terrorist attacks occurred, as well as the characteristics of the terrorist attacks themselves. The terrorist attack that took place in Oklahoma City in 1995, was a single unrepeated episode and was not associated to a serious civil or political conflict. In addition, the terrorists did not belong to an organized terrorist group from their own social group or community. As suggested by Vázquez et al. (2008), terrorist attacks can have a greater personal and collective impact when they are perpetrated by organized terrorist groups that belong to the community, and when they occur in the context of a serious ongoing civil or political conflict. Examples of places where this kind of terrorism took place are Northern Ireland, Sri Lanka, or the Basque Country in Spain. According to

Vázquez et al. (2008), this type of terrorism creates a collective atmosphere of wariness, mistrust, and destruction of the moral system of the community. It is important to emphasize that this type of terrorism also implies a high and continued threat level both to direct and indirect victims. Not only because of the continuity of the attacks, but because of the repetitive and prolonged acts of physical and psychological violence.

In Spain, ETA's terrorist activity did not only consist in the assassination of specific people by shooting them in the nape or by placing explosives in their vehicles. ETA also intended to kill indiscriminately by placing powerful bombs close to households, shopping centers, or on the street. Although most of the targets were usually members of security forces, military, and their families, ETA also targeted politicians, judges, journalists, prosecutors, university professors, or businesspersons. To these fatal attacks, we must also add the frequent acts of street violence, where juvenile organizations related to ETA burnt or destroyed houses, businesses, bank offices, political headquarters, public busses, vehicles, etc. According to López Romo (2015), a total of 5,113 street violence incidents took place in the Basque Country between 1991 and 2013. In 2002, 963 people (politicians, judges, prosecutors, journalists, professors, etc.) had to be escorted for protection due to the ETA's threats (without considering members of the armed and security forces, all of them targeted by ETA). Furthermore, an average of 804 terrorist attacks and street violence incidents took place per year between 1995 and 2000, and during the "years of lead" regarding terrorism in Spain (1978–1988), more than 65 people were assassinated on average per year. According to Martín-Peña (2013), victims of ETA and those who were threatened by the terrorist group in the Basque Country also suffered psychological violence: 69% were watched and controlled by people related to ETA, 74% received threats, 79% were disrespected, humiliated, or rejected, and 90% felt stigmatized. These data indicate that there are differences between the victims of terrorism in Spain and the victims from the 1995 Oklahoma City terrorist attack. The victims of terrorism in Spain were exposed for many years to repeated and intense terrorist attacks, as well as repeated physical and psychological acts of violence in a collective atmosphere of wariness, mistrust, and threat.

In this violent and threatening social context, it seems coherent that the percentage of people who had experimented large or very large changes was significantly smaller for the victims of terrorism that took part in the present study compared to the victims of the 1995 Oklahoma City bombing. Not only that, but they also obtained significantly lower scores in some items from three out of the five PTG dimensions: Personal Strength, Relating to Others, and Spiritual Change, especially in the two last dimensions. However, when explaining these findings, it is also necessary to address the cultural differences between Spain and the United States. For example, only 27% of the Spanish population consider that religion has an important and central role in their lives, compared to 62% of the United States population (Vázquez and Páez, 2010). This cultural difference could partially explain the smaller increase in spiritual growth

TABLE 5 | Linear and curvilinear relationships between the continuous predictors and the posttraumatic growth measures from the PTGI: Multiple regression analyses.

Predictor	Posttraumatic growth measures from the PTGI											
	PTGI total score		Relating to others		New possibilities		Personal strength		Appreciation of life		Spiritual change	
	B	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Posttraumatic stress symptoms												
Step 1: Linear term	0.100	0.010	0.109	0.012	0.077	0.006	-0.011	0.000	0.168*	0.028*	0.138*	0.019*
Step 2: Quadratic term	-0.048	0.001	-0.030	0.000	-0.012	0.000	-0.086	0.004	-0.043	0.001	-0.021	0.000
Depressive symptoms												
Step 1: Linear term	0.038	0.001	0.056	0.003	0.001	0.000	-0.047	0.002	0.117	0.014	0.104	0.011
Step 2: Quadratic term	-0.155	0.012	-0.093	0.004	-0.152	0.011	-0.105	0.005	-0.185	0.017	-0.171	0.014
Years elapsed since the attack												
Step 1: Linear term	-0.046	0.002	-0.041	0.002	-0.060	0.004	0.005	0.000	-0.108	0.012	0.003	0.000
Step 2: Quadratic term	-0.064	0.003	-0.056	0.002	-0.042	0.001	-0.062	0.003	-0.124	0.011	-0.018	0.000
Optimism												
Step 1: Linear term	0.044	0.002	-0.028	0.001	0.095	0.009	0.146*	0.021*	-0.010	0.000	-0.030	0.001
Step 2: Quadratic term	-0.126	0.014	-0.062	0.003	-0.135	0.016	-0.083	0.006	-0.186	0.030	-0.132	0.015
No. of terrorist attacks												
Step 1: Linear term	0.131	0.017	0.155*	0.024*	0.078	0.006	0.119	0.014	0.081	0.007	0.037	0.001
Step 2: Quadratic term	0.059	0.001	0.031	0.000	0.099	0.002	0.078	0.001	0.101	0.002	0.040	0.000
No. of traumatic events after the attack												
Step 1: Linear term	0.201*	0.041*	0.189*	0.036*	0.167*	0.028*	0.178*	0.032*	0.214*	0.046*	0.031	0.001
Step 2: Quadratic term	0.107	0.004	0.137	0.006	0.168	0.009	-0.082	0.002	0.078	0.002	0.248	0.019
Age												
Step 1: Linear term	0.104	0.011	0.086	0.007	0.066	0.004	0.163	0.026*	0.021	0.000	0.108	0.012
Step 2: Quadratic term	-0.013	0.000	-0.022	0.000	0.001	0.000	0.037	0.001	-0.117	0.014	0.043	0.002
Education level												
Step 1: Linear term	-0.060	0.004	-0.023	0.001	-0.034	0.001	-0.108	0.012	-0.055	0.003	-0.052	0.003
Step 2: Quadratic term	-0.116	0.013	-0.092	0.008	-0.088	0.007	-0.110	0.012	-0.131	0.016	-0.129	0.016
Age at the time of the attack												
Step 1: Linear term	0.105	0.011	0.092	0.008	0.067	0.004	0.135	0.018	0.078	0.006	0.078	0.006
Step 2: Quadratic term	-0.014	0.000	-0.016	0.000	0.010	0.000	-0.031	0.001	-0.074	0.005	0.064	0.004

*Statistically significant predictor at $p < 0.05$.

amongst the sample of Spanish victims that took part in the present study. Along the same lines, various studies have found transcultural differences in PTG in response to different types of traumatic events (see Tedeschi et al., 2018). An example of this is the smaller degree of PTG in Spanish university students that were not directly exposed to the terrorist attacks of March 11, 2004, in Madrid, compared to university students from the United States that were not directly exposed to the terrorist attacks of September 11, 2001, in New York and Washington, DC (Steger et al., 2008). This last finding has been interpreted as a reflection of the differences between collectivistic and individualistic cultures. It is more probable for people that come from individualistic cultures to make a greater effort to strengthen positive self-views through self-enhancement (Steger et al., 2008). Coherently, the United States is considered a much more individualistic country compared to Spain (a mean score of 91 vs. 51 in the individualism/collectivism dimension proposed by Hofstede; Vázquez and Páez, 2010).

These cultural differences and their possible influence on long term PTG after a terrorist attack should be further researched.

When doing so, certain variables such as sex must be controlled, given that in this study it was the most consistent and strongly associated variable with long-term PTG. In this sense, it is worth pointing out that the present study and the studies conducted by Tucker et al. (2016, 2018) had a similar percentage of women (49.5% vs. 52.2%) and a similar mean age (53.48 vs. 58.7 years). However, both samples differed in important characteristics, such as the type of exposure to the terrorist attack. The people who took part in the studies of Tucker et al. (2016, 2018) were all survivors, while the people who took part in the present study were not only survivors (38.6%). They were also close relatives of persons who had been wounded in a terrorist attack (20%) or close relatives of persons who had been killed in a terrorist attack (41.4%). The fact that a high percentage of people who took part in this study were close relatives of persons who had been killed in a terrorist attack could help explain the high levels in the PTG dimension of appreciation of life when compared to those obtained in the studies of Tucker et al. (2016, 2018). This data is consistent with that obtained in previous studies. Compared to survivors of other types of traumatic events, such as victims of sexual assault,

people who suffered the loss of a family member report higher levels of PTG, specifically in the dimension of appreciation of life (Shakespeare-Finch and Armstrong, 2010).

The present study also intended to examine the variables that could influence long-term PTG in people directly exposed to terrorist attacks. Out of the 16 sociodemographic, clinical, and attack-related variables that were gathered in this study, sex was the variable that showed a greater association with long-term PTG. Sex was also the only variable that was consistently associated with all the PTG measures, with coefficients between small and moderate (range of $r = 0.17$ – 0.29), reflecting that women reported greater levels of PTG than men.

This finding is coherent with the results obtained in the meta-analysis conducted by Vishnevsky et al. (2010) that included multiple types of traumatic events and came to show a difference in PTG between sexes in the same direction and between small and moderate ($g = 0.27$, equivalent to $r = 0.134$). It is also consistent with the results obtained by Tucker et al. (2016) on long-term PTG in terrorist attack survivors. For these reasons, the results obtained in the present study prove the importance of the sex of the person when explaining individual differences in PTG, even long-term and after suffering a terrorist attack. The results also show a need for further investigation on the specific factors that differentiate men from women and that could mediate the differences in PTG. For example, the sex differences in reflective or deliberate rumination processes, or emotion-focused coping, could be good candidates to be those mediators (Vishnevsky et al., 2010).

In this study, the second variable that was significantly and consistently associated with the long-term PTG measures was the number of traumatic events a person has suffered after the terrorist attack. The association of this variable with the total score of the PTG and with four of its five dimensions was positive and linear, but not curvilinear. This finding is coherent with the results obtained in previous studies that indicate that experiencing different types of traumatic events (cumulative trauma) is positively associated with global PTG and with several of its dimensions, such as a new appreciation of life, personal strength, and new possibilities (Kira et al., 2013). These results reaffirm the need to analyze in a more detailed manner the profile and characteristics of the traumatic events that a person has suffered in order to understand the presence of PTG.

