Experiences of mental health promotion and suicide prevention

Edited by
Santiago Gascon, Adrian Alacreu-Crespo, Jorge L. Ordóñez-Carrasco
and Carla Maria Santos De Carvalho

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Experiences of mental health promotion and suicide prevention

Topic editors

Santiago Gascon — University of Zaragoza, Spain

Adrian Alacreu-Crespo — University of Zaragoza, Spain

Jorge L. Ordóñez-Carrasco — University of Zaragoza, Spain

Carla Maria Santos De Carvalho — University of Coimbra, Portugal

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Editorial: Experiences of mental health promotion and suicide prevention

Santiago Gascón-Santos[1]*, Carla M. Santos de Carvalho[2], Adrián Alacreu-Crespo[1] and Jorge L. Ordóñez-Carrasco[1]

[1]Department of Psychology and Sociology, University of Zaragoza, Zaragoza, Spain, [2]Department of Social Psychology, University of Coimbra, Coimbra, Portugal

Editorial on the Research Topic
Experiences of mental health promotion and suicide prevention

The increasing prevalence of mental disorders and their strong association with suicidal behaviors (Bae et al., 2022) have not only strained health systems around the world, but have also underscored the urgent need for innovative approaches to mental health promotion, early detection and suicide prevention, and the promotion of experiences aimed at detection, provision of support, and promotion of wellbeing.

Mental health results from a complex interaction of biological, psychological, social, and environmental variables (Turecki et al., 2019) that affect each age group differently. Concretely, in school environments bullying is a risk factor for psychological disorders. Wen et al. analyzed its effects on the risk of self-harm (Plener et al., 2015) and the mediation of variables such as alexithymia and rumination (Borrill et al., 2009), offering new perspectives for prevention (Wilkinson et al., 2011).

Kwon addresses the congruence between one's own values and those of the organization in young people, who show particular sensitivity to fairness (Moon et al., 2024) and to the fact that injustice is associated with increased vulnerability to anger and Hwa-byung syndrome (Hong and Hong, 2023). Factors associated with suicidal ideation differed by age, but depression and stress were risk factors at all ages (Hwang et al., 2024). Liu et al., explore how negative life events contribute to suicidal ideation. They attended to the mediating role of entity, whereas meaning in life moderated the likelihood of suicide (Song et al., 2022). This variable was related to quality of life and physical and mental health (Kim et al., 2019). Qifei et al. found that resilience mediated the effect of exercise on feelings of safety, while exercise increased feelings of safety through the resilience factor (Piestrzyński et al., 2021), improving memory, mood, and physical and mental health (Al-Qahtani et al., 2018). A controlled study on the effectiveness of a resilience-based intervention in at-risk adolescents Llistosella et al. is also included, finding that it contributed to fostering positive development, reinforcing the potential of multicomponent interventions. This life stage presents greater vulnerability to developing mental health problems (Ryu and Fan, 2023). Conceptualizing resilience as a dynamic process, they confirm the association between individual traits, context and social variables.

Outside the field of education, there are experiences of mental health in the workplace. Lee and Lee studied the relationship between stress, mental health and productivity. 26.2% of the workers had high levels of stress, with job control and job demands being the highest sub-factors. Stress resulting from organizational conditions led to dissatisfaction, absenteeism, decreased productivity, accidents, cardiovascular diseases, depression, anxiety, etc. (Kim and Kang, 2010). On the other hand, Dobešová Cakirpaloglu et al. confirm that stress negatively affects the performance, mental health and wellbeing of healthcare workers. Emotional exhaustion and stress were associated with feelings of anxiety and depression, while self-fulfillment mitigated depression and promoted wellbeing (Taranu et al., 2022). Conflict of values may lead employees to act inconsistently with their roles and promote burnout (Rotenstein et al., 2023). Mental or physical exhaustion was associated with prolonged stress and inability to choose effective coping strategies (Edward and Hercelinskyj, 2007).

In this line, a study on symptomatology associated with aggression suffered by health professionals is presented (Gascón-Santos et al.), 57.5% had suffered aggression in the last year (threats, insults and physical aggression). This group presented more psychological symptoms: such as re-experiencing, avoidance, distancing, emotional, or cognitive alterations and hypervigilance. A relationship was found between aggression and burnout. Previous research concluded that violence was common in the emergency and psychiatric services (Gascón et al., 2009), but in recent decades there has been a collapse in primary care, creating the conditions for these episodes to occur (Moleras-Serra et al., 2023).

Mental health and suicide are being studied through communication processes and the inappropriate use of social networks, Arik et al. present a qualitative study on media consumption habits and their relationship with suicidal ideation. Four types of factors emerged: psychological, familial, sociocultural and network-related. Most of those who had made a suicide attempt came from dysfunctional families with experiences of violence. As psychological factors they found problems of anger, hopelessness and maladjustment. Most of them spent much of their time interacting with content that produced adverse emotional states. Social media have become a tool for feeling recognized in virtual communities and their misuse can contribute to normalizing suicidal thoughts (Balt et al., 2023). But these platforms can be used as a preventive measure for those who are facing integration problems and are contemplating suicide (Cheng et al., 2015).

Finally, Myrick and Willoughby highlight the impact that public figures acknowledging a mental disorder can have. Such disclosures may prompt the public to reconsider their health behaviors. Such a response differs according to age groups and whether the celebrity is from the world of entertainment, sport or politics. In the latter case, reactions varied according to the ideology of the politician. In any case, the search for information related to the disease increased. They conclude that news about mental illness could be used to provide accurate and useful information about ways to help (Kresovich and Noar, 2020).

Author contributions

SG-S: Conceptualization, Formal analysis, Funding acquisition, Project administration, Supervision, Writing – original draft. CS: Conceptualization, Formal analysis, Supervision, Visualization, Writing – review & editing. AA-C: Conceptualization, Data curation, Methodology, Resources, Validation, Writing – review & editing. JO-C: Investigation, Methodology, Project administration, Software, Visualization, Writing – review & editing.

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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Strain and serenity: exploring the interplay of stress, burnout, and well-being among healthcare professionals

Simona Dobešová Cakirpaloglu[1]*, Panajotis Cakirpaloglu[2], Ondřej Skopal[2], Barbora Kvapilová[3], Tereza Schovánková[4], Šárka Vévodová[1], Jane Peta Greaves[5] and Alison Steven[5]

[1]Department of Humanities and Social Sciences, Faculty of Health Science, Palacký University Olomouc, Olomouc, Czechia, [2]Department of Psychology, Faculty of Arts, Palacký University Olomouc, Olomouc, Czechia, [3]Department of Psychology and Abnormal Psychology, Faculty of Education, Palacký University Olomouc, Olomouc, Czechia, [4]Science and Research Centre, Faculty of Health Science, Palacký University Olomouc, Olomouc, Czechia, [5]Department of Nursing, Midwifery and Health, Faculty of Health and Life Sciences, Northumbria University, Newcastle upon Tyne, United Kingdom

Introduction: Stress and burnout can negatively affect performance, mental health, and the overall well-being of healthcare workers. The study aims to examine the prevalence of stress and burnout, and investigate links between stress, burnout, mental state, and well-being among healthcare workers in the Czech Republic.

Methods: A cross-sectional survey was conducted in the Czech Republic, focusing on healthcare professionals working in various healthcare settings. A total of 1,064 healthcare workers participated in the study. A standardized questionnaire battery was used, consisting of the Maslach Burnout Inventory (MBI), Perceived Stress Scale (PSS) and Supso-7 measuring mental state. Separate correlation and multiple regression analyses were conducted.

Results: 46.24% of the healthcare workers reported high levels of emotional exhaustion, 25.56% reported high levels of depersonalization, 24.15% reported low levels of personal accomplishment, while 11.18% reported high levels of perceived stress. The findings revealed that emotional exhaustion, a core component of burnout, was associated with increased feelings of anxiety and depression. Perceived stress was also linked to anxiety and depression, while personal accomplishment appeared to mitigate depression and support positive psychological well-being.

Conclusion: The study provides promising evidence suggesting that addressing stress and emotional exhaustion, while fostering a sense of personal achievement, could lead to improvements in the mental health and work performance of healthcare workers. These findings highlight the importance of addressing burnout and stress management strategies to support the overall well-being of healthcare professionals.

KEYWORDS

stress, burnout, mental health, well-being, healthcare workers

1 Introduction

In the Czech Republic, healthcare professionals operate within a system that combines both public and private healthcare services. The country has a universal healthcare system funded through public health insurance contributions, providing residents with access to essential medical care. Healthcare professionals in the Czech Republic, including doctors, nurses, and specialists, face challenges typical of many European healthcare systems, such as increasing demands due to aging populations and the need for modernization of facilities and technologies within the healthcare system. Shortage of staff can lead to increased workloads, longer hours, and heightened stress levels among employees. Demanding conditions and high-pressure environments contribute to various psychosocial risks, including burnout. The concept of burnout syndrome was first used by Herbert J. Freudenberg in 1974, when he observed a loss of motivation and a decreased readiness to meet work commitments and stay on the job among volunteers in a psychiatric clinic. Christine Maslach, who developed the famous Maslach Burnout Inventory (MBI), describes the problem as a "prolonged response to chronic interpersonal stressors on the job. The three key dimensions of this response are overwhelming exhaustion; feelings of cynicism and detachment from the job; and a sense of ineffectiveness and failure"(Maslach, 1998). Maslach suggests that burnout can negatively affect personal and social functioning. While some individuals may quit their job due to burnout, others may continue working but with reduced productivity (Maslach, 1998). These reductions in work quality and physical and mental health may be costly, not only to the individual but also to the team and the organization (Koren et al., 2023).

Maslach and Leiter (2016) describe the cause of burnout syndrome as a long-term mismatch between an individual and at least one of the six dimensions of the work process which they identify as workload, control, reward, community, fairness, and values. Work-overload can contribute to burnout by depleting an individual's ability to meet job demands, particularly when it is prolonged and there are no opportunities for rest, recovery, and rebalancing. Lack of control over the work process can reduce motivation, performance and lead to stress and burnout. A lack of financial, institutional, or social rewards can be interpreted as a reduced self-efficacy and inferior performance, leading to frustration, a reduced self-concept, decreased work motivation, and an increased susceptibility to burnout. Lack of support and trust in social relationships, as well as unresolved conflicts, can increase the risk of burnout. Reactions to lack of recognition and perceived unfairness, such as anger, cynicism, and hostility, can limit the individual's ability to perform their job and lead to burnout (Maslach and Leiter, 2016; Dall'Ora et al., 2020; Taranu et al., 2022; Luna et al., 2023).

Conflict between individual and organizational values can often force employees to act in ways that are inconsistent with their roles or qualifications, leading to burnout (Moss, 2021; Rotenstein et al., 2023). Burnout's depletion of mental or physical energy is associated with prolonged job stress and an individual's inability to choose effective coping strategies (Edward and Hercelinskyj, 2007). Burnout is a major problem, commonly associated with helping professions, especially in healthcare (Hellesøy et al., 2000) but it may also occur in many other sectors (Scanlan and Still, 2013; Makara-Studzińska et al., 2021).

A meta-analysis by Rotenstein et al. (2018) analyzed various studies on burnout syndrome in physicians between 1991 and 2018, which included over 109,000 physicians from 45 countries. The findings confirmed a significant association between burnout syndrome higher rates of medical errors and reduced physician work performance, which led to lower patient satisfaction with physician attitudes and prolonged patient recovery (Shanafelt et al., 2016; Rotenstein et al., 2018). In the meta-analysis of various studies conducted by Molina-Praena et al. (2018), shift work, multiple jobs, lack of recognition and appreciation for work well done, and length of experience were identified as factors contributing to burnout syndrome among nurses. Higher levels of job satisfaction and fulfilment among nurses have been associated to two factors: feeling that their work has a positive impact on patients and having enough time to devote to their work (Molina-Praena et al., 2018). Excessive administrative workload reduces nurses' time with patients and can increase the risk of development of burnout syndrome.

1.1 The prevalence of burnout among healthcare professionals

Burnout syndrome has been reported to have increased more among healthcare professionals than in any other profession Healthcare workers not only face physical demands and pressures related to patient care, but they are constantly exposed to emotional challenges associated with illness, human suffering, death, and daily stressful situations heightened by major events such as the pandemic, wars etc. (Bridgeman et al., 2018; Ghahramani et al., 2021; Macaron et al., 2023).

Discrepancies between assessments of the prevalence of burnout can be explained by several conceptual, methodological, socio-demographic, occupational and other factors. Back in 2007 Embriaco et al. (2007) revealed an alarming rate of severe burnout syndrome among healthcare workers. According to the study, approximately 50% of physicians and one-third of critical care nurses suffer from burnout. Shanafelt et al. (2012) revealed that 45.8% of 7,288 U.S. physicians had at least one burnout symptom. Besides the overall score, researchers also examined the prevalence of specific burnout components. More recently a cross profession review covering 182 studies from 45 countries indicated significant differences in the estimates of burnout syndrome between general practitioners and nurses (Rotenstein et al., 2018). For instance, the prevalence rates in U.S. ranged from 9.8–45%, 12.1–69% in China, 7.3% in Spain while studies conducted in U.K. reported a 19.8% prevalence rate.

In relation to single profession the trend continues with finding that 11.23% of nurses worldwide experienced burnout symptoms, based on findings of 113 studies in a systematic review and 61 studies in a meta-analysis (Woo et al., 2020). For instance, in a meta-analysis of studies of medical nurses conducted by Molina-Praena et al. (2018), 31% suffered from emotional exhaustion (EE), 24% from depersonalization (DP), and 38% from low personal achievement. In the United Kingdom, physicians scored from 31 to 54.3% for emotional exhaustion, from 17.4 to 44.5% for depersonalization, and from 6 to 39.6% for low personal accomplishment (Imo, 2017). A recent Greek study by Konstantinou et al. (2018) had similar findings, reporting 53.8% of mental health nurses experiencing high levels of emotional exhaustion (EE), 24.4% high levels of depersonalization (DP) and 25.6% high levels of personal accomplishment (PA). A survey of healthcare workers in Czech and Slovak university hospitals

conducted between 2021 and 2022 revealed that emotional exhaustion (EE) was found in 53.2% of respondents; depersonalization (DP) in 33% of them, and low personal accomplishment (PA) in 47.8% of them (Štěpánek et al., 2023).

However, it is not only qualified professionals that are at risk of burnout, stress, and emotional exhaustion, with studies identifying significant levels of these states in students (Morales-Rodríguez et al., 2019; Valero-Chillerón et al., 2019; Potter and Cadizet, 2021). Jezzini-Martinez et al. (2023) conducted a study at a medical school in Mexico which found a high prevalence of burnout syndrome even among medical students. According to the study, 54.2% of students had symptoms of burnout, including high levels of emotional exhaustion (79.6%), cynical feelings (57.3%) and low academic effectiveness (36.4%).

1.2 Burnout relation to mental-health and well-being

While there exists a certain degree of variability in research findings regarding the prevalence rates of burnout among physicians and nurses, there is a consensus within the scientific community that this phenomenon is escalating and exerting substantial repercussions on the physical and mental well-being of individuals in healthcare professions. Notably, burnout syndrome frequently coexists with post-traumatic stress disorder (PTSD), anxiety, depersonalization, heightened emotional exhaustion, reduced subjective well-being, and other psychopathological conditions. A study by Colville et al. (2017) revealed that 13% of participants exhibited clinically significant posttraumatic stress symptoms, emphasizing a correlation between burnout and various stress-related indicators, particularly anxiety.

Studies related to the stress of healthcare environments for professions have shown that physicians and nurses consistently face excessive pressure from work overload and responsibility for the health and lives of others, causing chronic stress (Rotenstein et al., 2018). Extensive evidence supports the notion that stress and burnout can be linked to elevated levels of anxiety, depression, and a general decline in well-being across multiple professional domains, encompassing both the broader workforce and healthcare professions. A study involving 645 U.S. general surgery residents conducted by Smeds et al. (2020) uncovered associations between perceived stress, burnout, and depression. Furthermore, observations by Hou et al. (2022) during the COVID-19 pandemic highlighted that work-related stress predicted heightened anxiety levels among 798 Chinese medical workers.

The long-term ramifications of chronic stress and burnout extend beyond immediate consequences, involving the depletion of physical, emotional, and psychological energy resources. Such depletion sets off a cascade of losses that may extend to other dimensions, including a decline in feelings of self-efficacy and the adoption of maladaptive coping strategies (Maddock, 2024). Consequently, it is reasonable to assert that chronic stress and burnout contribute significantly to adverse mental health effects, including anxiety, depression, and overall diminished well-being, thereby impacting various facets of an individual's life (Hakanen and Schaufeli, 2012). Hobfoll's resource theory explains this relationship. According to this theory, individuals have limited personal and environmental resources (like physical, psychological, and social resources) to manage stress and challenges. Chronic stress and burnout deplete these resources, making individuals more susceptible to mental health issues.

In healthcare, professionals face high demands such as long hours, heavy patient loads, and emotional strain, leading to chronic stress and burnout. Coping with these demands depletes personal and environmental resources, resulting in emotional exhaustion, depersonalization, and reduced personal accomplishment—common signs of burnout (Hobfoll, 1989). This underscores the enduring spill-over effects of burnout on depression, emphasizing the importance of supportive interventions within the work environment of healthcare professionals. The novelty of this article lies in its investigation of stress, burnout, and mental well-being specifically among healthcare workers in the Czech Republic, providing new insights into the prevalence and impact of these factors in this context. Focusing on specific occupational groups within healthcare, such as nurses, physicians, and midwives, is quite common in research on stress and burnout. However, it seems that there's a gap in the Czech Republic regarding studies that look at healthcare professionals as a whole, rather than individually. This broader perspective could provide valuable insights into systemic issues affecting the entire healthcare workforce and might lead to more comprehensive interventions and support mechanisms.

The aim of this study is to provide a greater understanding of the potential relationships between stress, burnout (emotion exhaustion, depersonalization, and personal accomplishment), mental state and well-being in healthcare workers. To achieve this aim, this study has two objectives:

1. To identify the rates of stress, burnout, mental state, and well-being of healthcare workers from a sample of healthcare workers in the Czech Republic.
2. To examine the relationships between stress, burnout (emotion exhaustion, depersonalization, and personal accomplishment), mental state and well-being in a group of healthcare workers in the Czech Republic.

The following Research Question was formulated: What is the effect of stress and burnout on the psychological well-being and mental state of healthcare workers?

2 Methods

2.1 Participants and procedure

The present study is a cross-sectional survey of healthcare employees in the Czech Republic. Data was collected electronically using Google forms, which met the methodological and research criteria of online research relevance (i.e., high degree of security, archiving and encoding during data transfer, access via generated password). The link to the survey, was distributed via email to healthcare institutions in all regions of the Czech Republic, in both public and private sectors. This direct approach to health care organizations was used to mitigate against false, imposter and, or 'bot' generated submissions. Data collection took place between September 2023 and November 2023. A total of 1,064 healthcare workers

TABLE 1 Characteristic of research sample.

Characteristic of research sample		No. (%) (n = 1,064)
Sex		
	Male	251 (23.59)
	Female	813 (76.41)
Education level – no. (%)		
	Secondary vocational edu w/o exam	13 (1.22)
	Secondary education w/exam	183 (17.2)
	Higher specialized education	49 (4.61)
	College undergraduate degree – BS, BA.	122 (11.47)
	College graduate degree – Master's degree.	404 (37.97)
	College postgraduate degree – PhD degree	293 (27.54)
Job position – no. (%)		
	Physician	457 (42.95)
	Non-medical healthcare worker	585 (54.98)
	Other	22 (2.07)
Sector – no. (%)		
	State	447 (42.01)
	Private	617 (57.99)
Work schedule		
	A dayshift	722 (67.86)
	2-shift regimen	245 (23.03)
	3-shift regimen	97 (9.12)
Lead worker		
	Yes	550 (51.69)
	No	514 (48.31)
Characteristic		**Mean±SD**
Age – yr		46.58 ± 11.97
Length of employment – yr		21.94 ± 11.43
Length of employment at current workplace – yr		13.01 ± 10.32

participated in the study working in various healthcare settings. The characteristics of the participants are shown in Table 1.

2.2 Ethical consideration

All participants were assured of the confidentiality of their answers and signed an online informed consent form prior to undertaking the questionnaire. No specific information enabling the identification of specific respondents was obtained as part of the online data collection. The Research Ethics Committee of Health Sciences, Palacký University Olomouc (UPOL-18671/FZV2023) granted ethical approval for this study. The inclusion criteria for this study were: being a healthcare worker in the Czech Republic working in the private or public sector with a minimum of 1-year length of practice. All participants received detailed written information about what participation in the study would entail, and were provided with several opportunities to ask questions before they provided written consent.

2.3 Measures

The participants were asked to provide demographic information and to fill in self-report measures. The reliabilities of each self-report measure were calculated based on the responses given by the participants.

The Perceived Stress Scale (PSS: Cohen et al., 1983): The PSS is a ten-item, five-point Likert scale (0 = never; 4 = very often), measure of perceived stress, which is widely used in the research literature on stress (Cohen et al., 1983). Some sample items related about data collection instrument are the following: "*In the last month, how often have you been upset because of something that happened unexpectedly*?"; "*In the last month, how often have you felt nervous and "stressed*"? Higher perceived stress is indicated by higher scores. The reliability of the PSS in this study was deemed acceptable (Cronbach's α = 0.87).

The Maslach Burnout Inventory (MBI: Maslach et al., 1997): The MBI is the most widely used occupational burnout measure. It is a

valid and reliable measure, with its discriminant and convergent validity confirmed with a range of populations (Maslach et al., 1996). The MBI has 22 items, each scored on a seven-point Likert scale (0 = never; 6 = everyday) and contains three subscales measuring emotional exhaustion (MBI-EE), depersonalization/loss of empathy (MBI-DP) and personal accomplishment (MBI-PA). The examples of the sample items for each subscale are the following: "*I feel emotionally drained by my work*" (MBI-EE); "*I really do not care about what happens to some of my patients/clients*" (MBI-DP); "*I feel full of energy*" (MBI-PA). The Cronbach's alphas for emotional exhaustion, depersonalization and personal accomplishment in this study were 0.92, 0.74, and 0.75, respectively.

The SUPSO-7 test is used to measure changes in the current psychological state depending on influencing situational variables. It allows for the understanding and interpretation of the relationships between internal and external manifestations of an individual, classifying situational variables from the perspective of optimal (stimulating psychological development) and suboptimal (leading to maladaptive manifestations or psychological distress). The method enables the assessment of the usual, long-term, and updated psychological state resulting from the influence of various situational factors. The SUPSO-7 test consists of 7 subscales specifically designed to measure participants both mental state and psychological well-being. The psychological well-being is measured by the scale P (well-being). SUPSO-7 is the result of a factor analysis of operationally defined and pragmatically designed scales comprising 28 adjectives (Mikšík, 2005). The test covers the following subscales: D (depression), U (anxiety), S (sadness), O (impulsivity), A (activity), N (mental restlessness), and P (well-being). The participant on a 4-point scale has to indicate his usual experiences and states. The examples of the sample items are the following: Depression (*pessimistic*); Anxiety (*tense*); Well-being (*content*); Activity (*energetic*); Impulsivity (*explosive*); mental restlessness (*impatient*); Sadness (*unhappy*). The Cronbach's alpha coefficient is $\alpha = 0.86$ for the 28 items.

Sociodemographic questionnaire is focused on sociodemographic data such as age, gender, length of employment, length of employment at current workplace, job position, work schedule, sector of employment, the highest completed level of education, place of work (region, size of the municipality).

2.4 Data processing and evaluation

In the first stage, the data were transformed into an xlsx format compatible with MS Excel 2013, which can easily process data exported from the electronic questionnaire. The research study was designed as a quantitative survey. Data collection was performed electronically using Google Forms, which met the methodological and

research criteria of online research relevance. During the second stage, the data were formally and logically inspected. No missing values were detected. Data integrity was ensured during the data collection, which did not allow any missing data. For the scales of the SUPSO-7 questionnaire, gender-specific weighted scores were first calculated according to the method manual. Further data processing was performed using the STATISTICA program, version 13.

An analysis of results distribution confirmed normal data distribution; for this reason, a parametric statistical approach was selected. Correlation and regression analyses were performed rather than structural equation modelling due to: (1) the aims of the study and (2) the fact that this study is somewhat exploratory in nature, as the potential predictors and outcomes being tested were generated from a review of the literature, rather than from a theoretical framework. We screened the data for missing values and potential outliers, employing the interquartile rule as described by Hoaglin et al. (1986), utilizing whisker plots for visualization. No outliers were found. Separate correlation and then multiple regression analyses were conducted using perceived stress, emotional exhaustion, depersonalization and personal accomplishment as predictor variables and the variables of the SUPSO questionnaire as outcomes. All regression assumptions were met. The scatterplot diagrams showed that there were linear relationships between each predictor variable and the outcome. We used the Durbin–Watson statistic to check if the residuals were independent. A value of around two on the Durbin–Watson scale (which ranges from zero to four) suggests that there is little to no correlation among residuals (Durbin and Watson, 1992). There was independence of residuals, as demonstrated by a Durbin–Watson statistic of 1, 92 for the regression on P (well-being), 1.98 for the regression on A (activity), 2.00 for the regression on O (impulsivity), 2.07 for the regression on N (mental restlessness), 1.98 for the regression on U (anxiety), 1.93 for the regression on D (depression) and 1.98 for the regression on S (sadness). We visually examined the plot of standardized residuals against standardized predicted values to evaluate homoscedasticity. Additionally, a normal probability plot indicated that these residuals followed a normal distribution. Compliance with the conditions for the use of regression analysis was verified prior to data analysis. The tests were conducted at 5% level of significance.

3 Results

The first part presents basic findings concerning the numbers and proportions of burnout among healthcare workers. Table 2 presents the proportions of the 3 subscales of the MBI questionnaire. The proportion of healthcare workers reporting low-level emotional exhaustion was 235 30.55% with 23.21% reporting moderate levels of emotional exhaustion and 46.24% reporting high levels of

TABLE 2 The proportions of burnout and stress among healthcare workers.

	Emotional Exhaustion no. (%)	Depersonalisation no. (%)	Personal Accomplishment no. (%)	Stress no. (%)
Low	235 (30.55)	479 (45.02)	257 (24.15)	390 (36.65)
Moderate	247 (23.21)	313 (29.42)	360 (33.83)	555 (52.16)
High	492 (46.24)	272 (25.56)	447 (42.01)	119 (11.18)

TABLE 3 Means, standard deviation and Pearson correlations of total scales ($n = 1,064$).

	M	SD	Emotional Exhaustion	Depersonalization	Personal accomplishment	Stress
A-Active	6.22	2.37	−0.46**	−0.29**	0.52**	−0.40**
O-Impulsivity	2.73	2.28	0.34**	0.42**	−0.34**	0.37**
N-Mental restless	3.65	2.29	0.57**	0.46**	−0.39**	0.54**
D-Depression	3.89	2.46	0.76**	0.46**	−0.41**	0.59**
U-Anxiety	3.76	2.64	0.59**	0.36**	−0.37**	0.63**
S-Sadness	3.59	2.16	0.60**	0.40**	−0.43**	0.61**
P-Mental well-being	7.11	2.16	−0.65**	−0.43**	0.58**	−0.59**

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

emotional exhaustion. The proportion of healthcare workers reporting low-level depersonalization was 45.02% per cent, with 29.42% reporting moderate levels of depersonalization and 25.56% reporting high levels of depersonalization. The proportion of healthcare workers reporting low-level personal accomplishment was 24.15%, with 33.83% reporting moderate levels of personal accomplishment and 42.01% reporting high levels of personal accomplishment. The proportion of healthcare workers reporting low-level of perceived stress was 37%, moderate level 52% while 11% reported high-level stress.

From Table 3, it is evident that high scores in the Perceived stress scale measure along with the scales of emotional exhaustion and depersonalization are most likely contributing to increased feelings of sadness, anxiety, and depression among the targeted employees, as well as an overall decline in mental well-being and activity. The first scale, emotional exhaustion, shows significantly higher values in the mid-range correlation of the SUPSO questionnaire, particularly in relation to depression ($r = 0.76$), sadness ($r = 0.60$), and anxiety ($r = 0.59$). The deterioration of mental well-being associated with emotional exhaustion is also confirmed by negative correlation values on the mental well-being scale ($r = −0.65$) and activity ($r = −0.46$).

The second scale of the MBI, depersonalization, also exhibits significantly higher values in the mid-range correlation of the SUPSO questionnaire, particularly in relation to depression ($r = 0.46$), mental restlessness ($r = 0.46$), and sadness ($r = 0.40$). The decline in mental well-being associated with this factor of burnout is further confirmed by negative correlation values on the mental well-being scale ($r = −0.43$) and activity ($r = −0.29$).

The third scale of the MBI, personal accomplishment, appears to be a protective factor against depression and in favor of positive mental well-being. It also exhibits significantly higher values in the mid-range correlation of the SUPSO questionnaire, particularly in relation to depression ($r = −0.41$), mental restless ($r = −0.39$), anxiety ($r = −0.37$), and sadness ($r = −0.43$). The increase in mental well-being associated with this factor of burnout is further confirmed by positive correlation values on the mental well-being scale ($r = 0.58$) and activity ($r = 0.52$).

The perceived stress scale PSS shows significantly higher values in the mid-range correlation of the SUPSO questionnaire, particularly in relation to depression ($r = 0.59$), sadness ($r = 0.61$), and anxiety ($r = 0.63$). The deterioration of mental well-being associated with perceived stress is also confirmed by negative correlation values on the mental well-being scale ($r = −0.59$) and activity ($r = −0.40$).