In this study, the third variable that was significantly and consistently associated with the long-term PTG measures was posttraumatic stress symptoms. This association was positive and linear, but not curvilinear, with two PTG dimensions: New Possibilities ($r = 0.16$) and Spiritual Change ($r = 0.13$). This finding is consistent with the results of the meta-analysis conducted by Liu et al. (2017) on PTG after different types of traumatic events, although the mean correlation obtained in the meta-analysis was slightly superior to the ones obtained in the present study (0.22 vs. 0.16 – 0.13). The results of the present study are also coherent with the ones found in Tucker et al. (2016), where the association between long-term PTG and posttraumatic stress symptoms in victims of terrorism was

significant and positive. In fact, the present study broadens the results obtained by Tucker et al. (2016), given that they did not examine the possibility of a curvilinear association in the shape of an inverted U (quadratic association) between long-term PTG and posttraumatic stress symptoms. The present study examined the presence of a curvilinear association for both the global PTG score as well as its five dimensions, but the results did not reveal statistically significant quadratic associations.

The absence of a curvilinear association between PTG and posttraumatic stress symptoms is not consistent with the results obtained from the meta-analysis of Shakespeare-Finch and Lurie-Beck (2014). These researchers found that the quadratic association was significant and in fact stronger than the linear association. However, the authors also found that the strength and linearity of the associations were different depending on the type of traumatic event that people had been exposed to. In addition, although Shakespeare-Finch and Lurie-Beck (2014) acknowledged the importance of elapsed time since the traumatic event, they were not able to examine its influence in the associations. For these reasons, it is possible that the absence of a quadratic association between PTG and posttraumatic stress symptoms is specific to long-term PTG after suffering a terrorist attack, as the results of the present study indicate.

In sum, there is a positive association between posttraumatic stress symptoms and long-term PTG in people directly exposed to a terrorist attack. In particular, there is a positive association of posttraumatic stress symptoms with the PTG dimensions of appreciation of life and spiritual change. This supports the idea that a certain degree of emotional distress is a necessary condition to develop PTG (Tedeschi et al., 2018). According to the results obtained in the present research, that emotional distress derived from the traumatic event would not be related to depressive symptoms, but to posttraumatic stress symptoms. In addition, the positive association between posttraumatic stress symptoms and long-term PTG suggests that positive psychological changes are not sufficient to eliminate the suffering caused by the direct exposure to a terrorist attack.

Finally, the results of the present study indicate significant, positive, and linear associations between the PTG dimension of relating to others and the number of terrorist attacks suffered by the victim. Also, between the PTG dimension of personal strength and the victim's age. However, in this study, no linear or quadratic associations were found between long-term PTG or its dimensions and other sociodemographic, clinical, and attack-related variables. In particular, they were not found between long-term PTG and depressive symptoms, optimism, education level, marital status, the diagnosis of an emotional disorder (PTSD, MDD, or anxiety disorder), the age the person had when he/she suffered the attack, the type of exposure to the attack (injured, family member of someone deceased or injured) and the time elapsed since the terrorist attack. Regarding this last variable, the present study examined a time span of 2 to 47 years since the terrorist attack, while the meta-analysis conducted by Wu et al. (2019) examined a time span of a few days or months to a few years after the terrorist attack. Given that Wu et al. (2019) found a significant and negative association between the time elapsed since a

traumatic event and PTG, it is possible that this association could disappear after many years. In particular, there is a possibility that this might happen with terrorist attacks of similar characteristics as the ones suffered by the victims of the present study.

The absence of a significant association between long-term PTG and depressive symptoms is consistent with the findings of Tucker et al. (2016) in a sample of survivors of the 1995 Oklahoma City bombing. It is also consistent with results of the meta-analysis conducted by Long et al. (2021) on different types of traumatic events. However, the absence of a significant association between long-term PTG and optimism is not consistent with the results obtained in the meta-analysis conducted by Prati and Pietrantonio (2009). These authors found an almost moderate association ($r = 0.23$) between PTG and optimism in people who had experienced all sorts of traumatic events. Nevertheless, they did not examine the moderating role of the type of traumatic events that victims had suffered on the association between PTG and optimism. The association between long-term PTG and optimism was also not examined in the studies conducted by Tucker et al. (2016) on survivors of the 1995 Oklahoma City terrorist attack. For these reasons, once other variables such as sex or posttraumatic stress symptoms are controlled, it could be possible to find that there is no association between optimism and long-term PTG in victims of terrorist attacks.

This possibility and the fact that there is not much literature that addresses this topic emphasize the need to carry out new studies on long-term PTG in people who have been directly affected by a terrorist attack. Future studies must try to surpass the limitation of the present study, which should be taken into consideration when considering its results and conclusions. Amongst these limitations, we would like to point out that this study has a cross-sectional design. For this reason, it would be necessary to carry out longitudinal studies, allowing a better evaluation of PTG evolution across the years and assessing the influence of different factors throughout this evolution. Another limitation has to do with the response rate of the study and, therefore, with the representativeness of the sample and the generalization of the results obtained by said sample. The response rate in the present study was between 26.5% (regarding the people who had been contacted in the first phase of the study) and 49.1% (regarding the people who had been contacted in the second phase). These data are consistent with those obtained in other studies conducted with people who had been directly affected by terrorist attacks in Spain (e.g., Miguel-Tobal et al., 2006). In the present study, no statistically significant differences were found between the people who took part in the face-to-face interview and those who did not when considering their marital status, education level, sex, or the time elapsed since the terrorist attack. However, there were statistically significant differences regarding the age of the person at the time of the evaluation, the age of the person when the attack took place, the type of exposure to the attack, and the presence of emotional symptoms. For this reason, a certain selection bias linked to the response rate cannot be completely ruled out.

Another limitation that should be acknowledged has to do with the possibility of correctly assessing PTG many years after the exposure to the terrorist attack. This limitation is related to a more general matter, the validity of reports of PTG. This matter has been thoroughly debated through the scientific literature and is faced with various difficulties (Tedeschi et al., 2018). Of course, these difficulties are even greater when PTG is assessed long-term. Some of these difficulties have to do with the idea that what PTG instruments such as the PTGI really assess is self-reported or perceived PTG, and not necessarily “authentic” or actual PTG. In this sense, self-reported or perceived PTG could be subject to the biases that the person being evaluated could have, including self-serving biases. In the case of long-term PTG, we should also take into consideration memory biases that could take place due to the elapsed time, and that could affect the reliability of self-report data. Taking this into account, future investigations should explore the degree of agreement between self-reported PTG and the changes in PTG observed by the person’s family members, friends, or co-workers. An additional problem when assessing long-term PTG is related to the difficulty to discriminate if the changes in one’s perception of him or herself, the world, and life are linked to the traumatic event he/she experienced or to the passage of time, for example, moving on from a young age to middle age or from middle age to old age. For this reason, future studies should include a control group to ensure that the evaluated growth has really emerged from the traumatic event and not only from the passage of time.

Despite its limitations, the results obtained in present study reveal new information on long-term PTG in people who have been directly affected by a terrorist attack, and there are hardly any studies on this type of PTG in this specific population. These results emphasize the influence of sex and cumulative trauma on long-term PTG and support the idea that a certain degree of posttraumatic stress symptoms is a necessary condition to develop PTG. The results also come to show the need for further research regarding long-term PTG, taking into consideration the characteristics of the terrorist attack and the profile and characteristics of other traumatic events suffered after the attack. It is also important to consider the context of violence and threats to which the victims are or were exposed, as well as the political, social and cultural characteristics of the communities affected by the attacks.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors upon reasonable request.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee of the Faculty of Psychology at Complutense University of Madrid (Spain).

The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RF, JS, and MG-V contributed to conception and design of the study and wrote sections of the manuscript. RF, AN-M, CG, NM, BC-R, PA, JM, and AS-G collected the data and organized the database. JS and RF performed the statistical

analysis and wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

FUNDING

This work was supported by the Spanish Ministry of Science, Innovation, and Universities under grant number PGC2018-098387-B-I00.

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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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Differences Between Posttraumatic Growth and Resiliency: Their Distinctive Relationships With Empathy and Emotion Recognition Ability

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OPEN ACCESS

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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 30 November 2021

Accepted: 03 March 2022

Published: 28 March 2022

Citation:

Elam T and Taku K (2022)
Differences Between Posttraumatic
Growth and Resiliency: Their
Distinctive Relationships With
Empathy and Emotion Recognition
Ability. *Front. Psychol.* 13:825161.
doi: 10.3389/fpsyg.2022.825161

Posttraumatic growth (PTG) and resiliency have been observed among people who experienced life crises. Given that the direct relationships between PTG and resiliency have been equivocal, it is important to know how they are different in conjunction with cognitive ability. The purpose of this study is to examine how perceived PTG and resiliency would be, respectively, associated with empathy and emotion recognition ability. A total of 420 college students participated in an online survey requiring them to identify emotions based on photographs of facial expressions, report their traumatic experiences, and respond to the PTG Inventory, Brief Resilience Scale, and Questionnaire of Emotional Empathy. The results suggest that perceived PTG was not associated with empathy but significantly predicted increased emotion recognition, whereas resiliency showed a negative relationship with empathy but no significant relationship with emotion recognition. These findings demonstrate that self-perceived PTG may be associated with cognitive ability, which could be due to one's growth within relationships and social interactions. Even though growing after trauma may promote resilient characteristics, the current results indicate that PTG and resiliency may foster different outcomes. Since empathy and emotion recognition are affected by other contextual factors, future studies should assess how empathy and the type of errors in emotion recognition may be associated with situational factors that are beyond personal factors such as post-traumatic life experiences or personality.

Keywords: posttraumatic growth (PTG), resilience, trauma, emotion recognition, facial expressions

INTRODUCTION

Many individuals may face a traumatic or highly stressful event at some point in their lives. That could mean experiencing a natural disaster, the loss of a loved one, an accident or injury, or conflicts within their family and relationships. Facing adversity can have the capacity to shatter and challenge one's core beliefs. This process can lead an individual to transform in a way that positively impacts their quality of life and helps them to realize how they have grown as a person (Tedeschi and Calhoun, 2004; Joseph and Butler, 2010; Joseph et al., 2012), known as posttraumatic growth or

PTG. However, facing adversity does not always shake beliefs or make people struggle, but can rather allow them to simply bounce back, known as resiliency (Yao and Hsieh, 2019).

Posttraumatic growth explains the positive psychological changes as a result of a struggle with a major life crisis or traumatic event (Calhoun and Tedeschi, 2014; Tedeschi et al., 2018). This process may be reflected through an individual gaining a greater appreciation for life, relating to others more, making a spiritual or existential change, having an increased sense of personal strength, or realizing new possibilities in life (Tedeschi and Calhoun, 2004). After experiencing adversity, individuals may have the capacity to learn from the event and reshape the way that they perceive themselves, their lives, and their world. For example, after someone has dealt with the loss of a loved one, they may realize that their relationships with others are very important, and therefore, build stronger bonds with their family and friends. Doing so ultimately may increase their level of social support, allowing for safety and security if uncertain times were to present themselves again.

On the contrary, if an individual is able to recover from a traumatic experience by exhibiting certain characteristics (e.g., flexibility and optimism) along with using various resources that are available for them (e.g., adaptive coping strategies and social support), they could be described as being resilient. Resilience explains the likelihood that an individual can overcome highly stressful events, remaining psychologically healthy despite undergoing hardships (Rutter, 2007). Not to be misunderstood with PTG, which involves severe psychological struggle due to the challenged core beliefs following a trauma – resilience is typically understood to be the way that an individual “bounces back.” For example, someone who has experienced a stressful financial pitfall may be able to use personal resources and mechanisms (e.g., coping skills, emotion regulation, hope, optimism) to help them push through the difficult time in order to recover to the level of financial stability they were able to maintain before the decline – regaining normality in their life (Duan et al., 2015). This means that they did not allow their finances to continue to plunder and negatively impact their life, but they also did not need to overwork themselves or overthink their beliefs enough to cause them to reevaluate several aspects of their life in order to change them in a profound or transformational way. In short, resilience focuses on adapting and adjusting to adversity with or without struggling, whereas, PTG focuses on transformative changes resulting from psychological struggle caused by shattered beliefs or worldview.

Due to these conceptual differences between PTG and resiliency, the relationship between them in literature is inconsistent. At least two studies have found that there is a negative relationship between PTG and resiliency (Levine et al., 2009; Zerach et al., 2013). This could possibly be due to highly resilient people being less influenced by a trauma experience, withholding their need for growth. Other studies found that there is a positive relationship between PTG and resiliency, suggesting that the more likely someone is to experience growth after trauma, the more likely they are to exhibit characteristics of resilience as well (Bensimon, 2012; Yu et al., 2014; Duan et al., 2015). Literature has identified a curvilinear relationship between

PTG and resilience which may suggest there being a possibility of a certain threshold, or “tipping point” associated with the two constructs, where the more resilient an individual is, the more likely they are to exhibit growth following adversity or vice versa, up to a certain point in which either the individual could become too resilient to experience growth or be influenced by traumatic events (Li et al., 2015; Kaye-Tzadok and Davidson-Arad, 2016). And yet, studies have also found that there is no linear relationship between PTG and resiliency (DeViva et al., 2016; Vieselmeyer et al., 2017). Given that the direct relationships between PTG and resiliency are equivocal, it is important to further investigate the distinct characteristics of each concept.

In order to reveal potentially distinct characteristics of PTG and resiliency, the current study focuses on empathy and emotion recognition ability because previous research has found that empathy is positively associated with PTG (Tedeschi and Calhoun, 2004), but little study was done for resiliency. Emotional or affective empathy is the tendency to feel the emotions of other people while keeping an other-focused and compassionate perspective. It is the ability to understand the emotions of another person that is an automatic, and often unconscious, reaction commonly understood to be the meaning behind the phrase of placing oneself in another person's shoes (Mehrabian and Epstein, 1972). For example, a highly emotionally empathetic individual may cry during a movie where the main character's family member has passed away. This empathetic person is able to understand the emotions of that character so well, that they exhibit or feel those emotions within themselves. It does not solely pertain to feeling sorry or having pity for someone, but it is displayed by gaining a sense of connection for what someone else may be going through or is currently feeling. A highly empathetic person is then able to use a combination of sympathy and compassion to console and approach others in a meaningful and positive way (Batson and Shaw, 1991; Pavey et al., 2012).

Findings suggest that the more growth an individual has experienced following trauma, especially growth involving others, such as within relationships, social support, and being more compassionate or more connected to others, the more likely they are to be empathetic towards them (Tedeschi and Calhoun, 2004; Cofini et al., 2014). Therefore, having experienced adversity that provoked PTG may allow an individual to be better at feeling and understanding those similar emotions in other people (Swickert et al., 2012). On the other hand, at least one study (Morice-Ramat et al., 2018) indicates that certain levels of empathy may promote more resilient characteristics, but the relationships between empathy and resiliency need to be further studied, because being able to bounce back following a trauma involves intra-personal characteristics; thus, unlike PTG, resiliency is conceptually more distant from empathy that involves inter-personal characteristics.

Emotions are essentially what prepare us to deal with or react to important events and situations without having to think deeply about them (Ekman, 1972). Not only do people feel emotions and have the capacity to understand the emotions that someone else may be feeling, but people physically express

emotions as well. There are seven basic and universal emotions: anger, fear, disgust, sadness, happiness, surprise, and contempt (Ekman, 1970, 1972; Ekman and Keltner, 1997). These emotions are automatically expressed through our facial muscles when we experience them, known as facial expressions (Ekman et al., 1971). Research has found that highly empathetic people are better able to accurately identify facial expressions in others (Carr and Lutjemeier, 2005; Besel and Yuille, 2010). Empathy can be linked to mirror neurons that demonstrate neurological processes that coincide with someone's level of empathy (Debes, 2017). This suggests that having an increased level of understanding for other individuals' current emotional well-being is what aids in being able to read others' emotions. The most current PTG theoretical model has identified that self-recognized PTG can be associated with outcomes that span beyond well-being, including expanded coping repertoires, increased compassion, and improved wisdom – all of which aid in the development, maintenance, and improvement of interpersonal relationships (Tedeschi et al., 2018). Therefore, since empathy and similar concepts are related to PTG, accurately identifying emotion expressions could be associated with PTG as well.

On the other hand, since being highly resilient is not directly and conceptually linked to empathy, the relationship between resiliency and emotion recognition ability is also unknown. In addition to the curvilinear relationship some studies have found between PTG and resilience, resilience researchers also suggested early on that there was a need to explore whether there is a capacity or threshold in which an individual can reach that “caps” their ability to continue to adapt, adjust, or be influenced by change over their lifespan of consistently withstanding adversity (Staudinger et al., 1993; Werner, 2005). Therefore, it may be important to explore this phenomenon in connection to social perspectives, relations, and interactions. It's possible that one's interpersonal development, in the contexts of emotional empathy and emotion recognition, may be affected over time due to a constant resistance or recovery to hardships. Overall, the ability to accurately read the emotions of others through their body language and facial expressions is a vital skill to have in daily life. Identifying the feelings of others allows an individual to determine their actions and behaviors toward them, providing that individual with the necessary information to respond accordingly.

Revealing the relationships between PTG and emotion recognition ability is also expected to make a theoretical contribution, because PTG reports are retrospective, requiring an individual to reflect on how they were before the traumatic event which, in turn, creates discrepancies between self-reported PTG and actual growth and/or cognitive improvement (Frazier et al., 2009). It is possible that people may amplify when they estimate how they changed by having a distorted view of their growth following the trauma, or simply not know just how much of an improvement they actually made (Taylor et al., 2000). Therefore, there has been debate on whether perceived growth is an illusory concept that is susceptible to deception (Maercker and Zoellner, 2004). It is important to

examine how perceived PTG is related to cognitive ability in order to establish a concrete understanding of PTG's benefits in someone's life. Even though PTG is conceptually linked to increased empathy levels, and empathy shares a positive relationship with emotion recognition ability (ERA), current literature has not directly examined the relationship between PTG and ERA. Experiencing growth after adverse experiences could improve cognitive processing due to the individual's increased participation in social settings (Stephens et al., 2013) and cognitive/emotional processing that they are engaged with. Therefore, the current study aimed to investigate the relationships between perceived PTG, resilience, empathy, and ERA. Given that this is the first study that investigates the associations among all these variables, no specific hypotheses were generated. However, due to the equivocal association between PTG and resilience, we expected that the size and direction of the relationships between PTG and empathy/ERA would be different than the relationships between resilience and empathy/ERA.

MATERIALS AND METHODS

Participants and Procedure

The sample consisted of 420 undergraduate students at a midwestern university in the US who had a mean age of 21.04 years ($SD = 5.15$). Approximately 65% of participants identified as White, 12% as African American, 10% being of Middle Eastern Heritage, 7% as Asian, and 5% identified as other. Additionally, about 80% of the sample were female and 19% were male. Two of the participants (less than 1%) did not provide their sex.

Participants were recruited through a university's subject pool and received class credit upon completion. They were first asked to provide demographic information and to identify emotions based on photographs of facial expressions. They then completed a questionnaire regarding empathy, which was followed by identifying their trauma experiences and PTG. Lastly, they completed a questionnaire measuring resilience. The study was approved by an internal review board (IRB-FY2020-16). Data were analyzed using SPSS 26.

Measures

Traumatic Events

Participants indicated which out of 13 traumatic events (e.g., “natural disaster,” “accident or injury,” “death of someone close to you”) they had experienced in the last five years, a measure that has been used in previous research (Taku, 2011). Following the trauma checklist, they identified which event impacted them the most (Taku, 2013).

Posttraumatic Growth

The PTG Inventory-Short Form (PTGI-SF; Cann et al., 2010; $\alpha = 0.91$) was used to measure the participants' level of perceived PTG as a result of the traumatic event that most impacted them (e.g., “I changed my priorities about what is important in life”). For 10 items, the participants were asked to indicate the degree

to which each change had occurred for them on a 6-point Likert scale ranging from 0, “not at all,” to 5, “very great degree.” Participants that did not identify a trauma event ($n = 10$) were excluded when analyzing total perceived PTG scores.

Resilience

The Brief Resilience Scale (BRS; Smith et al., 2008; $\alpha = 0.86$) with 6 items (e.g., “I tend to bounce back quickly after hard times”) was rated on a 5-point Likert scale ranging from 1, “strongly disagree,” to 5, “strongly agree.”

Empathy

The Questionnaire Measure of Emotional Empathy (QMEE; Mehrabian and Epstein, 1972; $\alpha = 0.87$) with 33 items (e.g., “it makes me sad to see a lonely stranger in a group”) was rated on a 9-point Likert scale ranging from 1, “very strong disagreement,” to 9, “very strong agreement.”

Emotion Recognition

The Standard Expressor Version of the Japanese and Caucasian Facial Expressions of Emotions (JACFEE; Matsumoto and Ekman, 1988; Ekman and Matsumoto, 1993) was used to measure an individual's ability of identifying the seven universal emotions: anger, disgust, contempt, fear, happiness, sadness, and surprise. The original set consists of a total of 130 photographed expressions from nine expressers (i.e., five Caucasian males, three Caucasian females, and one Japanese male). However, to diversify the measure as much as possible, as well as account for burnout and online efficiency, only a total of 24 photographs were used; a set of 8 facial expressions (i.e., anger, contempt, disgust, fear, happiness, sadness, surprise, and neutral) from each of 3 expressers (i.e., one Japanese male, one Caucasian female, and one Caucasian male). The 24 photographs were presented in a randomized order where the participants were asked to answer, “what emotion is this person expressing?” The amount of expressions identified correctly out of the 24 emotion expressions was used for a total ERA score. Only participants that answered all 24 items were included when analyzing ERA.