Other results relate to answering the research question. Primarily, this study investigated whether stress and burnout affect well-being and mental state of the healthcare employees.

The results of the regression analysis for the dependent variables "D (depression)," "U (anxiety)," "S (sadness)," "O (impulsivity)," "A (activity)," "N (mental restlessness)," and "P (well-being)" indicate high statistical significance and strong explanatory power of the models. The models explain variability in the dependent variables ranging from 24 to 63%, as measured by the coefficients of determination (R2). The results showed that in the context of the possible influence of stress and burnout on mental state, the effect of emotional exhaustion, depersonalization, personal accomplishment, and perceived stress can be observed (Table 4). Emotional exhaustion had the strongest effect on depression (explaining 63% of its variance, $p < 0.001$), followed by the effect on sadness (48% of its explained variance, $p < 0.001$), anxiety (explaining 43% of its variance, $p < 0.001$). Depersonalization had the strongest effect on impulsivity (explaining 24% of its variance, $p < 0.001$). Personal accomplishment had the strongest effect on mental well-being (explaining 57% of its variance, $p < 0.001$) and activity (explaining 35% of its variance, $p < 0.001$). Perceived stress had the strongest effect on sadness (explaining 48% of its variance, $p < 0.001$).

4 Discussion

The objective of this study was to examine the prevalence of burnout syndrome among healthcare professionals in the Czech Republic and to explore the association between stress, different dimensions of burnout and employees' psychological well-being. The concept of burnout, introduced by Freudenberg in 1974 and further developed by Maslach, is clearly reflected in the reported dimensions of overwhelming exhaustion, cynicism, detachment, and a sense of ineffectiveness (Maslach, 1998). The interpretations of the findings align with the core dimensions of the Maslach Burnout Inventory (MBI), emphasizing emotional exhaustion, depersonalization, and reduced personal accomplishment. The study found that 30.55% healthcare workers reported low-level of emotional exhaustion, 23.21% reported moderate levels of emotional exhaustion and 46.24% reported high levels of emotional exhaustion. 45.02% of healthcare workers reported low-level of depersonalization, 29.42% reported moderate levels of depersonalization and 25.56% reported high levels of depersonalization. The proportion of healthcare workers who reported low-level of personal accomplishment was 24.15%, with

TABLE 4 Linear regression of different psychological states (DV) as a function of different forms of burnout and stress (predictors).

DV/Predictors	F (df)	P	Adj. R^2	β	t	P
Depression (D)	450.76 (4,1059)	$p < 0.01$	0.62			
EE				0.553	21.414	0.000
DP				0.044	1.937	0.052
PA				−0.076	−3.510	0.000
PSS				0.251	10.370	0.000
Anxiety (U)	208.68 (4,1059)	$p < 0.01$	0.43			
EE				0.339	10.679	0.000
DP				0.029	1.037	0.299
PA				−0.091	−3.448	0.000
PSS				0.333	11.182	0.000
Sadness (S)	247.34 (4,1059)	$p < 0.01$	0.48			
EE				0.312	10.230	0.000
DP				0.053	1.985	0.047
PA				−0.144	−5.623	0.000
PSS				0.344	12.034	0.000
Mental restless (N)	196.93 (4,1059)	$p < 0.01$	0.42			
EE				0.278	8.645	0.000
DP				0.176	6.212	0.000
PA				−0.094	−3.508	0.000
PSS				0.274	9.083	0.000
Impulsivity (O)	85.84 (4,1059)	$p < 0.01$	0.24			
EE				0.010	0.272	0.785
DP				0.285	8.732	0.00
PA				−0.123	−3.996	0.00
PSS				0.216	6.242	0.00
Active (A)	147.08 (4,1059)	$p < 0.01$	0.35			
EE				−0.29	−8.622	0.000
DP				0.06	2.090	0.036
PA				0.40	14.026	0.000
PSS				−0.07	−2.482	0.013
Mental well-being (P)	359.71 (4,1059)	$p < 0.01$	0.57			
EE				−0.388	−14.024	0.000
DP				−0.005	−0.235	0.813
PA				0.342	14.748	0.000
PSS				−0.210	−8.108	0.000

EE, emotional exhaustion; DP, depersonalization; PA, personal accomplishment; PSS, perceived stress scale.

33.83% reporting moderate levels of personal accomplishment and 42.01% reporting high levels. The results also revealed that 37% of healthcare workers reported low-level of perceived stress, moderate level 52% while 11% reported high-level stress. Our findings align with those of various studies (Imo, 2017; Molina-Praena et al., 2018). Similarly, a recent study in Greece by Konstantinou et al. (2018) reported comparable findings. They found that 53.8% of mental health nurses experienced high levels of emotional exhaustion (EE), 24.4% dealt with high levels of depersonalization (DP), and 25.6% struggled with high levels of personal accomplishment (PA). The prevalence rates, as indicated by the responses of healthcare workers, underscore the pervasive nature of burnout in this specific context. The reported rates of emotional exhaustion among healthcare professionals point to the taxing nature of their work, often involving intense emotional labor and exposure to distressing situations (Gray, 2009; Qiu et al.,

2023). The sense of depersonalization reflects a detachment from their roles, possibly as a coping mechanism in response to the challenging interpersonal aspects of healthcare work (Wang et al., 2020). Additionally, the diminished sense of personal accomplishment raises concerns about overall job satisfaction and fulfilment among healthcare professionals in the Czech Republic (Vňuková et al., 2023). In the context of Maslach and Leiter's (2016) six dimensions of the work process, the interpretations suggest a potential misalignment between healthcare professionals and critical aspects such as workload, control, reward, community, fairness, and values. The demanding workload, coupled with a lack of adequate support and recognition, may contribute to the reported burnout levels. The study's interpretations underscore the urgent need to address these dimensions systematically to create a work environment conducive to the well-being of healthcare professionals.

The other goal of the study is to investigate potential associations and effect between stress, different dimensions of burnout syndrome and the mental well-being of the individuals affected. The findings suggest that emotional exhaustion is a widespread risk factor for developing feelings of anxiety, depression, and mental well-being issues in healthcare workers. Moreover, perceived stress seems to contribute to anxiety and depression, while personal accomplishment appears to protect against depression and supports positive mental well-being. The findings of this study suggest that emotional exhaustion, depersonalization, and personal accomplishment have significant implications for the anxiety, depression, and overall psychological well-being of healthcare workers. There is abundant evidence suggesting a strong connection between stress, burnout, and increased levels of anxiety, depression, and overall decline in well-being across various professional sectors, including both the general workforce and healthcare fields (Çelmeçe and Menekay, 2020; Maddock, 2024). For example, a study conducted by Smeds et al. (2020) involving 645 US general surgery residents revealed correlations between perceived stress, burnout, and depression. Additionally, observations made by Hou et al. (2022) during the COVID-19 pandemic emphasized that work-related stress was a predictor of elevated anxiety levels among 798 Chinese medical workers. Another study involving 386 Korean nurses (Choi et al., 2018) revealed a correlation between emotional exhaustion and both anxiety and depression. Similarly, Koutsimani et al. (2019), in a systematic review and meta-analysis of 101 studies, discovered a significant link between emotional exhaustion and anxiety as well as depression. Additionally, personal accomplishment was found to be correlated with the subjective and psychological well-being of 274 German hospital physicians (Huber et al., 2020), as well as the psychological well-being of 216 US healthcare employees (Shuck and Reio, 2014). These findings shed light on the growing problem of burnout among healthcare professionals in the Czech Republic.

The implications of this study extend beyond the individual experiences of healthcare professionals to broader consequences for the healthcare system and the well-being of patients. The high prevalence of burnout among healthcare workers carries significant ramifications for the quality of patient care, and patient safety as burnout has been linked to medical errors and reduced patient satisfaction (Rotenstein et al., 2018). The findings underscore the urgency of implementing targeted interventions to mitigate burnout and enhance well-being of healthcare professionals. Organizational strategies aimed at managing workload, providing adequate support, and recognizing the contributions of healthcare workers are crucial. The study's implications align with Maslach and Leiter's (2016) emphasis on addressing the root causes of burnout by fostering a positive work environment. At the systemic level, the study's results matter for healthcare policymakers and administrators. Burnout can lead to workforce shortages, reduced productivity, and increased healthcare costs (Rotenstein et al., 2018). Therefore, investing in interventions to prevent and alleviate burnout is not only a matter of prioritizing the well-being of healthcare professionals but also a strategic imperative for the overall functioning of the healthcare system in the Czech Republic. Interventions are needed at multiple levels- not only a focus on the individual as this can implicitly seem like 'victim blaming' as the individualization almost seems to suggest it is their problem for not being resilient or knowing how to deal with things- therefore interventions also need to be at organizational, ward or team levels. The implications also extend to the societal level, as burnout among healthcare professionals can have cascading effects on public health. A workforce experiencing burnout may be less resilient in the face of health crises, potentially compromising the overall health and well-being of the population. Thus, the study's results emphasize the broader societal implications of addressing burnout in the healthcare sector.

5 Limitations

While the study provides valuable insights, it is crucial to acknowledge its limitations to avoid overgeneralization and misinterpretation of the findings. In opting to categorize all healthcare professionals together as a unified group in our study, we acknowledge the potential variations in organizational structures, work cultures, and professional autonomy across different healthcare systems. While our focus solely on health workers simplifies data collection and analysis, it's essential to recognize that nuances in job roles and responsibilities could influence our findings. For instance, in the Czech healthcare system, where individuals may be expected to function as independent clinicians rather than solely following protocols, our results may bear unique implications. This approach allows for a more streamlined examination of broader trends and patterns within the healthcare workforce, facilitating a deeper understanding of professional dynamics and informing targeted interventions to enhance overall quality of care. The cross-sectional nature of the research design is a significant limitation, preventing the establishment of causal relationships. The reported burnout rates offer a snapshot, but the temporal dynamics and causation remain unclear. Future research employing longitudinal designs would be instrumental in unravelling the complex trajectories of burnout among healthcare professionals in the Czech Republic. The reliance on self-report measures introduces the possibility of response bias. Healthcare professionals may provide responses influenced by social desirability or may not accurately represent their experiences. Combining self-report measures with more objective indicators or employing a mixed-methods approach could enhance the validity of findings. This approach allows for triangulation of data from multiple sources, thereby reducing the impact of response bias and increasing the reliability of the study's conclusions. The study's focus on healthcare professionals in the Czech Republic may limit the generalizability of the findings to other cultural and organizational contexts. Cultural variations in work-related attitudes and behaviors should be considered in future research to understand how burnout manifests in different settings. Comparative studies across cultures could provide valuable insights into the cultural nuances influencing burnout among healthcare professionals. Moreover, the study primarily utilizes quantitative data, providing prevalence rates for burnout dimensions. While this offers a quantitative understanding, it may not capture the nuanced qualitative aspects of healthcare professionals' experiences. Future research could explore the qualitative dimensions of burnout, employing methods such as interviews or focus group discussions to gain a deeper understanding of the contextual factors contributing to burnout as well as the effect of stress, burnout on the individuals' wellbeing.

6 Conclusion

Building on the study's contributions, recommendations for further research encompass several dimensions. Longitudinal studies are imperative to track the evolution of burnout among healthcare

professionals over time. Understanding the antecedents and consequences of burnout longitudinally can provide a more nuanced understanding of the factors contributing to its development and persistence. Connecting with the global literature on burnout, future research could explore the effectiveness of organizational-level interventions in mitigating burnout among healthcare professionals in the Czech Republic. Strategies such as workload management, mentorship programs, and organizational support structures should be investigated to determine their impact on reducing burnout and enhancing overall well-being. By empirically evaluating the effectiveness of these interventions within the Czech healthcare context, researchers can provide valuable insights into strategies that best promote resilience and mitigate burnout among healthcare professionals. A cultural perspective should be integrated into future research to explore the unique cultural factors influencing burnout among healthcare professionals in the Czech Republic. Considering the potential impact of cultural dimensions on work-related attitudes and behaviors, cross-cultural studies could shed light on the cultural nuances contributing to burnout in this specific context. Moreover, the study highlights the need for a more comprehensive understanding of the qualitative aspects of burnout. Future research could employ mixed methods approaches, combining quantitative data with qualitative insights from healthcare professionals. In-depth interviews or focus group discussions could provide a richer understanding of the contextual factors and experiences that contribute to burnout. In conclusion, this study significantly contributes to the understanding of burnout among healthcare professionals in the Czech Republic, emphasizing the prevalence rates and implications for mental health. The interpretations align with established theories of burnout, and the implications underscore the urgency for targeted interventions. However, the study's limitations necessitate future research endeavors, including longitudinal studies, cross-cultural investigations, and a deeper exploration of qualitative dimensions, to advance our understanding of burnout in this specific context and inform effective interventions for healthcare professionals.

Data availability statement

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

Ethics statement

Author contributions

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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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Symptomatology of posttraumatic stress and burnout associated with aggressions suffered by primary care health professionals. A transversal study

Santiago Gascon-Santos[1,2]*, Bárbara Oliván-Blázquez[1,3], Maria José Chambel[4], Lucía Sebastián[5], Adrián Alacreu-Crespo[1,2], Yago Pérez-Montesinos[2,5], Pilar Paúl[6] and Ricardo Fueyo-Díaz[1,2]

[1]Department of Psychology and Sociology, University of Zaragoza, Zaragoza, Spain, [2]Research Team PROSAM Aragon Government, Zaragoza, Spain, [3]Aragon Health Service, Institute for Health Research (IIS Aragon), Zaragoza, Aragon, Spain, [4]Department of Social Psychology, University of Lisbon, Lisbon, Portugal, [5]Department of Psychology and Sociologý, University of Zaragoza, Zaragoza, Spain, [6]Hospital Universitario Miguel Servet, Zaragoza, Spain

Objective: To know the incidence of aggressions in Primary Care, and to determine the psychological symptoms that may accompany these experiences. A transversal study was carried out in North-Eastern Spain, in 2022.

Methods: 207 participants (60.9% women, mean age 48.8 years), primary care professionals (nurses and doctors), responded to Questionnaire of Sociodemographic and Occupational variables, List of Aggressions, General Health Questionnaire, Posttraumatic Stress Disorder Checklist, and Maslach Burnout Inventory.

Results: 57.49% had suffered aggressions in the last year (44.4% threats, 55.1% insults and 18.4% physical aggressions). They showed more psychological symptoms than those who had not been assaulted: re-experiencing, avoidance, distancing, emotional or cognitive disturbances and hypervigilance, as well as to emotional exhaustion, depersonalization and low personal realization. Although no statistically significant differences were found in terms of the number of victims with respect to gender, men showed more symptoms of trauma.