RESULTS

Posttraumatic Growth, Resilience, and Empathy

As shown in Table 1, a weak positive relationship was found between PTG and resilience, $r = 0.19$, $p < 0.01$. PTG and empathy were not correlated with one another ($r = 0.09$, $p = 0.08$), but resilience and empathy were found to be negatively correlated with one another, $r = -0.34$, $p < 0.01$.

PTG, Resilience, Empathy and Emotion Recognition Ability

Unlike self-perceived scales (i.e., PTG, resilience, and empathy), ERA reflects cognitive abilities through the expression and identification of universal emotions, and therefore, our participants were able to recognize more than half of the emotions accurately, leading to a non-normal distribution. Due

TABLE 1 | Correlations of PTG, resilience, and empathy.

	1.	2.	3.	Score Range	M (SD)	α
(1). PTG	-			0 – 50	30.98 (11.34)	0.91
(2). Resilience	0.19***	-		6 – 30	18.46 (4.87)	0.86
(3). Empathy	0.09	-0.34***	-	33 – 297	200.88 (26.60)	0.87

*** $p < .001$, PTG = Posttraumatic growth.

to that, the mean score of ERA, 19, was used as a cutoff to create two groups: an ERA-low group ($n = 144$) that identified less than 19 emotions out of the 24 correctly, and an ERA-high group ($n = 245$) that identified 19 or more emotions correctly. A logistic regression model was created to test the likelihood that PTG and resilience would predict ERA group differences. As displayed in Table 2, the model as a whole was statistically significant: $X^2(2, N = 372) = 7.38$, $p = 0.03$. This indicated that approximately 2% of the variance of ERA can be explained by PTG and resilience. However, only PTG showed to significantly predict ($p = 0.02$) differences between the ERA-low group and the ERA-high group. Whereas, resilience showed to make no significant contribution in predicting ERA group differences ($p = 0.10$).

DISCUSSION

The current study was designed to examine the relationships between PTG, resiliency, empathy, and ERA. Specifically, we investigated the ways in which PTG and resiliency may be different by analyzing their potential distinctive relationships with empathy and one's accuracy in identifying facial expressions. Overall, PTG and resiliency were found to have a significant but weak positive relationship, and their respective relationships with both empathy and emotion recognition were different.

First, PTG and empathy were found to be uncorrelated. This suggests that positive changes an individual perceives as a result of a trauma, such as appreciating life, having more compassion, and being able to do better things in life, and their ability to understand how others feel were independent from each other. This may be because PTG includes multiple domains, ranging from content that is not directly related to empathy, such as finding new opportunities that would not have been available without the specific triggering event, to content that should be related to empathy, such as being more compassionate for others, and they might cancel each other out.

TABLE 2 | Logistic regression analysis for PTG and resilience predicting ERA groups.

		B(SE)	p	95% CI
Model 1 ($N = 372$)	PTG	0.02(.01)*	0.02	[1.01, 1.04]
	Resilience	-0.04(.02)	0.10	[0.92, 1.01]

Model 1: $R^2 = 0.02$ (Cox and Snell), 0.03 (Nagelkerke). Model $X^2(2) = 7.38$, $p = 0.03$. * $p < .05$. PTG = Posttraumatic growth. ERA = Emotion Recognition Ability. ERA Groups: Low = Participants who answered less than 19 emotions correctly out of 24, High = Participants who answered 19 or more emotions correctly out of 24.

On the other hand, empathy and resilience showed a negative relationship. This could explain that the more resilient someone is, the less empathetic they are or vice versa. Since one study has suggested that empathy could be a predisposition of resilience (Morice-Ramat et al., 2018), the current findings may suggest that the more resilient people become, the less likely they may be able to relate and share emotional experiences with others – or perhaps, that the more empathetic they are, the less resilient they are. It is possible that there are other factors, such as self-sufficiency, autonomy, self-confidence or toughness, that may cause these constructs to be inversely related with one another. The heightened ability to continuously overcome obstacles may cause highly resilient people to develop and remain at an emotional equilibrium, not being heavily influenced by certain situations or susceptible to others' emotional states, and therefore, making them less sensitive to others who may be strongly influenced by their daily circumstances that causes them to both feel and express a wide range of emotions. These results of inconsistent relationships with empathy indicate PTG and resilience differ.

Second, the current study suggested that PTG, but not resiliency, predicted emotion recognition ability. More specifically, PTG significantly predicted ERA group differences, where higher perceived PTG levels were more likely to be associated with belonging to the ERA-high group, explaining that higher growth is more likely to lead to increased emotion recognition. This suggests that perceived PTG may not be entirely illusory, since it was associated with the cognitive abilities of identifying emotions on pictures, which is unrelated to each person's life narratives. On the other hand, resilience did not significantly predict ERA group differences, suggesting that being resilient and cognitive abilities in reading others' emotions are independent from each other. Even though someone highly resilient may show a lower level of empathy, that does not necessarily mean that their ability to identify emotions in others is also low, since the results showed no significance. It is important to note, however, due to the non-normal distribution of ERA scores, participants were assigned into the two ERA groups (low-high) using the cutoff of 19 for this study, which means some of the participants in an ERA-“low” group were still able to identify 75% of the emotions correctly (e.g., 18 out of the 24 pictures). Similarly, some of the participants in an ERA-“high” group were only able to identify 83% of the emotions correctly (E.g., 20 out of 24 pictures); thus, they showed a few errors as well.

IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS

Posttraumatic growth and resiliency are both processes that one may experience following a potential traumatic event that share similar characteristics, but are also very distinct from one another. Both growing and bouncing back after adversity are positive constructs but it is important to understand the potential differences. This study lends insight into the ways in which PTG was related to ERA but

not empathy, but when it comes to resilience, a decrease in empathy with no conclusive relationships with emotion recognition accuracy.

Empathy and ERA are important because they provide the knowledge someone needs that allows them to respond to others in the most constructive way. For example, an empathetic person who is also fairly good at recognizing emotions is able to notice that their friend is sad based on their facial expressions and then empathize with them because they know what sadness feels like. Since they have the knowledge to accurately identify that their friend is sad and use their previous life experiences to understand their sadness, they are able to recall what it is they may have needed from someone when they were in the same position. They may recall that in their own time of sadness, they desired a hug from their loved one or wanted to talk about what caused them to feel that way. Due to that understanding, they are able to react to their friend in a similar way. This may then provide comfort and support to their friend, increasing the quality of their relationship which would lead to a stronger bond between them. Being both empathetic and high in person perception allows an individual to notice behaviors and resonate with them, further allowing someone to respond in an appropriate manner. Strong interpersonal skills are necessary for effectively communicating, connecting, and collaborating with others, prospering in professional matters, as well as developing and maintaining a safe and secure social support system – which can all result in a good quality of life and overall well-being.

The more independent, intrapersonal nature of resilience may be the biggest aspect in which it differs from PTG. Resilience causes one to call upon personal skills and characteristics to recover from tragedy, however, PTG causes one to do that but in addition to changing the way in which they relate, interact, and express themselves with others, recently demonstrated in a cross-cultural study that showed having positive experiences when disclosing a trauma to others is the only significant predictor for PTG across 10 countries (Taku et al., 2021). PTG may be more realized when the experience was shared with at least one person who can be there for them, whereas resiliency may be more recognized without the presence of others. Programs that stress the importance of being resilient and programs that stress the importance of transformational growth may be able to complement each other well. Focusing on implementing practices that involve becoming more empathetic toward others may benefit individuals who are highly resilient. The applications of PTG can now highlight not only leading to feeling stronger, appreciating life more, becoming spiritually connected, realizing new possibilities in life, and developing stronger bonds with others, but may include cognitive abilities in judging others' emotions. This study provides evidence showing that perceived PTG may not be entirely illusory, and may portray quantifiable objective positive changes in terms of emotion recognition accuracy.

Even though this study provides insight into the relationships between PTG, resiliency, empathy, and ERA, there are limitations. The lack of diversity within the sample demographics

such as age, race, and gender, makes it difficult to generalize these findings to various other populations. Due to the lack of timing how long it took the participants to identify the facial expressions, the participants had more time to ruminate, which could have contributed to the overall high accuracy rate. Lastly, the self-report online nature of the study makes the research susceptible to inaccuracy, however, the sample size is substantial enough to buffer against most inaccuracies.

Despite these limitations, this study has fostered further exploration into the differences between PTG and resiliency. Specifically, we identified that the factors that can distinguish PTG and resiliency may be within interpersonal constructs such as empathy and ERA. Future research should explore what other factors can help explain the differences as well as overlaps between PTG and resiliency. Furthermore, it is important to investigate what types of growth may lead to cognitive improvement over others along with which emotions (e.g., anger, sadness) are easier to identify over others among people who experienced PTG as opposed to people who are highly resilient. Expanding this study to a wider audience of various different backgrounds would make the findings more applicable and generalizable to more populations. Research should also explore whether the amount/type of trauma events experienced affects an individual's PTG, resilience, empathy, and emotion recognition ability. Replicating this study with the addition of a cognitive empathy measure, a more diverse expressor measure, and a timing feature for identifying the facial expressions, would further provide insight into the relationships between PTG, resiliency, empathy, and emotion recognition.

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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 studies involving human participants were reviewed and approved by Oakland University Institutional Review Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

TE and KT: conception and design of the study and acquisition of data and drafting the manuscript and tables. TE: analysis of the data. Both authors have reviewed and edited the manuscript.

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The COVID-19 Stress Perceived on Social Distance and Gender-Based Implications

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OPEN ACCESS

Edited by:

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Reviewed by:

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Sciences, Iran
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Specialty section:

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

Received: 30 December 2021

Accepted: 17 March 2022

Published: 09 May 2022

Citation:

Taurisano P, Lanciano T, Alfeo F, Bisceglie F, Monaco A, Sbordonè FL, Abbatantuono C, Costadura S, Losole J, Ruggiero G, Iachini S, Vimercati L, Vacca A, De Caro MF and Curci A (2022) The COVID-19 Stress Perceived on Social Distance and Gender-Based Implications. *Front. Psychol.* 13:846097. doi: 10.3389/fpsyg.2022.846097

The COVID-19 pandemic is an unprecedented event entailing long-term consequences on population health and welfare. Those who contracted the coronavirus may have suffered from both physical and mental health issues that unfold the need for tailored intervention strategies. Hence, our study aims to investigate the psychological and social consequences of COVID-19 on a sample of 86 participants, encompassing 43 patients (clinical group; 25 women; mean age = 50.4 ± 10.1 years) recruited from Bari University Hospital, 19 of whom were hospitalized due to the disease. The remaining 43 were individuals not fallen ill with COVID-19 to date (control group; 25 women; mean age = 50.4 ± 10.1 years). The investigation yielded significant gender differences in post-traumatic stress symptoms, depression, and representation of interpersonal distance (IPD), evaluated through the IES-R, the BDI-II, and the IVAS task, respectively. This pattern of results was not replicated in the control group. In general, participants who reported having experienced the most intense post-traumatic symptoms also presented a greater mood deflection and, more specifically, within the clinical group women obtained the highest scores on both scales. Women reported higher IES-R and BDI-II scores compared to men, that could indicate that women who have contracted COVID-19 are more exposed to post-traumatic and depressive symptoms. Our results also showed a significant effect of COVID-19 on IPD with a tendency of disease-experienced individuals to increase their preferred IPD from adults, children, and elderly people. Regarding gender differences in mood and proxemic behavior, a correlation between depressive symptoms and probable PTSD and a further correlation between probable PTSD and greater IPD were found in women from both clinical and control group. Overall, these findings might contribute to a better understanding of gender-based implications of the current pandemic on mental health, also leading to the development of integrated yet personalized intervention strategies.