Conclusion: The data show the increase of violent episodes in Primary Care. Although the attacks perpetrated in this sector do not usually present the magnitude required for the diagnosis of post-traumatic stress, many of its symptoms were manifested in those who had suffered violence. Likewise, a relationship was found between aggression and burnout. The need to have post-incident protocols is evident, raising awareness among professionals about the importance of reporting episodes, as well as designing and implementing prevention plans. The damage generated by these behaviors does not only affect nurses and doctors, but, indirectly, all users of the health system.

KEYWORDS

aggressions, primary care, Posttraumatic Stress Disorder, burnout, psychological damage

1 Introduction

Violence is a phenomenon present in numerous interpersonal actions, including the work environment. The International Labour Organization defines workplace violence as "any action, incident or behavior by which a person is assaulted, threatened or humiliated in the course of or as a consequence of his or her work" (Di Martino, 2003). The Health Division of Safety Research (1996) distinguishes between different types of workplace violence based on the relationship between aggressors and victims and classifies as type I when the aggressor is not related to work; type II when the aggressor is the recipient of a service (students, patients, clients, etc.) and type III when the aggressor and victim have a work relationship (boss, co-worker).

Research has focused on episodes of physical aggression, as it is believed that its consequences for health could be the most serious. In recent decades, more and more attention has been paid to verbal violence, differentiating between insults and threats (Rudkjoebing et al., 2020). Winstanley and Whittington (2004) cataloged these incidents in order to avoid confusion and define physical aggression as the use of force against another person, producing physical, sexual or psychological harm (punching, slapping, pushing, even the use of weapons), distinguishing it from threatening behavior–which involves a declaration of intent to cause harm, provoking fear in the target–and from verbal abuse (insults, teasing, etc.) as an action that humiliates or implies lack of respect for dignity.

The professions most affected by interpersonal violence are those in the service sector. Police officers, security guards or healthcare professionals are the main victims of aggression in the workplace (Menckel and Viitasara, 2002). As a result, this issue has become a matter of concern for international organizations, governments and professional associations. The World Health Organization has estimated that 25% of violence in the workplace corresponds to the healthcare sector, and that more than half of its professionals have suffered some episode of this type in the course of their work. These figures seem to be increasing according to recent studies (Mento et al., 2020).

Previous research concluded that assaults were more frequent and severe in large hospitals–specifically in emergency and psychiatric departments–while much lower numbers of incidents were significantly reported in smaller institutions and primary care centers (Gascón et al., 2009).

In recent decades, in different countries, there has been a healthcare collapse, especially in public primary care services, due to socio-economic reasons as well as to the emergency generated by the COVID-19 pandemic (Eurofound-ETF, 2022). It is reported that there is a greater burden of care and an increase in waiting times, which contributes to generate discomfort in professionals and patients, propitiating the conditions for violent episodes to occur (Moleras-Serra et al., 2023).

In Spain, incidences in this sector have increased to reach figures close to 50% of assaulted healthcare workers in the twelve months prior to self-reporting, and affecting up to 75% over the course of their professional life (Bernaldo-De-Quirós et al., 2005). These data come from research studies, as official figures are based exclusively on complaints–and these only reflect the most serious cases of physical attacks that have required medical attention and account for between 2 and 3.7%–while mild cases, threats and insults are rarely reported. Healthcare professionals may not report

for various reasons, either because they end up "normalizing" these behaviors, or because they do not feel supported by their organization (Spelten et al., 2020).

Despite its increasing incidence, studies on this phenomenon have been limited and it is only now that publications on the contribution to possible psychological harm in those who suffer from it are increasing (Chirico et al., 2022), which is considered a priority with a view to developing preventive programs (Lanctôt and Guay, 2014).

1.1 Objective

In view of the above, the objective was to determine the incidence of aggressions in primary care centers, considering all types of violence perpetrated by users, as well as to contrast the possible associated symptomatology in nurses and doctors who had suffered this type of episode with those who had not.

1.2 Theoretical framework

Abundant literature supports the relationships between stress and health. From the interactive theories of stress, great importance is attributed to chronic stress and daily events that involve discomfort, worry or discomfort, which are related to both physical health and anxiety and mood disorders (Lanctôt and Guay, 2014).

Beyond interactive theories, Post Traumatic Stress Disorder (PTSD) can manifest when the person has lived through or witnessed a shocking event, such as threat of death, violence or injury. The symptoms described (American Psychiatric Association, 2013) are re-experiencing, avoidance, cognitive or emotional disturbances, and arousal and hypervigilance. Although PTSD was initially studied in survivors of war and major catastrophes, in recent decades the spectrum has been broadened to experiences such as sexual abuse, family or workplace violence (Rudkjoebing et al., 2020). More specifically, several studies have found links between assaults on health professionals and PTSD-related symptomatology, such as anxiety, irritability, insomnia, or depression (Varghese et al., 2022).

On the other hand, in the relationship between work stress and health, we should pay attention to the burnout phenomenon, constituted by the factors of emotional exhaustion (EE), depersonalization (DP), and lack of realization by work (RP) (Maslach and Leiter, 2016). To understand the different genesis of this syndrome, Maslach and Leiter (2008) proposed a two process model of burnout, which states, in summary, that while work overload acts directly on the EE (producing professionals to experience fatigue due to excessive demands and lack of time to recover), a second process can occur, in which overload is not reflected in high levels of EE because other variables–such as control, rewards, feelings of community or justice–act as protectors, through a congruence between the values of the individual and the values of his or her organization; thus, a change in the negative direction of these values could trigger an acceleration of the burnout process.

In occupations that require a high degree of demands -such as nurses and doctors- it is common to observe not only exhaustion due to excessive workload, but also a loss of involvement and a

feeling of accomplishment for the work. Thus, in environments where aggressions are common, it has been found a decreased sense of control, a negative perception of rewards and, in the case of not finding support, absence of sense of community and justice, all of which erodes the possible congruence of values and commitment necessary to perform care tasks (Viotti et al., 2015).

Similarly, many studies have confirmed relationships between the permanent risk of experiencing violence, regardless of the form or intensity of the episodes, and dimensions of burnout (Gascón et al., 2013; Kind et al., 2018).

Finally, several authors note that physical aggressions do not have as serious consequences for the psychological health of the victims as might be expected, while a hostile climate with continuous insults and threatening behavior could have worse consequences, especially in terms of symptoms constituting PTSD, anxiety, depression, or negative indices in the dimensions of burnout (Kobayashi et al., 2020; Rudkjoebing et al., 2020). The association between physical violence and psychological symptomatology has sometimes yielded contradictory results, with some studies finding that verbal aggressions, insults and threats could have a greater impact on mental health than physical assaults themselves, while other research showed that physical aggressions are often accompanied by verbal violence and that both types showed a negative relationship with various symptoms of stress, anxiety and burnout (Bernaldo-De-Quirós et al., 2005; Kind et al., 2018).

The following hypotheses were established for this study:

> Hypothesis 1: Those who have suffered some kind of aggression will show a higher rate of psychological symptoms than those who have not suffered aggression.

> Hypothesis 2: Those who have been victims of non-physical aggression, such as insults and threats, will report a higher number of symptoms than those who have suffered physical violence.

2 Materials and methods

The study was carried out between September and December 2022 in the three provinces of N.E. Spain, where 1,988 healthcare professionals (doctors, nurses and other professionals) provide services. Given the observed phenomenon of underreporting, it was impossible to establish a priori two groups of professionals according to whether or not they had been victims of attacks. For this reason, the Department of Health of the Government was asked for advice in order to select a number of centers that would provide a representative sample. Subsequently, this department sent information and an invitation to participate to 836 professionals from 19 primary care centers (urban and rural). Based on previous data (Gascón et al., 2013), with a confidence level of 95%, a precision of 5% and considering that 11% of professionals have suffered physical aggression, the required sample size was 146 participants (to which 10% was added).

2.1 Participants

A total of 244 professionals showed their willingness to participate in the study. After applying the aforementioned criteria, 207 were considered for the study (participants in an active work situation, without sick leave). The inclusion criteria were: (a) being over 18 years of age, (b) not suffering from a mental disorder, (c) giving informed consent and (d) providing services in primary care. Lack of consent prevented access to the questionnaire and incomplete surveys were not included.

2.2 Variables and instruments

In addition to socio-demographic and work-related variables (gender, age, profession, position, seniority, family cohabitation), variables related to aggressions (number, types of violence, reporting, feeling of being supported by the organization), variables related to PTSD (re-experiencing, avoidance, cognitive or emotional disturbances, arousal and hypervigilance) and burnout symptoms (emotional exhaustion, depersonalization, lack of personal realization by work) were analyzed through the following questionnaires:

Sociodemographic and labor variables: Participants completed a demographic and labor data form with information on age, gender, family situation, profession, work shift, seniority and administrative situation.

List of assaults: Violence Type II -exercised by users, patients or companions-. Each item describes a type of aggression: physical, threats, threatening behavior and verbal abuse (Winstanley and Whittington, 2004) and is answered on a Likert scale from 0 (never), 1 (on one occasion) and 2 (on more than one occasion). The fact of having been attacked, or not having suffered aggression, was used as a dichotomous variable for contrast between groups. In relation to this, they answer if they have denounced or reported the episode and if they feel, or not, support from their management in cases of violence.

Psychological symptomatology: Evaluated by means of the General Health Questionnaire (GHQ-12), whose 12 items measure somatic symptomatology, depression, anxiety and insomnia and dysfunction in the social area. It is answered on a Likert-type scale, where 0 represents always and 3 never. The validated version for the Spanish population showed Cronbach's alpha indices between 0.74 and 0.81 (Sánchez-López and Dresch, 2008). In this study, the global measure was used as an index of possible symptomatology and obtained an alpha of 0.88.

Posttraumatic stress symptoms: Assessed using the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5, Weathers et al., 2013), composed of 20 items that are grouped in terms of constituent PTSD symptomatology experienced in the past month and scored on a Likert-type scale whose score ranges from 0 (not at all) to 4 (totally); for example, "how much have you been bothered by repeated, disturbing, and unwanted memories about the event?" The scores generate four subscales: re-experiencing REE, avoidance AV, cognitive or emotional disturbances CED, and arousal and hypervigilance AH. The Spanish version obtained an $\alpha = 0.94$ to 0.96 (Soberón et al., 2016), and, in the sample of this study, an $\alpha = 0.93$.

Burnout dimensions: The Maslach Burnout Inventory-General Survey (MBI-GS) was used, offering information on the dimensions of emotional exhaustion (EE), depersonalization (DP) and personal realization by work (PR). Its 16 items are answered by means of a Likert scale expressing the frequency in which a situation has been experienced; for example, the statement "*I feel emotionally exhausted at work*" can be answered from 0 (never) to 6 (daily). Low levels in RP and high rates in EE and DP indicate a greater experience of job burnout. In different studies, using the version validated for the Spanish population, reliability indices above 0.74 have been found in all three dimensions (Salanova et al., 2000). In the present study, the indices were 0.81 in EE, 0.76 in DP and 0.70 in RP.

2.3 Ethical aspects

The project was approved by the Clinical Research Ethics Committee of Aragón (CEICA, PI22/049). The procedures carried out complied with ethical standards and with the 1975 Declaration of Helsinki. The professionals were informed that their participation was voluntary and that the responses obtained would be treated anonymously and confidentially. All of them signed an informed consent form and were subsequently informed of the results.

2.4 Statistical analysis

The use of parametric tests was considered appropriate, given the sample size. For the description of the characteristics of the sample, frequencies and percentages were used for categorical variables and means and SDs for continuous variables. In the bivariate analysis of comparison between professionals who have suffered aggressions and those who have not, the Chi-square statistic was used to compare categorical variables and Student's *t*-test to compare continuous variables.

Although a cross-sectional survey design was used, both because of the type of population and the subject matter about which participants were asked, it is considered unlikely that factors such as the consistency effect, halo effect or social desirability, have acted to produce bias.

An exploratory analysis with all the variables of interest resulted in a matrix of two factors, one of them related to the dimensions of burnout, and the other to the symptomatology of post-traumatic stress disorder, which explain the variance equally (Hair et al., 2006), so it was considered that the results would not show a possible bias due to the variance of the common method.

Finally, multivariate logistic regression analyses were performed to establish those factors that could be predictive of aggressions, introducing in the model, as a dependent variable, having been a victim of aggression and, as predictive variables, sociodemographic and work-related variables. Subsequently, multivariate analyses (stepwise linear regression) were performed to predict those variables (sociodemographic, occupational and aggressions) that may contribute to PTSD symptomatology and burnout dimensions.

3 Results

The profile of the participant was a man or woman with an average age of 48.79 years, living with family members, working in ordinary care, as a doctor or nurse, with a seniority of almost 20 years, with an interim or permanent contract. Regarding aggressions, more than half (57.49%) of the participants had suffered them, being mainly threats (44.41%) or insults (55.14%), and physical aggressions (18.35%). Of these, only 18 (15.1% of those assaulted) recorded the incident and only one had filed a complaint. A total of 80.1% of the professionals doubted that their organization would support them in the event of a complaint (Table 1).

Although the authors of the Burnout Questionnaire (MBI-GS) are not in favor of offering cut-off points and have repeatedly advised against their use, since the questionnaire offers dimensional measures in three variables (EE, DP, RP) that make up burnout syndrome cannot be dichotomous, but dimensional (Maslach and Leiter, 2008), in the present study we have used the criterion that participants' measurements were in the fourth quartile to establish their symptomatology in the three dimensions of the syndrome (Schaufeli et al., 2001; Brenninkmeijer and Van Yperen, 2003). In this way, the difference between the sub-samples who report aggression and those who do not can be observed in terms of the dimensions of burnout (Table 1).

On the other hand, although PTSD is a pathology resulting from having lived through or witnessed a traumatic situation, or from repeated exposure to details of traumatic events (Echeburúa, 2017) and, in order to be diagnosed, as a first requirement, such an event must have occurred. The episodes of violence commonly reported in Primary Care do not have the characteristics that may accompany acts of war, situations of major catastrophes, rape, etc. However, the hypothesis was established that, perhaps, the victims of this daily violence could show some of the symptoms of re-experiencing, avoidance attempts, cognitive or emotional problems, distancing or hypervigilance, required when diagnosing PTSD.

The aim was rather to establish a dimensional measure of possible trauma, from a research perspective, rather than to obtain a diagnosis, for which a clinical interview would be much more advisable. The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5 is an undoubtedly helpful tool, especially for recording the constituent symptomatology of this disorder). Although it was not designed to make an "all or nothing" diagnosis, in Table 1 shows the sum values of the subscales that make up the PCL-5 and takes as a cut-off point those that are above 33 points (Durón-Figueroa et al., 2019).

Through a contrast of means (*t*-test), the symptomatology variables studied, with the exception of general health, showed statistically significant differences between professionals who had not suffered aggressions and those who had experienced them, both in PTSD constituent symptoms, and in the burnout dimensions (Table 2).

Both the variables relating to diagnostic criteria for PTSD and those relating to the variables constituting burnout syndrome showed statistically significant differences between the group of victims and those who did not report aggressions. As can be seen in Table 2, the statistical significance was: REE = $t_{(205)}$ −4.421.

TABLE 1 Description of the sample in the variables collected (sociodemographic, occupational, psychological symptomatology, burnout, PTSD, as well as incidents recorded).

Variables	Frequency (%) Mean (DT) $N = 207$	No aggressions $N = 88$	Aggressions $N = 119$	χ^2.P-value 30.94 (0.000)
Sex				
Man	81 (39.1%)	34 (41.9%)	47 (58.1 %)	0.016 (0.900)
Woman	126 (60.9%)	54 (42.8%)	72 (57.1%)	
Age	48.79 (9.51)	49.11 (10.54)	48.55 (8.68)	
Convivience				
No family coexistence	70 (33.8%)	24 (34.3%)	46 (65.7%)	2.929 (0.087)
With family living	137 (66.2%)	64 (46.7%)	73 (53.2%)	
Type of care				
Routine care	165 (79.7%)	78 (47.3%)	87 (52.5%)	5.743 (0.017)
Continuous attention	42 (20.3%)	10 (23.8%)	32 (76.2%)	
Profession				
Doctor	101 (48.8%)	43 (42.6%)	58 (57.3%)	1.586 (0.452)
Nursing	97 (46.9%)	42 (43.3%)	55 (56.6%)	
Others	9 (4.3%)	2 (22.2%)	7 (77.7%)	
Seniority	19.90 (10.00)	20.58 (10.98)	19.39 (9.20)	
Situation				
Temporary contract	25 (12.1%)	13 (52%)	12 (48%)	4.303 (0.116)
Interim	63 (30.4%)	20 (31.7%)	43 (68.2%)	
Permanent	119 (57.5%)	55 (46.2%)	64 (53.7%)	
Frequency aggress				
No	88 (42.5%)	88		207.000 (0.000)
One aggression	29 (13.5%)		29	
More than one aggression	90 (43.9%)		90	
Type of aggressions				
Physical aggression	38 (18.4%)			
Threats	89 (44.4%)			
Insults	113 (55.1%)			
MBI				
Emotional exhaustion (EE)	59 (28.5%)	13 (14.7%)	46 (38%)	1.839 (0.022)
Depersonalization (DP)	69 (33.3%)	10 (11.3 %)	49 (42.2 %)	2.107 (0.008)
(Lack) Personal realization (PR)	75 (36.2%)	21 (23.8 %)	54 (55.4%)	2.724 (0.043)
PTSD	46 (21.8%)	5 (5.7%)	41 (34.5%)	1.005 (0.001)

$p \leq 0.001$; AV = $t_{(205)}$ −4.468. $p \leq 0.001$; ECD = $t_{(205)}$ −5.731. $p \leq 0.001$; DIST = $t_{(205)}$ −3.014. $p = 003$; AH = $t_{(205)}$ −5.378. $p \leq 0.001$; EE = $t_{(205)}$ −6.271. $p \leq 0.001$; DP = $t_{(205)}$ −4.170. $p \leq 0.001$ and PR = $t_{(205)}$ −4.040. $p \leq 0.001$.

These results were expected, as a previous Pearson correlation analysis showed statistically significant correlations between EE with PR ($r = 0.649$; $p < 0.001$), with REE ($r = 0.600$; $p < 0.001$), AV ($r = 0.628$; $p < 0.001$), CED ($r = 0.568$; $p < 0.001$), DIST ($r = 0.581$; $p < 0.001$) and AH ($r = 0.550$; $p < 0.001$). The correlations of PR with REE ($r = 0.520$; $p < 0.001$), VA ($r = 0.474$; $p < 0.001$), CED ($r = 0.404$; $p < 0.001$), DIST ($r = 0.450$; $p < 0.001$) and AH ($r = 0.455$; $p < 0.001$) were also statistically significant.

However, the PD dimension did not show correlations with any of the PTSD variables.

In a logistic regression analysis, all the professionals who had experienced some type of aggression (physical, threats or insults) were considered as victims, regardless of the frequency with which they had suffered it. As we have seen, of the 119 professionals who experienced episodes of violence by patients in the last year, 90 experienced them on more than one occasion. Likewise, the fact of experiencing one type of violence did not exclude witnessing others. For example, of the 38 who had been physically assaulted, 31 had also received threats and 35 had been insulted.

In order to analyze the predictive role of aggressions and sociodemographic and occupational variables on different symptomatology, a multivariate logistic regression analysis was performed. A significant model was obtained with a Cox and Snell R-squared of 0.073. The only factor related to being assaulted, as shown in Table 3, was the fact of working in continuous care [$t = 4.341$, $p \leq 0.001$; Exp(B) = 0.437].

Finally, linear regression analyses were performed taking each of the constituent symptoms of PTSD and the three dimensions of burnout as a dependent variable, and introducing as independent, demographic and occupational variables, as well as the different types of aggressions (Table 4).

The fact of having received threats from patients contributed to symptoms of re-experiencing, distancing and hypervigilance, constitutive of PTSD, as well as to the depersonalization (cynicism) dimension of burnout. Insults predicted the variables of avoidance, emotional and cognitive disturbances, emotional exhaustion and low personal realization at work. Physical aggressions were also predictive of irritation and hypervigilance symptoms and, to a lesser extent, of re-experiencing, emotional and cognitive disturbances. These types of aggressions also

contributed to the emotional exhaustion and lack of realization characteristic of burnout.

The professionals working in continuous care (on shifts) were more affected by different symptoms after the aggressions than those working in ordinary care; specifically, in terms of re-experiencing, avoidance, distancing and irritation.

Although there were no statistically significant differences in terms of gender-based aggression, men who had suffered violence were more likely than women to suffer PTSD constitutive symptomatology: avoidance, emotional and cognitive alterations, distancing and hypervigilance.

The number of years in the profession showed a negative or protective relationship in terms of emotional or cognitive alterations and irritability. Likewise, the fact of practicing medicine as a profession was shown to be a protective variable in terms of realization through work.

The variables that contributed to predicting re-experiencing symptomatology (REE) were having suffered threats ($b = 2.208$; $p = 0.001$), physical aggression ($b = 1.800$; $p = 0.040$) and working in continuous care ($b = 1.908$; $p = 0.015$). VA symptoms were predicted by having received insults ($b = 1.484$; $p \leq 0.001$), working

TABLE 2 Contrast of means (*t*-test) in the psychological variables (victims-non-victims).

	Aggressions		T	Sig (bilat)	Dif aver	Interval	
	No M (DS)	Yes M (DS)					
General health	25.84 (5.72)	27.05 (5.22)	−1.550	0.123	−1.20	−2.727	0.327
REE	2.63 (3.82)	5.35 (5.03)	−4.421	0.000	−2.718	−3.930	−1.506
AV	1.30 (2.02)	2.84 (2.89)	−4.468	0.000	−1.527	−2.201	−0.853
ECD	1.38 (2.34)	4.03 (4.22)	−5.731	0.000	−2.643	−3.553	−1.734
DIST	1.85 (2.56)	3.07 (3.23)	−3.014	0.003	−1.214	−2.008	−0.420
AH	4.29 (3.82)	8.18 (5.50)	−5.378	0.000	−3.886	−5.311	−2.461
EE	17.15 (7.31)	23.77 (7.80)	−6.271	0.000	−6.625	−8.709	−4.542
DP	8.12 (3.03)	9.86 (2.90)	−4.170	0.000	−1.741	−2.564	−0.917
PR	7.02 (3.53)	8.98 (3.29)	−4.040	0.000	−1.944	−2.893	−0.995

REE, re-experiencing: AV, avoidance; ECD, emotional and cognitive disturbances; DIST, distancing; AH, arousal, hypervigilance; EE, emotional exhaustion; DP, depersonalization; RP, lack of personal realization by work.

TABLE 3 Multivariate analysis (logistic regression) related to being assaulted.

Victm	B	Standard error	Wald	gl	Sig	Exp(B)	95% interv Exp(B)	
							inf	sup
Interception	1.653	0.948	3.041	1	0.081			
Female sex	0.188	0.316	0.356	1	0.551	1.207	0.650	2.241
Age (25–45 years)	0.066	0.413	0.025	1	0.873	1.068	0.475	2.402
No coexistence	0.360	0.351	1.048	1	0.306	1.433	0.720	2.852
Continuous care	−0.827	0.397	4.341	1	0.037	0.437	0.201	0.952
Medical profession	−0.966	0.861	1.257	1	0.262	0.381	0.070	2.059
Nursing profession	−1.162	0.857	1.840	1	0.175	0.313	0.058	1.677
1–20 years worked	−0.179	0.426	0.177	1	0.674	0.836	0.362	1.927
Temporary contract	−0.046	0.499	0.009	1	0.926	0.955	0.359	2.538
Interim	0.619	0.384	2.607	1	0.106	1.858	0.876	3.941

TABLE 4 Linear regression model.

	Coefficient	P-value	Confidence interval 95%		Collinearity statistics	
			Inferior	Superior	Tolerance	VIF
Re-experimentation						
Constant	0.604	0.548	−1.374	2.581		
Threats	2.208	0.001	0.889	3.526	0.863	1.159
Continuous care	1.908	0.015	0.371	3.445	0.961	1.040
Physical aggressions	1.800	0.040	0.083	3.516	0.832	1.202
R2	0.140					
R2adj	0.127					
Avoidance						
Constant	−1.236	0.067	−2.654	0.182		
Insults	1.484	0.000	0.774	2.155	0.970	1.031
Continuous care	1.168	0.008	0.312	2.025	0.966	1.035
Sex (man)	0.866	0.015	0.171	1.561	0.995	1.005
R2	0.150					
R2adj	0.138					
Emotional-cognitive disturbance						
Constant	0.866	0.336	0.90	2.637		
Insults	2.165	0.000	1.207	3.122	0.872	1.147
Time in healthcare	−0.081	0.001	−0.126	−0.036	0.982	1.019
Physical aggression	2.042	0.001	0.806	3.279	0.864	1.158
Sex (man)	1.490	0.002	0.575	2.406	0.992	1.008
R2	0.272					
R2adj	0.257					
Distancing						
Constant	−1.494	0.074	−3.131	0.144		
Continuous attention	1.739	0.001	0.767	2.711	0.994	1.006
Threat	1.102	0.005	0.314	1.890	0.997	1.003
Sex (man)	1.059	0.010	0.259	1.859	0.996	1.004
R2	0.124					
R2adj	0.112					
Irritation hypervigilance						
Constant	−1.101	0.523	−2.295	4.498		
Physical aggression	3.327	0.001	1.388	5.267	0.825	1.212
Continuous care	2.973	0.001	1.227	4.720	0.943	1.061
Time in healthcare	−0.122	0.001	−0.191	−0.052	0.965	1.036
Threat	2.407	0.002	0.922	3.891	0.861	1.161
Sex (man)	1.875	0.009	0.470	3.280	0.990	1.010
R2	0.288					
R2adj	0.271					
Emotional exhaustion						
Constant	16.967	0.000	15.479	18.456		
Insults	5.558	0.000	3.404	7.711	0.872	1.146
Physical agress	5.019	0.000	2.250	7.788	0.872	1.146
R2	0.225					
R2adj	0.217					

(Continued)

TABLE 4 (Continued)

	Coefficient	*P*-value	Confidence interval 95%		Collinearity statistics	
			Inferior	Superior	Tolerance	VIF
Depersonalization						
Constant	8.356	0.000	7.820	8.892		
Threats	1.768	0.000	0.950	2.585	1.000	1.000
R2	0.081					
R2adj	0.077					
(Lack) Personal realization						
Constant	6.643	0.000	4.340	8.947		
Physical agress	2.070	0.002	0.790	3.351	0.841	1.189
Insults	1.248	0.013	0.270	2.226	0.872	1.147
R2	0.129					
R2adj	0.112					

Dependent variables: PTSD symptoms and burnout. Independent variables: sociodemographic, occupational and aggression variables.

in continuous care ($b = 1.168$; $p = 0.008$) and being male ($b = 0.866$; $p = 0.015$). Cognitive or emotional disturbances (CED) were predicted by having been a victim of insults ($b = 2.165$; $p \leq 0.001$) or physical aggression ($b = 2.042$; $p = 0.001$), as well as being male ($b = 1.490$; $p = 0.002$), while the number of years working in healthcare appeared to be a protective variable ($b = -0.081$; $p = 0.001$). Symptoms of alienation (DIST) were contributed to by working in continuous attention ($b = 1.739$; $p = 0.001$), having experienced threats ($b = 1.102$; $p = 0.001$) and being male ($b = 1.059$; $p = 0.010$) and, finally, hypervigilance symptomatology (HA) was predicted by having experienced physical aggression ($b = 3.327$; $p = 0.001$), or threats ($b = 2.407$; $p = 0.002$), serving in continuous care ($b = 2.973$; $p = 0.001$) or being male ($b = 1.875$; $p = 0.009$).

In terms of burnout dimensions, having suffered physical aggression contributed to predicting both burnout (EE) ($b = 5.019$; $p \leq 0.001$) and lack of Personal Accomplishment (PD) ($b = 2.070$; $p = 0.002$). Likewise, being insulted predicted the EE dimension ($b = 5.558$; $p \leq 0.001$) as well as the lack of Personal Accomplishment (DP) ($b = 2.070$; $p = 0.002$).

4 Discussion

The data show not only the incidence of this phenomenon in primary care, but also the increase in this sector in recent decades (Bernaldo-De-Quirós et al., 2005; Chirico et al., 2022). To date, small health centers -with a small number of professionals and a more familiar and close treatment- had shown in several studies a lower occurrence of violent episodes than in large hospitals (Gascón et al., 2009; Mento et al., 2020). However, the most recent research confirms that no healthcare sector is free from violence. Professions that seemed immune to this phenomenon–such as radiologists, analysts, even healthcare volunteers–are also victims of aggression (Magnavita et al., 2012).

The present study did not reveal statistically significant differences between professionals who had suffered violence and those who had not in terms of gender, age, profession, seniority or administrative situation. However, as has been found in other studies, shift workers reported a higher number of assaults compared to those who worked regular hours (Lanctôt and Guay, 2014).

The results confirmed the first hypothesis: those professionals who had suffered some type of aggression showed a higher rate of psychological symptoms than those who had not. However, was not fulfilled the second hypothesis: that those who had only been victims of non-physical aggression would report a higher number of symptoms than those who had suffered physical violence.

Some theoretical and practical implications can be drawn from these results.

4.1 Theoretical implications

This increase in violence in primary care centers seems to have been contributed to, among other issues, by the economic crises of the last decades, the reduction in the number of professionals, the consequent increase in the pressure of care, as well as the COVID-19 pandemic and its continuous waves, which have altered relationships, favoring occasions of violence (Moleras-Serra et al., 2023).

Beyond the incidence of aggressions and vulnerability according to demographic variables, the aim was to delve into the relationship between violence suffered in the work environment and its possible symptomatology.