Keywords: gender, depression, post-traumatic symptoms, interpersonal distance, psychological implications

INTRODUCTION

On March 20, 2020, Italy was second only to China for confirmed COVID-19 cases, and the increasing number of patients in need of medical care and hospitalization led to an overload on the national healthcare system (Saglietto et al., 2020). The infection ascribed to the novel coronavirus (provisionally named 2019-nCoV) was first identified in Wuhan, China, (Huang et al., 2020), and has been designated as a severe acute respiratory syndrome (SARS-CoV-2) (Xu et al., 2020). As the disease may be contracted through aerosol particles and droplets inhaled at short to medium distances (Bahl et al., 2020; Morawska and Milton, 2020), several health devices, notably non-pharmaceutical interventions, have been implemented globally to reduce the transmission of the virus and “flatten the curve” of infections. Among all containment measures and preventive strategies, the maintenance of physical distance has emerged as one of the most effective (Yang et al., 2020).

The contraction of COVID-19 appears to be prevalent in the elderly, in people affected by multiple underlying conditions, and in patients presenting atypical symptoms (e.g., delirium, falls, gastrointestinal symptoms) (Vena et al., 2020; Lozano-Montoya et al., 2021). In particular, older age, co-occurrent cardiovascular diseases, and increased C-reactive protein (CRP) levels are associated with higher risks for all-cause in-hospital mortality (Vena et al., 2020). Overall, in- and out-of-hospital mortality due to the infection requires clinical awareness as post-acute sequelae and complications are relatively frequent over 12 months after hospital discharge (Mainous et al., 2021; Sykes et al., 2021; Vincent et al., 2021).

Regarding mental health consequences, the spread of COVID-19 has contributed to increased vulnerability in anxiety, fear, uncertainty, and internal unrest (Hussain, 2020; Mazza M. G. et al., 2020), entailing a significant psychological strain on the general population (Lanciano et al., 2020; Marazziti et al., 2020; Saladino et al., 2020; Amendola et al., 2021). In particular, gender was found to be among the highest predictors of the onset of depressive symptoms associated with the COVID-19 outbreak, severe lockdown, and quarantine in women (Delmastro and Zamariola, 2020). These findings appear consistent with those derived from a survey of Italians' short-term psychological responses to the pandemic experience, which reported a higher prevalence of distress and depression among women (Hodes and Epperson, 2019; Mazza C. et al., 2020; Yan et al., 2021). It is indeed evident that COVID-19 peritraumatic processes may manifest differently based on gender and other variables such as, for instance, employment stability and dimensions of home environment (Bonati et al., 2021). Another key psychological factor potentially affecting the subjective experience of COVID-19 could be hospitalization, as COVID-19 suspected individuals that were admitted to hospital departments and clinics reported higher psychological distress and poorer quality of life after discharge (Vlake et al., 2021). In-patients might also exhibit negative emotions (e.g., fear, denial, anger, health-related concerns) during the early stage of the disease that precedes the acceptance of the diagnosis (Sun et al., 2021).

In view of the high infectious load and relevant implications associated with COVID-19 (including, among all, mortality, and morbidity), the current pandemic has also resulted in particularly poor mental health outcomes in frontline healthcare workers (Kang et al., 2020; Lai et al., 2020; Rossi et al., 2020; Tan et al., 2020). In Italy, healthcare providers showed psychological symptoms of distress compatible with depression, anxiety, and post-traumatic stress disorder (PTSD) (Di Tella et al., 2020; Putri et al., 2021). Notably, PTSD symptoms in March 2020 reached a prevalence of 29.5%, contributing to the labeling of COVID-19 as a traumatic event (Forte et al., 2020). Individuals who had been hospitalized after having contracted the virus have shown features of anxiety and depression (Kong et al., 2020), as well as symptoms consistent with PTSD before being discharged (Bo et al., 2021). Symptomatology compatible with PTSD may persist even after recovery and regardless of the direct experience of hospitalization (Einvik et al., 2021).

The relative unpredictability of health outcomes, the diversity in perceived risks of contagion, and the modes of transmission of the virus causing COVID-19 may have also changed the readiness of individuals while approaching others. Indeed, Iachini et al. (2021) showed that anxiety related to risk perception during the pandemic could affect interpersonal-space boundaries and the fear of contact with others. This readiness to approach others may be conditioned by the use of personal protective equipment (PPE), such as face masks, leading to the perception of others as safer and more reliable (Cartaud et al., 2020).

People especially worry about being infected in places with high public traffic (e.g., public transport; shops; restaurants), and within overcrowded contexts, women seem to be more concerned about COVID-19 transmission than men (Gerhold, 2020). Despite men's greater vulnerability to encountering more serious physical consequences from COVID-19, women are more likely to disclose negative emotions and expectations about their chances of contracting the disease and experiencing its adverse effects (Alsharawy et al., 2021). Consistently, women, compared to men, report greater perception and fear regarding the severity of COVID-19 and thus tend to be more compliant with pandemic prevention measures, such as cleaning surfaces and engaging in physical distancing (Galasso et al., 2020; Alsharawy et al., 2021).

Aim and Hypotheses

Considering the psychological burden entailed by the current pandemic, this study aims to investigate the extent to which having contracted COVID-19 may lead to changes in mood and perceived distress, and how these changes may be reflected in the perception of interpersonal distance. More specifically, the current work seeks to investigate potential sex differences that may emerge in parameters related to depression, likelihood of PTSD, and proxemic preferences toward children, adults, and the elderly. Consistent with the aforementioned literature, we expect that women could report higher scores of distress and psychological symptomatology associated with the psychosocial phenomenon of COVID-19. Indeed, the current pandemic represents a complex psychosocial phenomenon that entails, besides physical suffering, mental health implications that may also lead to behavioral changes such as a different perception of

interpersonal distance. Moreover, we assume that women who contracted COVID-19 may have an even greater risk of suffering from distress and psychological symptoms. We also expect that variables such as gender and the direct experience of illness may affect self-reported proximity or distance behaviors.

MATERIALS AND METHODS

Study Design

The study adopted a 2×2 design with Diagnosis (Clinical vs. Control) and Gender (Women vs. Men) as between-subjects factors. The dependent variables were depression, post-traumatic symptoms, and interpersonal distance (IPD).

Participants

The study was conducted with the voluntary participation of 86 individuals, 43 of whom contracted COVID-19 (i.e., clinical group). The clinical group consisted of 24 subjects who were not hospitalized, including 21 individuals who suffered from a non-severe form of the disease, and 3 who contracted COVID-19 in a severe form. Within the same group of COVID-19 patients, 19 subjects have, instead, undergone hospitalization, presenting in nine cases a non-severe form of the disease, whereas the remaining 10 developed severe symptoms. Conversely, the 43 participants forming the control group reported not having contracted the disease themselves.

The subjects included within the clinical group have been enlisted at the A.O.U. Policlinico of Bari (Italy) and recruited from both the Clinic of Pneumology of the Department of Internal Medicine and the Clinics of the Department of Occupational Medicine. The survey focused on the assessment of the symptoms of post-traumatic stress, depression, and perception of interpersonal distance (IPD) through the administration of the Impact of Event Scale—Revised (IES-R) (Weiss and Marmar, 1996), the Beck Depression Inventory—Second Edition (BDI-II) (Beck et al., 1996), and a digitalized version of the Interpersonal Visual Analog Scale (IVAS) (Iachini et al., 2021), respectively.

All subjects who entered the study provided written informed consent to the evaluation and underwent the administration of the research protocol (i.e., IES-R, BDI-II, and IVAS).

Measures

The Beck Depression Inventory—Second Edition (BDI-II) (Beck et al., 1996) is a brief and time-effective self-report tool with a cut-off of 16 and a split in severity. The inventory consists of 21 items and is rated along a 4-point Likert scale (i.e., from 0 to 3). The Italian version of the instrument (Ghisi et al., 2006) represents a reliable and valid measure of depressive disorders in the Italian context (Sica and Ghisi, 2007), allowing for the assessment of the presence and magnitude of depressive symptoms in adults over a 2-week period.

The psychological impact of stressful events has been measured using a version of the Impact of Event Scale-Revised (IES-R) (Weiss and Marmar, 1996). The IES-R is a self-report questionnaire consisting of 22 items and three sub-scales that

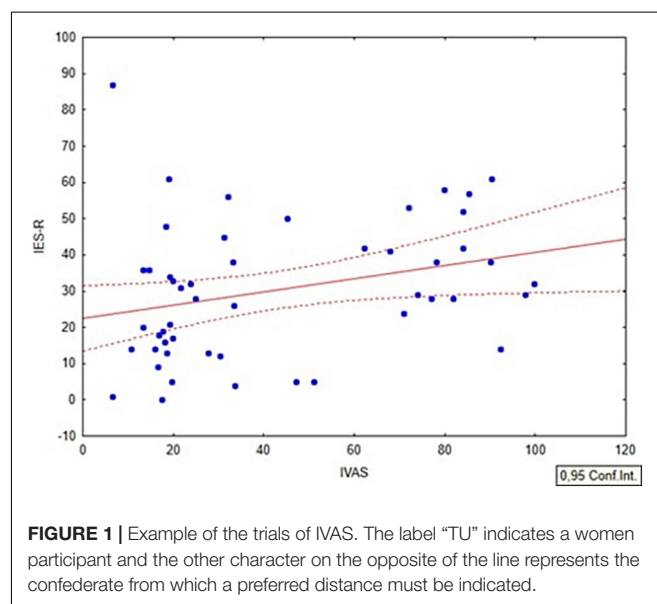
measure medium avoidance, intrusion, and hyperarousal. Each item can be evaluated from 0 to 4 and is referred to the last seven days prior to the administration. The total score can range from 0 to 88, with higher scores representing a greater psychological impact triggered by the stressful event considered. In the present study, trauma-related stress symptomatology was assessed with specific regard to the COVID-19 event. To this end, the Italian version of the questionnaire (Giannantonio, 2005) was adopted to detect the presence of symptoms related to a likely PTSD is estimated on a cut-off basis (IES score of 33 or more).

The software package Psytoolkit (Stoet, 2017) was used to create a survey that includes a version of the Interpersonal Visual Analog Scale or IVAS (Iachini et al., 2021) that investigates interpersonal distance (IPD) in an analog mode. For the evaluation of IPD participants were presented on the screen of a PC images depicting two different characters on opposite sides of a line: one of the figures (men or women) represented the participant, whereas the other one represented a different subject whose age and gender varied. Participants were asked to move the cursor and indicate the IPD they preferred to maintain from the subject at the opposite end of the line, carrying on the task for all items presented (Figure 1).

Procedure

Data collection was carried out between July 20, 2021, and October 25, 2021, i.e., following the outbreak provoked by the Delta SARS-CoV-2 variant in Italy. The study involved A.O.U. Policlinico of Bari for the recruitment of participants belonging to the clinical group, the University of Bari “Aldo Moro” for the recruitment of participants belonging to the control group, and the University of Campania Luigi Vanvitelli that provided for the IVAS for the assessment of interpersonal distance (IPD).

COVID-19 patients were included in this study on condition that they were aged between 18 and 65 years and did not suffer from major neurocognitive disorders, based on the Diagnostic



and Statistical Manual of Mental Disorders (DSM-5) criteria (American Psychiatric Association, 2013). The exclusion of underlying neurocognitive disorders followed a brief clinical examination and screening.

The clinical group was selected from a pool of subjects scheduled for clinical assessment and medical consultations after having contracted COVID-19. These subjects were assigned to the Unit of Clinical Psychology and Neuropsychology by the referring physicians for either the Department of Internal Medicine or the Department of Occupational Medicine. Thus, well-trained psychologists provided the patients with clinical assessment tools and proper instructions.

All participants were asked to provide written informed consent. Among them, those who met the inclusion criteria for our study could pursue psychological assessment. Sociodemographic data (i.e., age, sex, level of education) were considered in recruiting control group subjects with characteristics identical to those of clinical subjects. Control subjects started an online survey consisting of the same

assessment instruments proposed to the clinical group, after having filled in the informed consent through a dedicated online form.

Both clinical and control subjects were administered the psychometric protocol comprising: (1) the Beck Depression Inventory—Second Edition (BDI-II) (Beck et al., 1996); (2) the Impact of Event Scale-Revised (IES-R) (Weiss and Marmar, 1996); (3) the Interpersonal Visual Analog Scale (IVAS) (Iachini et al., 2021). The overall time required by each participant to complete the questionnaires and the task ranged from 15 to 30 min.

Study Arrangements

The adoption of some precautions allowed to limit potential internal validity bias. In particular, the whole sample shared the same geographical context of origin (Apulian region in Southern Italy), where the same restrictions implemented by the Government to limit the transmission of Sars-Cov-2 were in force. All clinical subjects referred to the U.O.S. of Clinical Psychology and Neuropsychology scheduled for post-COVID monitoring at the General Hospital of Bari were included in the study as they met the preset eligibility criteria. None of them discontinued or withdrew their participation, presenting a response rate of 100%. The same adherence to the assessment procedure was recorded by controls who were paired to clinical subjects based on common sociodemographic characteristics to provide comparability between the two groups and control for potential confounders.

Statistical Methods

Variance analyses and correlations have been carried out by means of the software package “Statsoft Statistica.” Before carrying out parametric tests, kurtosis and asymmetry tests were performed for all the measurements obtained, suggesting appropriate symmetry and peakedness of the distribution (e.g., DeCarlo, 1997). Two-way ANOVAs were performed to compare

TABLE 1 | Sociodemographic variables characterizing the clinical group and the control group.

Variable	Clinical group	Control group
Age (missing data = 0)		
Mean (SD)	50.4 (SD = 10.1)	50.4 (SD = 10.1)
Range	26–65	26–65
Gender (missing data = 0)		
Men—M	18 (41.86%)	18 (41.86%)
Women—F	25 (58.14%)	25 (58.14%)
Educational level (missing data = 0)		
Mean (SD)	13.67 (SD = 3.99)	13.67 (SD = 3.99)
Primary school	1 (2.33%)	1 (2.33%)
Middle school	9 (20.93%)	9 (20.93%)
Secondary school	17 (39.53%)	17 (39.53%)
University degree	16 (37.21%)	16 (37.21%)
Non-contracted COVID-19 (missing data = 43)	—	43
Contracted COVID-19 (missing data = 43)		
Non-hospitalized	24 (55.81%)	—
Non-severe	21 (87.5%)	—
Severe	3 (12.5%)	—
Hospitalized	19 (44.19%)	—
Non-severe	9 (47.37%)	—
Severe	10 (52.63%)	—
Marital status (missing data = 0)		
Single	5 (11.63%)	6 (13.95%)
Married	33 (76.74%)	37 (86.05%)
Separated/divorced	4 (9.30%)	—
Widowed	1 (2.33%)	—
Employment status (missing data = 0)		
Not employed	9 (20.93%)	7 (16.28%)
Employed	34 (79.07%)	36 (83.72%)

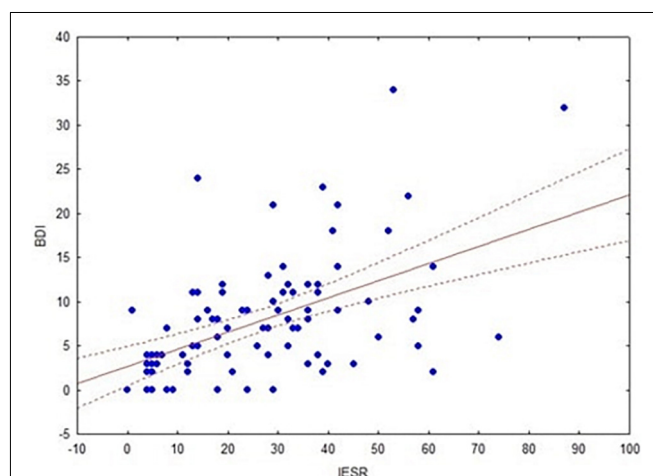


FIGURE 2 | The flow diagram of participants shows the main characteristics of the clinical and control groups.

the means of the two samples (i.e., Clinical vs. Control; Women vs. Men), on the variables of the study (i.e., depression, post-traumatic symptoms, and IPD). Both gender and diagnosis were included as categorical predictors, whereas the BDI-II, IES-R, and IVAS scores (interpersonal proximity from children, adults, and the elderly) were considered as dependent variables. A repeated-measure ANOVA was used to compare means across variables based on repeated IVAS observations. Bonferroni *post hoc* tests were performed to explore further and to identify which pairs of means are statistically different.

Correlations were performed between the scores at IVAS, BDI-II, and IES-R within the whole group of participants and accounting for the two categories of diagnosis and gender. All correlation findings were corrected through Benjamini-Hochberg False Discovery Rate (FDR) to control for type-I errors when performing multiple comparisons.

RESULTS

Sociodemographic and Clinical Variables

A total of 86 participants were recruited for the study. The clinical specimen consisted of 18 men and 25 women aged approximately 50.4 years ($SD = 10.1$), and with an average education of 13.67 years ($SD = 3.99$). The control group is composed of women and men in equal numbers (18 men; 25 women) and with the same age ($= 50.4$; $SD = 10.1$) and educational level ($= 13.67$; $SD = 3.99$) of the clinical group, but who have not contracted the virus.

Table 1 and **Figure 2** shows the demographic and clinical characteristics of the participants in the study sample, whereas **Table 2** displays BDI-II, IES-R, and IVAS scores reported by both clinical and control subjects.

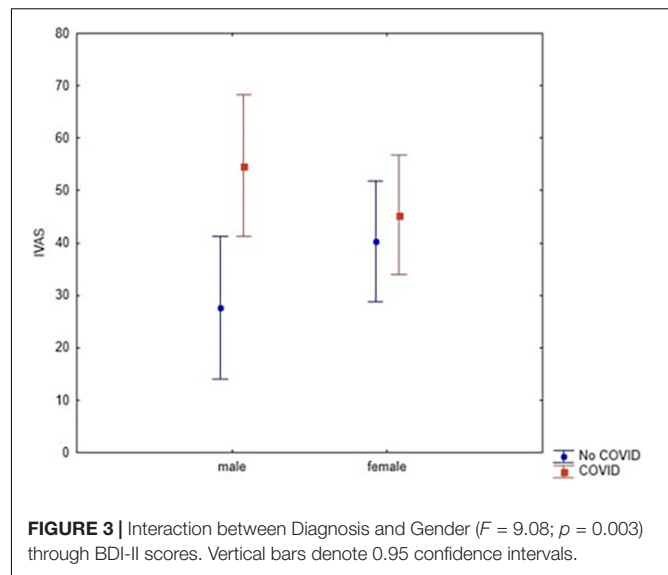
Analysis of Variance

Depressive Symptoms

A 2×2 ANOVA with Diagnosis (Clinical vs. Control) and Gender (Women vs. Men) as between-subjects factors, and BDI-II as dependent variable was performed. No Diagnosis effect was detected ($df = 1$; $F = 3.5$; $p = 0.06$; Cronbach's $\alpha = 0.5$),

TABLE 2 | Mean scores at BDI-II, IES-R, and IVAS of the clinical group and the control group.

Questionnaire or test	Clinical Group	Control Group
BDI-II	9.53 ($SD = 8.17$)	6.28 ($SD = 4.80$)
(Range = 0–63)	0–34	0–23
IES-R	25.35 ($SD = 19.13$)	28.14 ($SD = 17.67$)
(Range = 0–88)	1–87	0–74
IVAS		
Child	48.84 ($SD = 31.85$)	33.66 ($SD = 31.75$)
(Range = 0–100)	3.83–100	0–100
Adult	49.00 ($SD = 27.32$)	36.18 ($SD = 28.48$)
(Range = 0–100)	0–100	8.5–100
Elderly	50.08 ($SD = 30.46$)	35.32 ($SD = 30.44$)
(Range = 0–100)	0–100	0–100



although a marginal significant was observed. With respect to gender differences, we found that women had higher BDI-II scores than men ($df = 1$; $F = 4.46$; $p = 0.038$; Cronbach's $\alpha = 0.6$). However, a significant interaction between diagnosis and gender on BDI-II scores was observed only among women who contracted COVID-19 ($df = 1$; $F = 9.08$; $p = 0.003$; Cronbach's $\alpha = 0.9$; **Figure 3**). Bonferroni *post hoc* analysis revealed that women who contracted COVID-19 had higher scores than women who did not contract the disease ($p = 0.002$) and men, regardless of their diagnosis (respectively, $p = 0.003$, and $p = 0.004$).