The first of the hypotheses was confirmed. Symptoms of stress, anxiety, constituent symptoms of PTSD, and burnout syndrome were found (Kobayashi et al., 2020). The indices in general health, measured by the GHQ-12 were moderately high considering the whole sample, and higher in the population that had experienced violence, although the difference between both groups was not statistically significant. Several studies indicate that having suffered aggression by patients is associated with an increased risk of mental health problems (Bernaldo-De-Quirós et al., 2005; Gascón et al., 2013), although the methodological diversity of the studies has yielded very different results (Lanctôt and Guay, 2014).

These incidents occurring in the healthcare setting do not usually have the magnitude of traumatic events required to cause

PTSD, however, many of its symptoms can be recorded, using a non-diagnostic but approximate checklist. Those who had been victims of violent events showed a statistically significant higher incidence of PTSD-constituent symptoms. This was true for each of the subscales of "re-experiencing," "avoidance," "cognitive or emotional disturbances," and "excitability and hypervigilance." This type of symptomatology has been described after experiencing situations of violence regardless of the intensity of the violence (Kobayashi et al., 2020), with professionals experiencing at least one symptom, such as recurrent, involuntary and intrusive memories; distressing dreams; dissociative reactions; prolonged psychological distress; and intense physiological reactions when exposed to factors symbolizing the event (Lanctôt and Guay, 2014). Also, persistent efforts to avoid distressing memories and external reminders associated with the traumatic event or negative cognitive and mood alterations were reported.

The second hypothesis was partially confirmed, since both physical violence and non-physical violence were associated with psychological symptoms. In contrast to research highlighting a greater impact on psychological symptomatology in those who have suffered threats and insults (Findorff et al., 2005), in this study the impact was manifested equally in victims of physical and non-physical aggressions. It should be remembered that a high percentage of those who reported physical aggression also reported insults and threats, often repeatedly.

While physical aggressions are usually punctual and their impact may fade after a short time, verbal aggressions and threats may constitute a daily occurrence with no precise end, proving to be more deleterious on mental health (Gascón et al., 2013).

Likewise, higher and statistically significant indices were found among victims, with respect to professionals who had not suffered aggressions, in terms of the dimensions that constitute burnout syndrome: EE, DP, and lack of PR. Taking into account that this syndrome develops when there is a mismatch between work demands and the ability to cope with them effectively and understanding aggressions as a stressor over which there is little control, these could be contributing significantly to this symptomatology (Gascón et al., 2013; Viotti et al., 2015).

4.2 Practical implications

The centers studied have post-incident protocols which, in addition to recording the episode, provide the victim with medical, psychological and legal support. However, most were unaware of them or did not consider them useful.

It is clear that the existence of these protocols is not enough and that studies aimed at exploring possible post-incident symptomatology are necessary when designing prevention plans to mitigate the chronicity of possible harm (Lim et al., 2022). Several hospitals and primary care centers have implemented training modules aimed at healthcare workers, such as: development of resilience, self-compassion, empathy, communication skills, etc (Asensio-Martinez et al., 2019). Undoubtedly this training can be of great use for healthcare workers, but no professional can face this reality or prevent it alone. It is a structural issue of health systems, starting from zero tolerance policies.

Geoffrion et al. (2015) sought to identify individual and organizational predictors of trivialization of violence in healthcare.

Overall, men were more likely to think that violence is normal in this type of work and complaining is frowned upon by peers and bosses. Healthcare organizations need to bust these myths, through information and continuing education. Similarly, reporting assaults and filing complaints are necessary actions for several reasons. Firstly, because a general registry of assaults provides a faithful map of the centers and positions most affected, allowing action to be taken on them. On the other hand, reporting a complaint deters the aggressors and reinforces the professional's self-esteem if, in addition, they feel supported by their organization.

As we have seen, only 15.1% of those assaulted reported the incident and only one filed a complaint because the injuries were more serious. The lack of reporting is a generalized phenomenon in all countries, as confirmed in other studies and which has been explained by various reasons: lack of time, normalization of certain behaviors or even that the professionals themselves are not familiar with the prevention protocols of the centers in which they work (Spelten et al., 2020).

4.3 Limitations

The main limitation is that it was a retrospective study, using questionnaires, in which the professionals recalled the incidents they had experienced in the last year, as well as the feelings and symptoms that had accompanied them since then. The type of design makes it difficult to establish causal relationships; for example, the relationship between burnout and aggressions could be interpreted in a double sense. That is, that violent episodes contribute to greater emotional exhaustion and depersonalization, or that professionals who feel more burned out are found to have diminished skills for the therapeutic relationship. Likewise, the number of participants is small, and although the region in which the study was carried out is considered representative of the rest of Spain, it is difficult to generalize the results to the entire population of health professionals.

Based on this study, cross-sectional follow-up has been initiated in some of the centers studied.

5 Conclusion

Taking into account the results of this study, the relationships between the attacks suffered and the various subsequent symptoms are highlighted, which is very useful to undertake a more ambitious cross-sectional study over two years.

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 humans were approved by the Comité de Ética en la Investigación de la Comunidad de Aragón (CEICA). The studies were conducted in accordance with the local legislation and

institutional requirements. The participants provided their written informed consent to participate in this study.

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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The influence of negative life events on college students' suicidal ideation: the mediating role of entity theory and the moderating role of meaning in life

Dan Liu[1,2], Xiaowei Geng[3]*, Fuwei Zhang[4], Yuan Zhang[1] and Xueli Li[1]

[1]College of Education, Ludong University, Yantai, China, [2]Institute for Education and Treatment of Problematic Youth, Ludong University, Yantai, China, [3]Jing Hengyi School of Education, Hangzhou Normal University, Hangzhou, China, [4]School of Teacher Education (Physical Education), Taizhou University, Taizhou, China

Suicidal ideation is a desire, thought, or conception that is closely associated with suicide, which is an important risk factor for suicidal behavior. Negative life events may impact college students' suicidal ideation. According to the suicide susceptibility-stress model, the interaction between susceptibility factors and stressors may influence college students' suicidal ideation. The present study investigated the role of entity theory and meaning in life in the influence of negative life events on suicidal ideation among college students. A nationwide questionnaire survey was conducted among 938 college students. The Beck Scale for Suicide Ideation, the Implicit Personality Theory Questionnaire, the Adolescent Life Events Scale, and the Meaning in Life Questionnaire were used. The results showed that negative life events were positively correlated with suicidal ideation, entity theory played a mediating role, and meaning in life moderated the mediation of entity theory. Finally, meaning in life and entity theory may bring some benefits to college students; that is, when faced with negative life events, meaning in life and entity theory may attenuate students' suicidal ideation.

KEYWORDS

negative life events, suicidal ideation, entity theory, meaning in life, college student

1 Introduction

According to the *World Health Organization Yearbook*, there were more than 700,000 deaths by suicide globally in 2019. As mentioned in the report, suicide is the fourth leading cause of death for people aged 15–29 years worldwide (World Health Organization, 2019). It should be noted that nearly all college students are in this age group. In the 2022 *Chinese Health Statistics Yearbook*, suicide is listed as number 2 in the mortality data table for adolescents aged 15–25 years. Clearly, suicide not only causes loss and severe injury to one's life and health, but also places a huge economic burden on families, schools, and society (Cerel et al., 2019). In recent years, many scholars have conducted research on suicide, investing a large amount of money each year to reduce its incidence. However, to date, the effectiveness of suicide prevention and intervention programs among college students remains unsatisfactory globally.

The majority of people experience suicidal ideation, an academic term for suicidal thoughts, before committing the act of suicide. Suicide can be seen as an ongoing process that progresses gradually from ideation to the act of carrying out the suicidal action. In the whole process of generating suicidal ideation, making a suicide plan, attempting suicide, and ultimately engaging in suicidal behavior, suicidal ideation, which is the first step, becomes the most important predictor of suicidal behavior (Feng and Xiao, 2007). One study revealed that 80% of suicidal people admitted to experiencing suicidal ideation in various forms before committing suicide (Xiao, 2001).

It has been confirmed that negative life events are a key factor in causing suicidal ideation, which plays an important role in suicidal behavior. Negative life events in the lives of college students generally include interpersonal relationship problems, freshman maladjustment, academic struggles, and emotional frustrations that lead to mental health issues. Even if the psychological development of college students is still in its early stages, they often experience confusion and may suffer from psychological barriers when faced with contradictions, challenges, and pressures in daily life. In this case, the continuous self-denial, pessimism, and disappointment among college students may even cause psychological crisis. According to Blalock et al. (2015), negative life experiences of college students not only serve as the primary cause of suicidal ideation but also act as a trigger for actual suicide. Individuals who are under prolonged pressure from negative life events are prone to negative emotions, and those who adopt negative coping styles may experience suicidal ideation and resort to suicidal behaviors (Miranda et al., 2013). Therefore, it is important to study the impact of negative life events on suicidal ideation.

Negative life experiences cause changes in individuals according to the implicit personality theory. The implicit theory of personality pertains to the belief in personality malleability. It is a fundamental cognitive schema or rudimentary theory about basic human attributes adopted by people (Yeager et al., 2013). According to the implicit personality theory, the variability in the personality of individuals is described by two types of theorists: entity theorists and incremental theorists. Entity theorists point out that an individual's personality traits are fixed and difficult to change, while incremental theorists suggest that an individual's personality traits are dynamic and can evolve and change (Chen and Pajares, 2010). After going through several setbacks, instead of seeking to overcome difficulties and try new approaches, many people suffer from helplessness and anxiety, which strengthens the development of an individual's view of entity theory (Dweck, 1999). The more negative the life experiences are, the greater the learned helplessness, which leads to the negative evaluation of self-development (Dweck and Yeager, 2019). This situation can also lead to the development of an entity theory, as well as negative thoughts and behaviors.

When faced with challenges and obstacles, implicit personality theory also plays an important predictive role in the mental health of individuals (Burnette et al., 2018). It has been established that individuals described by entity theory are more likely to develop depressive states than those described by incremental theory (Kaufman et al., 2020). Students conforming to entity theory are more likely to experience negative emotions, such as sadness, and doubt their own abilities when faced with frustrating situations. On the other hand, students who adhere to incremental theory tend to have higher levels of mental fitness and mobilize all of their cognitive resources to cope positively

with failures and challenges. As a result, they are less likely—perhaps never—to consider suicide (Song et al., 2022). Thus, the more negative life events they experience, the more likely they are to develop the attitudes mentioned in entity theory and to react more negatively. This belief suggests that they cannot change the bad situation, which may prompt suicidal ideation.

Therefore, H1 is proposed: *Entity theory plays a mediating role in the effect of negative life events on college students' suicidal ideation.*

Meaning in life refers to an individual's perception of the intention and value of life that he or she possesses in the present, as well as the pursuit of meaning and purpose in the future (Steger et al., 2008). As an important psychological resource, meaning in life is closely related to an individual's life quality, social behavior, and physical and mental health (Czekierda et al., 2017; Kim et al., 2019). As we mentioned before, negative life events cannot be viewed without the influence of the individual's own characteristics. Positive characteristics may play a protective role in the adaptation of some individuals, even if they have experienced bad life situations (Fergus and Zimmerman, 2005). Meaning in life also improves people's well-being. When faced with adversity, individuals can reduce the negative effects by pursuing their life purpose, which in turn reduces the risk of developing psychological disorders (Du et al., 2017). When dealing with negative life events, entity theorists tend to make negative attributions and suggest that the environment and the self are difficult to change thereby losing expectations for the future. As a psychological resource, meaning in life will further help college students reduce suicidal ideation when negative events occur. Specifically, when meaning in life feels stronger, individuals possess more psychological resources to deal with negative events, which in turn reduces the production of suicidal ideation. High meaning in life could promote positive change, self-expansion, psychological repair, and growth (Gardner et al., 2002), enabling individuals to achieve better psychological states and avoid negative states. On the other hand, low levels of meaning in life have little effect on reducing the suicidal ideation of individuals who conform to entity theory. It is, therefore, reasonable to speculate that, for individuals with lower levels of meaning in life, the mediating role of entity theory was significant, while for those with higher levels of meaning in life, the mediating role of entity theory was not significant, as high levels of meaning in life may weaken the link between entity theory and suicidal ideation.

Therefore, H2 is proposed: *In the influence of negative life events on college students' suicidal ideation, meaning in life moderates the mediating effect of entity theory on college students' suicidal ideation.*

2 Methods

2.1 Participants

Using a convenience sampling method, we selected 951 college students from several cities across the eastern, central, and western regions of China. All college students voluntarily participated in the questionnaire survey. Finally, we obtained 938 valid samples, consisting of 393 males ($M = 18.51$, $SD = 1.13$) and 545 females ($M = 19.12$, $SD = 2.06$). The final number of participants was 938

because 13 questionnaires were not completely answered. The response rate of the questionnaire was 98.63%.

2.2 Materials

(1) Adolescent Life Events Scale (ASLEC): The scale was developed by Liu et al. (1997) and consists of 27 questions covering six dimensions, including interpersonal relationships; academic stress; being punished; loss of family, friends, and property; health and adjustment problems; and other problems, for example, "heavy academic pressure." The respondents answered on a five-point scale ranging from 1 ("no impact") to 5 ("extreme impact"). The higher the score, the greater the impact of the event on the individual. Cronbach's α coefficient of the questionnaire in this study was 0.939.

(2) Entity theory was measured using the Implicit Personality Theory Questionnaire developed by Dweck (1999). The questionnaire consists of eight questions, such as, "The way a person does things can be changed; but a person's nature, by and large, cannot be changed." A five-point scale was used, with 1 representing "strongly disagree" and 5 representing "strongly agree." By deducting the total score of entity theory from the total score of incremental theory, a final score is obtained. The higher the score, the more the subject favors entity theory. Cronbach's α coefficient of this questionnaire in this study was 0.805.

(3) The revised Beck Scale for Suicide Ideation-Chinese Version (BSI-CV) (Li et al., 2011) was used to measure suicidal ideation among college students. The 19-item scale was used to assess suicidal ideation in the past week and obtain scores for both suicidal ideation (1–5 items) and suicidal behavior tendency (6–19 items) dimensions. In the present study, questions 1–5 were used to assess suicidal ideation. The higher the score, the higher the suicidal ideation. Cronbach's α coefficient for this questionnaire in this study was 0.928.

(4) The Chinese Meaning in Life Questionnaire (C-MLQ) (Wang and Dai, 2008): The C-MLQ is divided into two dimensions with 10 questions in total; for example, "I understand the meaning in my life very well." Subjects answered on a seven-point scale, with 1 representing "totally disagree" and 7 representing "totally agree" to assess their perception of meaning in life. The higher the score, the higher the level of meaning in life. The Cronbach's α of the Meaning in Life Questionnaire in this study was 0.909.