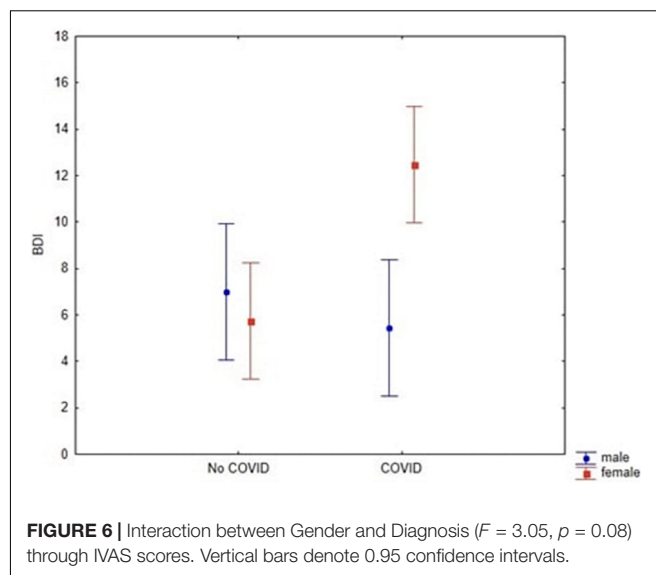
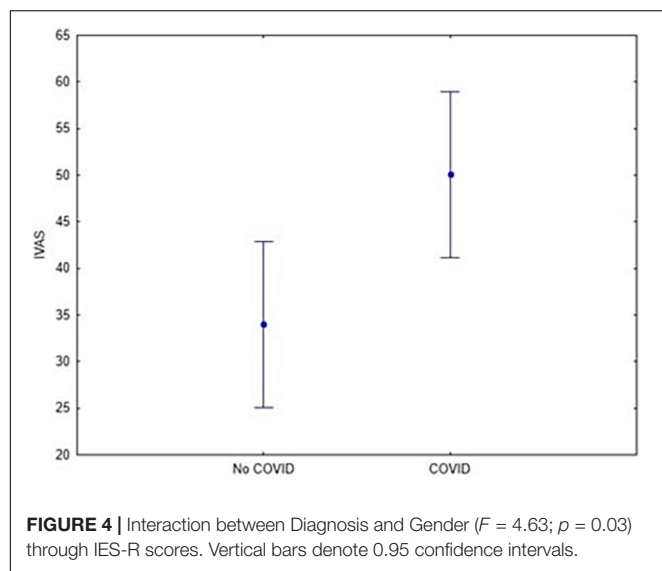
The Psychological Impact of Stressful Events

A 2×2 ANOVA with Diagnosis (Clinical vs. Control) and Gender (Women vs. Men) as between-subjects factors and IES-R as dependent variable was performed. Results showed a Gender effect, as women reported significantly higher IES-R scores than men ($df = 1$; $F = 4.63$; $p = 0.03$; Cronbach's $\alpha = 0.6$). No significant effect emerged for diagnosis ($df = 1$; $F = 0.96$; $p = 0.33$; Cronbach's $\alpha = 0.2$) and no significant interaction was found between diagnosis and gender with reference to IES-R scores ($df = 1$; $F = 2.64$; $p = 0.11$; Cronbach's $\alpha = 0.9$) (**Figure 4**).

3.2.3 Interpersonal Distance

A 2×2 mixed ANOVA with Gender (Women vs. Men) as between factor and IVAS scores as within-subjects was performed. We found that Diagnosis may have affected IVAS scores, as participants who contracted COVID-19 had higher scores than those who did not contract the disease ($df = 1$; $F = 6.5$; $p = 0.013$; Cronbach's $\alpha = 0.7$, **Figure 5**).

In addition, we found a relevant trend in the interaction between diagnosis and gender ($df = 1$; $F = 3.05$, $p = 0.08$; Cronbach's $\alpha = 0.4$; **Figure 6**) which yet was not significant. As for the other main effects observed through ANOVAs, we further explored this potential interaction through a *post hoc* analysis. Hence, we found that men's scores varied between the clinical and the control group. In particular, men who did



not contract COVID-19 reported lower IVAS scores (Bonferroni *post hoc* $p = 0.04$). Nevertheless, these data require further investigation to be supported as no (other) significant effect or interaction emerged (all $F < 3.05$; $p > 0.08$).

The total results of the aforementioned ANOVAs are summarized in **Table 3**.

Pearson's Correlations

We found a strong correlation between BDI-II and IES-R scores within the whole sample ($r = 0.5$, $p = 0.0001$, FDR-corrected = 0.0003; **Figure 7**). The same correlation was observed within the clinical ($r = 0.65$; $p = 0.0001$,

FDR-corrected = 0.0003) and the control group ($r = 0.41$; $p = 0.006$, FDR-corrected = 0.009), respectively. Another significant correlation concerned the BDI-II and IES-R scores within women ($r = 0.51$; $p = 0.0001$, FDR-corrected = 0.0003) and men ($r = 0.48$; $p = 0.003$, FDR-corrected = 0.006), respectively.

Additionally, we performed a Pearson's correlation between IVAS scores, BDI-II, and IES-R. No significant associations between BDI-II and IVAS ($r = -0.05$; $p = 0.66$, FDR-corrected = 0.66), and IES-R and IVAS ($r = 0.08$; $p = 0.47$, FDR-corrected = 0.5) emerged within the whole sample. Conversely, a relevant trend pertaining to the correlation between IVAS and

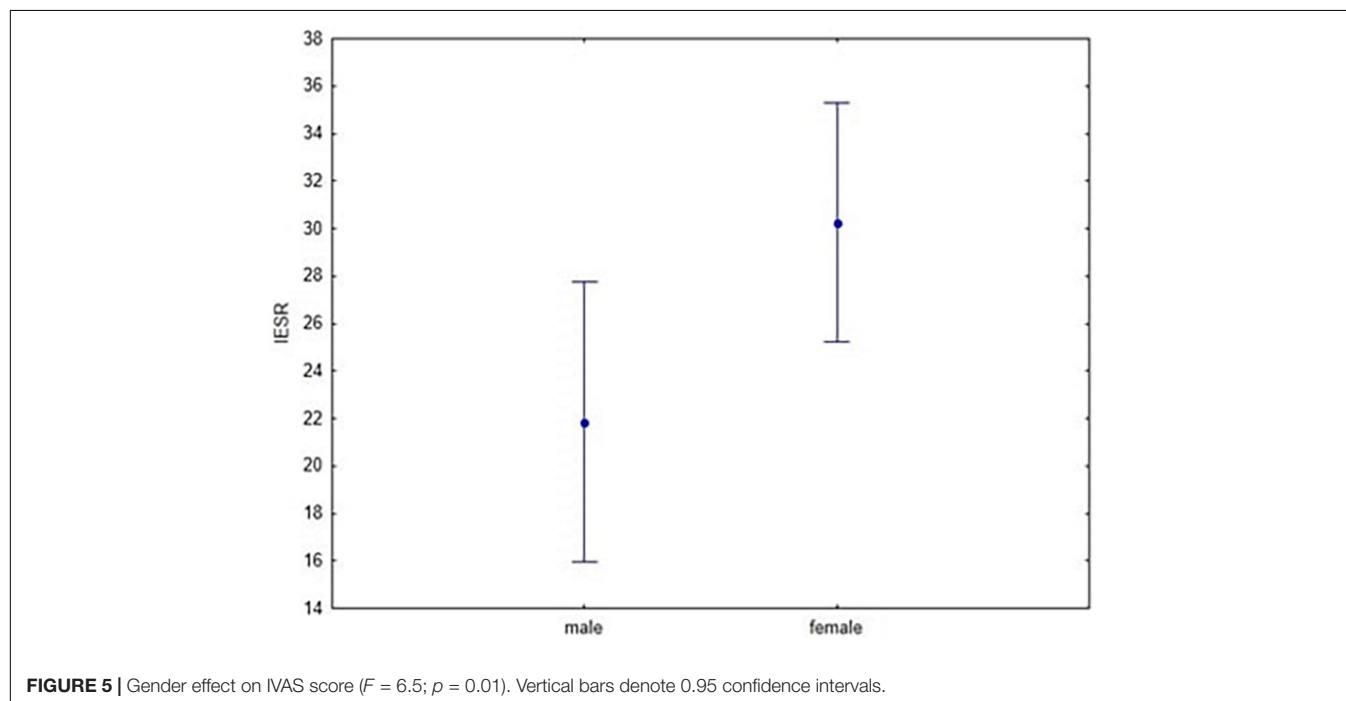
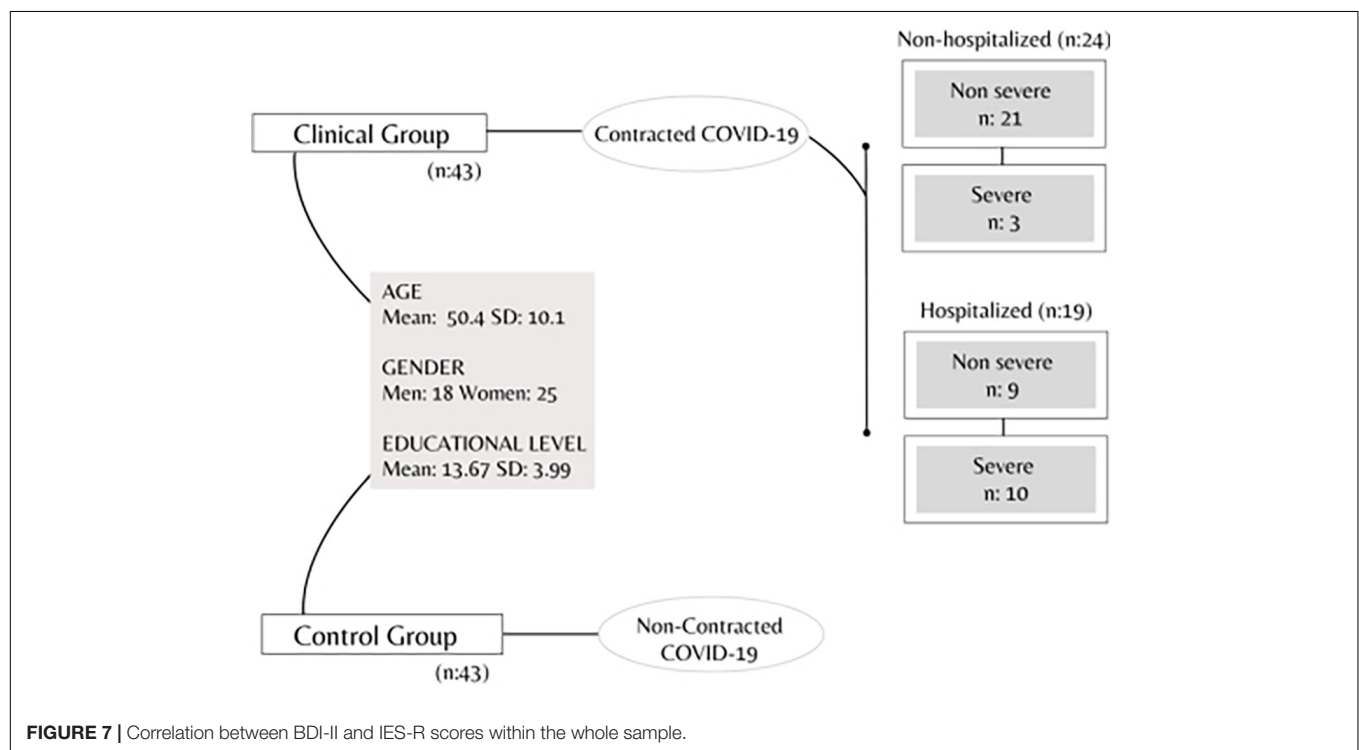


TABLE 3 | Summary table of results obtained from ANOVAs.