2.3 Procedure

The current study was embedded in a larger assessment plan that analyzed the mental health status of a sample of students in different classes during orientation week. In the introductory psychology course and the mental health education course, students completed a questionnaire survey. All the students were informed of their voluntary right to take part in this study. Then, participants signed the informed consent form and completed a battery of self-report questionnaires on their smartphones, including the questionnaires

mentioned above. For students who experienced psychological distress (for example, feeling depressed, anxious, or having suicidal thoughts) after completing the questionnaires, we arranged for professional counselors and psychological hotlines to address their concerns. The research team strove to ensure the mental health of every student.

2.4 Statistical analysis

All statistical analyses were conducted using SPSS 26.0 statistical software and PROCESS 4.1. We used Harman's single-factor test to test for common method variance. Multiple hierarchical regression analysis was conducted to test the mediating effect of entity theory in the relationship between negative life events and suicidal ideation among college students. To further test the moderating effect, the PROCESS plug-in for SPSS 26.0 was used. In this study, statistical significance was set at $p < 0.05$.

2.5 Data analysis

2.5.1 Common method biases

In the present research, we used Harman's single-factor test to check the common method variance (CMV) (Aguirre-Urreta and Hu, 2019). The results showed that there were 11 factors with eigenvalues greater than 1 and the first factor explained 19.266% of the variance, which did not exceed 40%. Therefore, this study did not have a significant CMV.

2.5.2 Descriptive analysis

Suicidal ideation was analyzed among college students who completed all questionnaires ($M = 1.08$, $SD = 1.77$). There were significant gender differences in suicidal ideation ($t = -2.175$, $p < 0.05$); females ($M = 1.19$, $SD = 1.79$) had significantly higher suicidal ideation than males ($M = 0.94$, $SD = 1.73$). Whether the subjects were only child had no significant effect on suicidal ideation ($t = 0.325$, $p > 0.05$). Furthermore, the subjects' majors ($F = 0.542$, $p > 0.05$), grades ($F = 2.231$, $p > 0.05$), and age groups ($F = 0.139$, $p > 0.05$) did not significantly affect suicidal ideation (See Table 1).

2.5.3 Correlation analysis

The means, standard deviations, and correlation coefficients for gender, age, suicidal ideation, negative life events, entity theory, and meaning in life are shown in Table 2. Suicidal ideation was positively correlated with negative life events and entity theory; suicidal ideation was negatively correlated with meaning in life. Negative life events were positively correlated with entity theory; negative life events were negatively correlated with meaning in life. Entity theory was significantly negatively correlated with meaning in life. The results are shown in Table 2.

2.5.4 The mediation of entity theory

According to Baron and Kenny (1986), multiple hierarchical regression analysis was adopted to test the mediating effect of entity theory in the relationship between negative life events and suicidal ideation among college students, as shown in Table 3. In step 1, with suicidal ideation as the dependent variable and gender, age, and negative

TABLE 1 Difference analysis of suicidal ideation ($N = 938$).

		M	SD	T	F	p
1. Gender	Male	0.94	1.73	−2.175		0.030*
	Female	1.19	1.79			
2. Only child	Yes	1.11	1.82	0.325		0.746
	No	1.10	1.74			
3. Major	Science	1.05	1.72		0.542	0.582
	Liberal arts major	1.10	1.74			
	Medicine	1.28	2.30			
4. Grade	Freshman	1.08	1.75		2.231	0.083
	Sophomore	0.93	1.72			
	Junior	0.75	1.67			
	Senior	1.75	2.29			
5. Age	<20	1.10	1.79		0.139	0.870
	21−24	1.01	1.74			
	>25	1.05	1.33			

*$p < 0.05$.

TABLE 2 Correlation of variables ($N = 938$).

	M	SD	1	2	3	4	5	6
1. Gender	1.58	0.49	1					
2. Age	18.87	1.76	0.173**	1				
3. Suicidal ideation	1.08	1.77	0.071*	−0.13	1			
4. Negative life events	1.99	0.76	0.099**	−0.008	0.321**	1		
5. Entity theory	3.79	0.81	0.125**	0.014	0.142*	0.080*	1	
6. Meaning in life	24.11	5.55	0.075*	0.085**	−0.218**	−0.115**	−0.126**	1

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

life events as predictors, Model 1 showed that suicidal ideation was not related to gender and age ($F = 2.669$, $p > 0.05$). Model 2 showed that negative life events were a significant positive predictor of suicidal ideation ($\beta = 0.736$, $p < 0.001$). In step 2, with entity theory as the dependent variable and gender, age, and negative life events as the predictor variables, Model 3 showed that 1.6% of entity theory could be attributed to gender and age ($F = 7.447$, $p < 0.01$). Among these, gender was a significant positive predictor of entity theory ($\beta = 0.208$, $p < 0.001$), whereas age was not a significant predictor ($\beta = -0.004$, $p > 0.05$). Model 4 indicated that negative life events were also a significant positive predictor of entity theory ($\beta = 0.073$, $p < 0.05$). In step 3, with suicidal ideation as the dependent variable and gender, age, negative life events, and entity theory as the predictor variables, Model 5 indicated that 11.1% of suicidal ideation was attributable to negative life events and entity theory ($F = 30.987$, $p < 0.001$). Negative life events ($\beta = 0.718$, $p < 0.001$) and entity theory ($\beta = 0.247$, $p < 0.001$) were significant positive predictors of suicidal ideation. These results suggest that entity theory mediates the effect of negative life events on suicidal ideation among college students (see Table 3). In addition, following Preacher and Hayes' (2008) bootstrap analysis, the mediating role of entity theory between negative life events and suicidal ideation was tested using negative life events as the independent variable, entity theory as the mediator variable, suicidal ideation as the dependent variable, and gender and age as covariates. With a generated sample size of 5,000, the indirect effect through entity

theory was 0.0170, 95% CI = [0.0002, 0.0390], which illustrated the mediating role of entity theory in the effect of negative life events on college students' suicidal ideation (see Figure 1).

2.5.5 The moderated effect of meaning in life

To further test the moderating effect, a moderated mediation effect test was conducted using the PROCESS plug-in for SPSS 26.0, with reference to the bootstrap method proposed by Hayes (2013). Model 14 was selected, with a sample size of 5,000 and a 95% confidence interval, using negative life events as the independent variable X, suicidal ideation as the dependent variable Y, entity theory as the mediator variable M, meaning in life as the moderator variable V, and gender and age as the covariates. The results of the bootstrap analyses indicated that the moderated mediation model was established (see Figure 2). Specifically, meaning in life had a significant moderating effect on entity theory influencing suicidal ideation ($Effect = -0.032$, $SE = 0.117$, $p = 0.006$, 95% CI = [−0.0554, −0.0094]). Entity theory was used as a mediator variable ($Effect = -0.002$, $SE = 0.015$, 95%CI = [−0.0059, −0.0001]). In contrast, after controlling for the mediating variable (i.e., entity theory), the direct effect of the independent variable (i.e., negative life events) on the dependent variable (i.e., Suicidal Ideation) was significant ($Effect = 0.673$, $SE = 0.071$, 95% CI = [0.5336, 0.8128]), which suggested that the mediating role still held in the model. When the meaning in life scores

TABLE 3 The mediation of entity theory in the influence of negative life events on suicidal ideation ($N = 938$).

Variables	Step1: Dependent variable: suicidal ideation		Step 2: Dependent variable: entity theory		Step 3: Dependent variable: suicide ideation
	Model 1 β	Model 2 β	Model 3 β	Model 4 β	Model 5 β
Gender	0.270*	0.153	0.208***	0.197***	0.105
Age	−0.026	−0.018	−0.004	−0.003	−0.017
Negative life events		0.736***		0.073*	0.718***
Entity theory					0.247***
R^2	0.006	0.105	0.016	0.020	0.117
Adjusted R^2	0.004	0.102	0.014	0.017	0.113
F	2.669	36.401***	7.447**	6.453***	30.987***

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

were low ($M - 1SD = -4.114$), the indirect effect did not contain 0 ($Effect = 0.026$, $SE = 0.015$, 95% CI = [0.0026, 0.0588]); when meaning in life scores were high ($M + 1SD = 5.386$), the indirect effect contained 0 ($Effect = 0.004$, $SE = 0.006$, 95% CI = [−0.0084, 0.0160]). In other words, for subjects with low scores on meaning in life, entity theory mediated the effect of negative life events on suicidal ideation; for subjects who scored high on meaning in life, entity theory did not mediate the effect of negative life events on suicidal ideation, which suggested that meaning in life moderates the mediating role of entity theory in the influence of negative life events on suicidal ideation (see Figures 2, 3).

3 Discussion

This article explored the effects of negative life events, entity theory, and meaning in life on college students' suicidal ideation. The results found that suicidal ideation was positively correlated with negative life events and entity theory; suicidal ideation was negatively correlated with meaning in life. Entity theory was significantly negatively correlated with meaning in life. Entity theory plays a partial mediating role in the influence of negative life events on college students' suicidal ideation. Negative life events may lead college students to develop the entity view, potentially resulting in increased suicidal ideation. From the perspective of implicit personality theory, individuals who hold incremental and immutable beliefs about personality and mental health differ in the way they process information (Hong et al., 1997). Previous studies have confirmed that implicit personality theory plays an important role in mental health, and our results are consistent with previous studies that individuals conforming to entity theory are more likely to experience suicidal ideation than individuals conforming to incremental theory when faced with negative life events. Negative life events could activate the individual's negative cognition of the self and cause the individual's negative to engage in coping behaviors. Long-term negative life events can severely impact one's self-esteem and self-worth. With the accumulation of negative life events, the individual's self-evaluation continues to decrease; one may begin to doubt one's own abilities, the surrounding environment, and others (Ma et al., 2022). In summary, negative life events can intensify one's views as expressed by entity theory, thereby diminishing an individual's resistance to frustration and potentially leading to psychological problems.

When faced with negative life events, the individual's implicit personality is stimulated to play a role. When adolescents are confronted with sudden public events, those adhering to incremental theory are more likely to figure out the events positively and optimistically. Therefore, they remain low on suicidal ideation. However, individuals conforming to entity theory are more likely to act in a negative and pessimistic way, thereby prompting higher levels of suicidal ideation (Song et al., 2022). In particular, those who conform to entity theory have more negative emotions, which also accelerates the generation of suicidal thoughts, than those who adhere to incremental theory (Yang et al., 2021). Suicide is often an attempt to escape the intolerable cycle of bad events, occurring when a depressed person believes their symptoms are permanent and incurable. Furthermore, entity theory and hopelessness are highly associated (Mullarkey and Schleider, 2020). Hopelessness also leads to suicidality (Van Orden et al., 2010). When experiencing negative life events, entity theory can cause suicidal fantasies and suicidal acts, which are efforts to escape or end the psychological pain that is believed to be unchangeable. However, as a positive psychological trait, incremental theory is a protective mechanism for individuals to cope with stress, enabling them to better confront the negative events. This provides the inspiration for this study.

Meaning in life moderated the second half of the effect of entity theory on suicidal ideation among college students under the influence of negative life events. For individuals with lower scores on meaning in life, entity theory played a partial mediating role of negative life events on suicidal ideation; for individuals with higher scores on meaning in life, the mediating role of entity theory was not significant. In other words, when faced with negative life events, college students conforming to entity theory were more likely to experience suicidal ideation under the weak influence of low meaning in life scores.

Meaning in life, as a positive cognitive attribute, serves to moderate the effects of entity theory and negative life events on suicidal ideation, according to the results of this article. Individuals conforming to entity theory and facing negative events are more likely to experience suicidal ideation if they have low scores on meaning in life. This is in line with previous research confirming that a low score on meaning in life predisposes individuals to suicidal ideation, whereas a high score on meaning in life reduces it (Hu et al., 2023). Individuals with lower levels of meaning in life who are prone to feeling empty and helpless show more depression and anxiety and lower levels of well-being (Carreno et al., 2020). On the other hand, meaning in life as a positive factor can help individuals. The results of this study show that meaning in life moderates the second half of the mediation model, that is, the impact of negative life events on
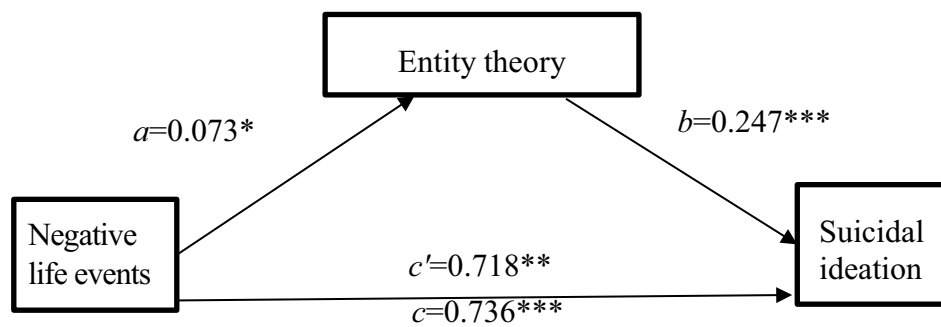
FIGURE 1
The mediation of entity theory in the influence of negative life events on suicidal ideation. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
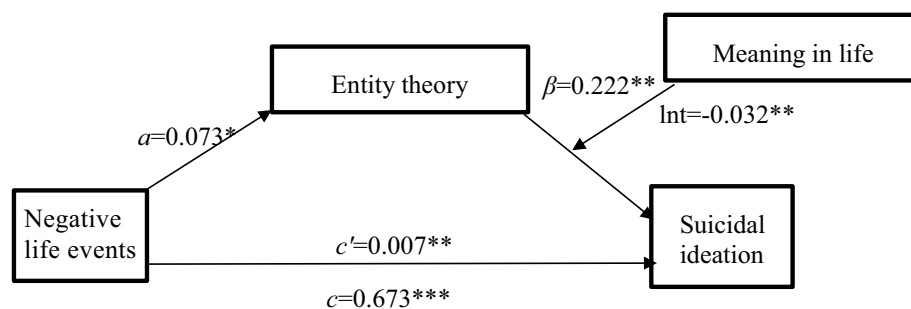
FIGURE 2
The influence of negative life events on suicidal ideation: the mediating role of entity theory and the moderating role of meaning in life. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
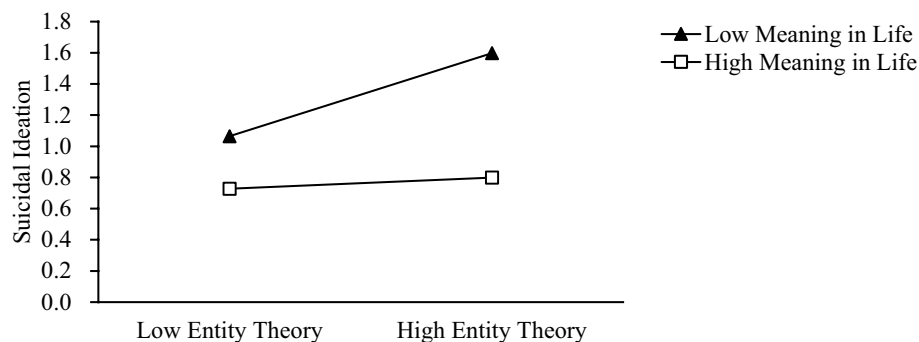
FIGURE 3
The moderation of meaning in life in the effect of entity theory on suicidal ideation.

college students' suicidal ideation. Specifically, for college students who conform to entity theory, the impact of negative life events on suicidal ideation gradually decreases as their sense of meaning in life increases. This result is sufficient to show that meaning in life plays an important role in suicidal ideation. On a deeper level, awareness and recognition of meaning in life can help individuals realize their potential to know what they can become and should become, so as to bring out their potential and better manifest meaning in life, always having confidence and faith to achieve goals and overcome difficulties.