Depressive symptoms (BDI-II)	df	df × factor	df -Error	F	p	Cronbach's alpha
Diagnosis-based differences	3	1	82	3.5	0.06	0.5
Gender-based differences		1	82	4.46	0.038	0.6
Diagnosis and gender		1	82	9.08	0.003	0.9
The psychological impact of stressful events (IES-R)	df	df × factor	df -Error	F	p	Cronbach's alpha
Diagnosis-based differences	3	1	82	0.96	0.3	0.2
Gender-based differences		1	82	4.63	0.03	0.6
Diagnosis and gender		1	82	2.64	0.11	0.4
Interpersonal distance	df	df × factor	df -Error	F	p	Cronbach's alpha
Diagnosis-based differences	3	1	82	6.5	0.013	0.7
Diagnosis and gender		1	82	3.05	0.08	0.4

**FIGURE 7 |** Correlation between BDI-II and IES-R scores within the whole sample.

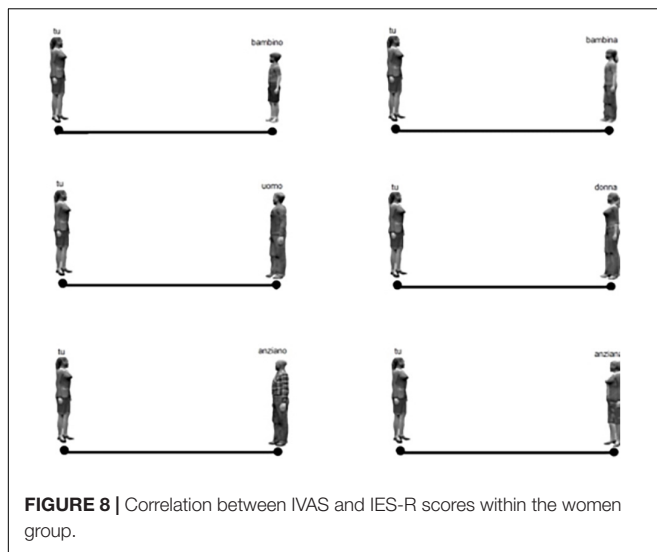
IES-R scores was found within the women group ($r = 0.29$; $p = 0.04$, FDR-corrected = 0.056; **Figure 8**). No other significant correlation emerged within the men group, regardless of the COVID-19 diagnosis (all $r < 0.05$; $p > 0.7$).

DISCUSSION

The present research work sought to examine changes in mood and distress based on having or not contracted the COVID-19, and how changes in these psychological variables may have been reflected in the perception of interpersonal distance. The study also investigated gender differences, revealing that women might have experienced a greater psychological burden than men and they are also more prone to experience severe depressive and post-traumatic symptoms. In particular, women who contracted the disease showed higher levels of depression

than men. The analysis of interpersonal distance revealed people who contracted the infection tend to prefer greater distancing from others. Further associations between depressive and post-traumatic symptoms as well as potential salient trends between post-traumatic symptoms and IPD were observed within the women group.

The findings of our study thus indicated that the women may be related to a higher occurrence of depression and probable PTSD. Depressive symptoms in women also seem to be associated with having contracted COVID-19 as women who contracted the disease reported higher scores at the BDI scale measuring depressive state. These results appear to be in line with previous research that highlighted the association between the women and increased risks for psychological discomfort (Mazza C. et al., 2020; Qiu et al., 2020; Wang et al., 2020), as well as evidence of women's vulnerability to distress and the development of symptoms compatible with PTSD



(Sareen et al., 2013; Liu et al., 2020). These findings also appear consistent with the literature concerning women's exposure and risks for psychological distress (Sareen et al., 2013; Liu et al., 2020; Mazza M. G. et al., 2020; Qiu et al., 2020; Wang et al., 2020).

Furthermore, this study showed how having contracted COVID-19 may have affected interpersonal distance, made manifest by the propensity of participants who have suffered from the disease to maintain greater distances from adults, children, and the elderly, compared to those who have never been infected. The increase in interpersonal proximity has also been evaluated in previous studies as a useful method for dealing with epidemic situations (Caley et al., 2008). To date, current recommendations suggest standing about 2 meters away from others while wearing protective facial masks, whereas without the masks an even greater IPD is expected (Chu et al., 2020; Setti et al., 2020). The maintenance of the recommended long distances (i.e., social distance) represents an ongoing challenge because it would result in a change in the natural proxemic preference that is less than one meter only in informal meetings (Welsch et al., 2020), although the perception of interpersonal space has undergone a strong variation due to the pandemic (Iachini et al., 2021). The analyses also revealed a tendency for men to maintain less interpersonal distance from children, adults, and the elderly. This behavior does not appear to be related to disease contraction and is consistent with the literature stating that, in general, the women have higher risk perceptions than men and tend to estimate a lower likelihood of the COVID-19 crisis being solved completely, leading to a return to "normal," everyday life.

Moreover, recent COVID data showed that women are more concerned about COVID-19 than men (Gerhold, 2020) that may result in behavioral changes because of their beliefs and expectations related to the pandemic event (Alsharawy et al., 2021). Consequently, our data may be consistent with an increase in women's perception of distress that may be reflected through the adoption of greater proximal behavior than men. also considering the high rate of comorbidity between PTSD and major depressive disorder (Elhai et al., 2008; Roley et al., 2015).

During the COVID-19 pandemic, several symptoms attributable to PTSD have emerged as intense and persistent even after recovery in individuals with a history of depression who had previously contracted the virus (Einvik et al., 2021).

In our study, emerged a positive correlation between scores indicative of probable post-traumatic stress disorder and greater mood deflection was indicated by scores to BDI-II and IES-R. These findings also revealed gender-related differences with a greater tendency for women to obtain higher scores, consistent with the literature (Galasso et al., 2020; Alsharawy et al., 2021).

Finally, findings obtained from correlational analyses may lay the groundwork for further investigation into correlations between scores indicative of probable post-traumatic stress disorder and greater interpersonal distance. Indeed, despite the lack of data on long-term adaptation strategies for IPD in response to the COVID-19 health crisis, we know that traumatic situations can persistently increase individuals' need for greater IPD (Bogovic et al., 2014). Such eventuality could also occur during and after the current pandemic that it has been defined as an impactful, trauma-related event (Forte et al., 2020; González-Sanguino et al., 2020; Johnson et al., 2020; Liu et al., 2020). Overall, the preliminary evidence obtained may also set the stage for new data collection and analysis to gain a better understanding of the potential interactions between diagnosis and gender in IPD adjustment, besides the associations between post-traumatic symptoms and IPD according to gender.

Limitations

Although our results are referred to subjects residing in Southern Italy, risk perception and concern about contagion was found to be high across the country (Lanciano et al., 2020), consistent with the WHO statement about the global impact of the pandemic (Alsharawy et al., 2020). The relatively small sample size reflects, however, the need to collect further data from additional participants and at other stages in the progression of COVID-19 transmission, including the randomized use of digital versions of the psychometric measures used. Albeit significant, these preliminary findings may indeed have limited clinical translatability in improving understanding of COVID-19 from both psychological and psychosocial perspectives. Moreover, the estimates deriving from the administration of both online and offline assessment protocols, as well as from the virtual task for interpersonal proximity may not be generalizable to a varied array of real-life contexts, where other external variables might affect the actual spatial and social behavior.

Future studies with a larger sample should account for potential predictors of depression, post-traumatic symptoms, and variation in IPD preference within the clinical group (e.g., considering the type, severity, and persistence of COVID-19 symptoms; ICU stay; oxygen supply; timepoint of COVID-19 diagnosis, negativization, hospital discharge, and/or complete recovery; duration of hospitalization). In particular, based on routine hospital care, it would be advisable to explore, in more detail, if there could be differences within the clinical group between patients who were hospitalized and those non-hospitalized, and between individuals who suffered from a non-severe disease and those who contracted COVID-19 in a

severe form as. Further, the investigation of the role played by key factors such as, for instance, resilience, overall quality of life, burden of isolation measures, and worries about contracting the disease, besides contact history and risk factors for severe disease, may be warranted.

CONCLUSIVE REMARKS

The present study involved 86 participants to appraise differences by diagnosis and gender related to the presence of depressive, post-traumatic symptoms, and proxemic preferences following the peak of Sars-Cov-2 Delta variant in Italy. Psychological assessment relied on the combined use of direct (self-report) and indirect (visual analogic) measures to delve into both psychological distress and distance behavior related to COVID-19, also considering differential gender vulnerability to the psychological repercussions of the disease on psychosocial functioning. On the whole, these preliminary findings could contribute to a better understanding of the psychological and psychosocial correlates and potential implications of COVID-19 on both disease-experienced and healthy individuals, setting the basis for future research and the design of more targeted interventions to foster mental health during and after the pandemic.

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: Forms, material, and data are available on the Open Science Framework (OSF): <https://osf.io/qtvwe/>.

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ETHICS STATEMENT

The study was given ethical approval by the Interregional Ethics Committee of the “Azienda Policlinico” of Bari, and executed according to the Declaration of Helsinki (No. ET-20-01). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

PT: concept and design of the work, acquisition of the data, development of the analysis and interpretation of data, and drafting the manuscript. TL, FA, FB, and CA: concept and the design of the work, acquisition and interpretation of data, and manuscript revision. AM, FS, SC, JL, and GR: acquisition and interpretation of the data. SI, LV, AV, MD, and AC: concept and the design of the work, analysis and interpretation of data, and critical revision. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

We thank all participants for sharing their time by participating in this study. We thank the evaluators for their important contribution, Luciana Loponte, (Department of Biomedical Sciences and Human Oncology), Celeste Dalfino, and Chiara Rosaria Massagli, (Department of Interdisciplinary Medicine, Occupational Health Division). We also thank for patient evaluation and recruitment, Simona de Santis, Cristina Filannino, Valeria Ladisa, Jessica Pisani, Ilaria Vacca, and Valentina Valenzano, (U.O.S. Clinical Psychology and Neuropsychology—Policlinico di Bari).

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