4 Theoretical implications

The present study examined the suicidal ideation of college students based on the beliefs of an individual's meaning in life and personality plasticity, combined with the susceptibility-stimulation model. The susceptibility stress model suggests that the interaction between susceptibility factors (personality, environment, cognition, etc.) and stress factors (negative life events, etc.) can affect suicidal ideation in adolescents. As positive qualities and protective predisposing factors, meaning in life and implicit theories enable

individuals to tap into their potential and grow during stressful events. Our results enrich the susceptible stimulus model (Mann et al., 1999). Most previous research has focused on entity theory and academic performance, but the effect of implicit theory on suicidal ideation has not yet been theoretically refined. This study also confirms that entity theory has a significant impact on suicidal ideation in university students. The results expand our understanding of implicit theory.

5 Practical implications

This study focuses more on exploring one's own positive attributes, with the expectation of reducing suicidal ideation. By fostering personal change, it aims to further block the occurrence of suicidal behavior. Our study has established that entity theory-conforming adolescents are more likely to experience suicidal ideation after a negative event. For the irrational cognition changing training of cognitivist therapy, we can transform those conforming to entity theory into ones following incremental theory, so that they could make better functional adaptations, recognize the specific causes of frustration, persevere in their own efforts, and seek effective strategies to solve problems (Dweck et al., 1995).

In today's fast-paced modern society, which is full of pressures and challenges, individuals in their daily lives can easily feel pain and helplessness, resulting in a loss of life goals and a lack of value and meaning in life (Abeyta et al., 2015). This is especially true for college students, who face multiple problems such as academic obstacles and employment issues. College students with a low score of meaning in life tend to possess poor psychological resilience but a strong sense of insecurity and burnout, which forces them to cope with difficulties and challenges through more negative and passive behavioral strategies (Cho et al., 2014). This research also has significant practical implications. By offering self-growth education courses, universities can assist college students in developing a clearer sense of self-understanding and establishing their own values, ideals, and life goals. This approach can effectively improve their sense of mission and significance, which in turn will improve their sense of well-being.

6 Limitations and future directions

Although this study has obtained valuable results, there are still some limitations. First, the study did not collect data on psychiatric diagnosis and medication intake. Psychiatric diagnosis and drug intake may be confounding variables, which should be noted in future studies. Second, a questionnaire method was used to measure suicidal ideation, negative life events, entity theory, and meaning in life among college students. Future studies could use multiple sources of data to avoid a monolithic research approach. Additionally, this study was cross-sectional in design, lacking rigorous longitudinal comparative attribution. Causality between variables should be further explored using an experimental or follow-up study design. Finally, our study only made recommendations, lacking an intervention experiment to apply the results to confirm them. Future studies could explore the influence of implicit theory and meaning in life on college students' suicidal ideation in more complex models. This would pave the way for establishing comprehensive intervention programs based on the influencing mechanism of suicidal ideation.

7 Conclusion

Suicidal ideation is positively correlated with negative life events and entity theory; suicidal ideation is negatively correlated with meaning in life. Entity theory is negatively correlated with meaning in life. Entity theory plays a partial mediating role in the influence of negative life events on college students' suicidal ideation. In the effect of negative life events on college students' suicidal ideation, meaning in life moderated the effect of entity theory on college students' suicidal ideation in the second half of the model. For individuals with lower scores on meaning in life, the mediating role of entity theory was significant, while for individuals with higher scores on meaning in life, the mediating role of entity theory was not significant.

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 humans were approved by the Ethics Committee of Ludong University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

DL: Conceptualization, Data curation, Investigation, Methodology, Writing – original draft, Writing – review & editing. XG: Supervision, Writing – review & editing. FZ: Supervision, Writing – review & editing. YZ: Supervision, Writing – review & editing. XL: Supervision, Writing – review & editing.

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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Check for updates

Public responses and parasocial relationships following senator John Fetterman's depression disclosure

Jessica Gall Myrick[1]* and Jessica Fitts Willoughby[2]

[1]Department of Media Studies, The Pennsylvania State University (PSU), University Park, PA, United States, [2]Department of Strategic Communication, Washington State University, Pullman, WA, United States

Research has found that when a public figure discloses an illness, it can motivate members of the public to reconsider their own health behaviors, particularly when they have a parasocial relationship with the public figure. When the public figure is a politician, it is possible that partisan differences may also influence emotional, attentional, and behavioral responses to health news. We empirically examined public responses to Democrat John Fetterman's disclosure of his treatment for depression shortly after he was inducted into the United States Senate as the junior senator from Pennsylvania in 2023. Using a survey of adult Pennsylvania residents who identified as eligible voters in April 2023, we found that 204 respondents were aware of the news of Fetterman's diagnosis of and treatment for depression. Our data revealed that differences in demographics and parasocial relationships—both positive and negative—with Fetterman predicted different patterns of emotional responses to the news. In addition, age, anger, a negative parasocial relationship, and a positive parasocial relationship were associated with additional outcomes, including attention to news about the disclosure and depression-related information seeking. Mental health advocates could use politicians' depression disclosures to provide information at a time when people are paying more attention to the condition; however, they may need to find other public figures to counteract negative responses to partisan officials. Policymakers could also consider funding mental health campaigns, which could be launched alongside public figure disclosures.

KEYWORDS

depression, emotion, media, politics, attention, information seeking

Introduction

The psychological attachments people form with public figures through media can influence their responses to learning about a public figure's illness (1). These psychological attachments manifest in various ways, but often they appear as parasocial relationships, where individuals experience a one-sided sense of familiarity and emotional attachment to a public figure represented in the media (2). For instance, learning about singer Demi Lovato's diagnosis of bipolar disorder resulted in a decrease in negative stereotypes and social distancing intentions amongst audiences. This change in attitude was partially due to the influence of an existing parasocial relationship with Lovato (3).

In general, health disclosures by celebrities and public figures can impact emotions, information-seeking behaviors, and discussions about health on social media and can cause changes in health behavior, increased news coverage, and, in some cases, policy changes (4).

Indeed, in a meta-analysis of 14 studies with more than 5,700 participants that focused on the impact of health disclosures by celebrities on audience involvement and behavioral intentions, Kresovich and Noar (5) found that there was a small- to medium-sized positive association between audience involvement and behavioral intentions related to celebrity health disclosures. However, many of these studies have examined disclosures by generally popular entertainers. The present study aimed to assess whether similar public responses occur when a partisan political figure discloses a stigmatized health condition.

Through repeated media exposure to public figures, individuals can respond like a friend (i.e., develop a positive parasocial relationship) or a well-known enemy (i.e., develop a negative parasocial relationship) when misfortune befalls the public figures and is reported in the news (6). Compared to widely popular celebrities, politicians are often strongly liked or disliked by partisans who identify with different political groups. As such, their illness disclosures could have different effects on and could evoke different responses from the public. For instance, Myrick and Chen (7) found that many Americans experienced schadenfreude, or pleasure in another's pain, when they learned about conservative media figure Rush Limbaugh's diagnosis of lung cancer in February 2020 and about Kentucky Republican Senator Rand Paul's COVID-19 diagnosis in March of 2020.

In both cases, parasocial relationships—both positive and negative—with these political figures increased feelings of schadenfreude, which in turn decreased audience intentions to take preventative health measures (e.g., avoiding smoking in response to Limbaugh's lung cancer or minimizing social contact during the COVID-19 pandemic in response to Paul's COVID-19). Interestingly, feelings of schadenfreude and anxiety after learning about Limbaugh's lung cancer prompted participants to seek more information about the disease; however, these same emotions in response to Paul's COVID-19 diagnosis did not encourage individuals to seek more information about the virus.

These results reveal that although political figures disclosing an illness can shape public emotions and information-seeking behaviors, these responses are not uniform and vary depending on the health condition or the politician involved. We know less about how the public responds to the news of a politician's mental health crisis, especially given the stigma surrounding mental health (8). Understanding the effects of such a disclosure is an important public health goal because news media are often identified as both sources of mental health information and perpetrators of stigmatizing stereotypes that prevent some people from seeking treatment (9, 10).

If a politician reveals a mental illness diagnosis, it could make their constituents feel compassion or other tender emotions, which scholars define as emotions related to meaningful or moral events and caring for others (11). Researchers have found that news stories about members of stigmatized groups can elicit tender emotions (e.g., compassion, sympathy), which in turn encourages intentions to help and seek more information (12, 13). Public figure health disclosures have long been associated with information seeking. For instance, after President Ronald Reagan had part of his colon removed, calls to cancer information lines about colon cancer increased significantly (14). However, if Fetterman's mental health disclosure had caused individuals who already disliked him to experience anger or schadenfreude, then negative outcomes must also be considered.

Negative emotions, such as anger, experienced after receiving the news can prompt defensive audience responses (15), and anger has also been linked with lower levels of politics-related information seeking (16).

To investigate these possibilities, we empirically examined public responses to Democrat John Fetterman's disclosure of his treatment for depression shortly after he was inducted into the United States Senate as the junior senator from Pennsylvania in 2023. This disclosure came after he had suffered a stroke during his election campaign, after which he spoke publicly about the stroke and its effects, stating that he felt he was recovering well and would be well-poised to serve (17). The difficulty he experienced in processing information following the stroke was cited as a potential cause of the depression (18).

To summarize, research has shown that public figure health disclosures can affect audience responses; however, the responses may differ based on the strength and type of the parasocial relationship and emotional responses to the disclosure news. Moreover, when a disclosed health condition is stigmatized and associated with a partisan public figure, there could be further differences in public responses compared to disclosures involving other people or other health conditions. The present study can help determine if sociodemographic similarities (e.g., race, gender, and political party) are more or less predictive than parasocial relationships. Based on previous literature, we formulated two hypotheses and asked two research questions:

H1: Respondents who share some similarities with Fetterman (gender, race, political party, having a depression diagnosis, or knowing someone with a depression diagnosis) will report stronger tender emotions (e.g., concern or compassion) and lower negative emotions (e.g., schadenfreude or anger) to the news about Fetterman's depression diagnosis.

H2: After controlling for demographic variables, respondents' parasocial relationships—both negative and positive—will predict stronger emotional responses (concern, compassion, schadenfreude, or anger) to the news about Fetterman's depression diagnosis.

RQ1: Which variables—demographics, parasocial relationships, or emotional responses—will be the strongest predictors of post-disclosure attention to news about Fetterman's diagnosis and treatment?

RQ2: Which variables—demographics, parasocial relationships, or emotional responses—will be the strongest predictors of post-disclosure depression information seeking?

Methods

Procedure

We used Cloud Research's Prime Panels to recruit respondents for this online survey from 6 April 2023 to 10 April 2023. The eligibility criteria included Pennsylvania residents who were at least 18 years of age, U.S. citizens, and eligible to vote. We selected this population

because they were Fetterman's constituents and potentially more likely to consume news about him, given their voter eligibility status. After excluding individuals who failed attention checks, who did not report their age, or who did not report their citizenship status, 352 respondents were included in this study.

The respondents were first shown an image of Fetterman (his official U.S. Senate photograph) and asked to respond to questions assessing their parasocial relationship with him. Then, the respondents read the following statement: "John Fetterman was sworn in as Pennsylvania's junior senator in January of 2023. About a month later, in the middle of February, John Fetterman voluntarily checked himself into Walter Reed Hospital, at the advice of the Senate physician, in order to receive treatment for severe depression." The respondents were then asked: "Prior to taking part in this survey, were you aware that John Fetterman had entered the hospital this year to be treated for severe depression?" Nearly three-fifths (58.0%) said "yes," while 37.2% said "no," and another 4.8% chose "not sure/cannot remember." Those who said yes ($N = 204$) were the focus of the subsequent analyses.

Participants

Of the 204 respondents who had heard of Fetterman's depression diagnosis, 33.8% identified as Republicans, 41.7% as Democrats, 18.6% as Independents, and 5.9% as members of other parties. The majority of the respondents (60.3%) identified as women, 38.7% identified as men, and 1.0% identified as non-binary. The average age of the respondents was 49.16 years ($SD = 17.28$, range: 18–80 years). Nearly two-fifths (37.7%) of the respondents reported having been diagnosed with depression at some point in their lives, while half (51.5%) of the respondents reported having a close friend or family member with depression.

Measures

All items were measured using 7-point Likert-type scales, unless otherwise noted. See Table 1 for correlations between the study variables.

Parasocial relationships

A total of 22 items comprising the positive parasocial relationship (PSR) scale (11 items) and the negative parasocial relationship scale (11 items), answered on scales from 1 = strongly disagree to 7 = strongly agree, were adopted from Hartmann et al. (6). An exploratory factor analysis (EFA) with Promax rotation revealed two separate factors: one for the 11-item negative PSR scale (Cronbach's $\alpha = 0.96$, $M = 3.51$, $SD = 1.93$), explaining 58.77% of the variance, and one for the 11-items positive PSR scale (Cronbach's $\alpha = 0.96$; $M = 3.69$, $SD = 1.82$), explaining 16.59% of the variance.

Post-disclosure emotions

The respondents were presented with the following prompt: "Please think about when you first learned of John Fetterman's severe depression and admittance to the hospital. How did you feel? 'When I found out John Fetterman was diagnosed with depression and entered the hospital for treatment, I felt _____.'" This was followed by 14 emotions, answered on a scale from 1 = not at all to

7 = very much. The EFA with Promax rotation revealed that the word upset was cross-loaded onto multiple factors. The item upset was removed, and the subsequent EFA revealed three factors. The largest factor, explaining 40.64% of the variance, included the tender emotions, such as "sympathetic," "compassionate," "concerned," "hopeful," "worried," "sad," "optimistic," "stunned," and "surprised" (Cronbach's $\alpha = 0.91$; $M = 4.34$ and $SD = 1.56$). The second factor, explaining 21.10% of the variance, comprised the two anger words ("aggravated" and "angry," $r = 0.72$, $p < 0.001$; $M = 2.76$ and $SD = 1.88$). The third factor, explaining an additional 9.18% of the variance, included "pleased" and "secretly happy," which we labeled as schadenfreude ($r = 0.70$, $p < 0.001$; $M = 2.36$ and $SD = 1.70$).

Attention to Fetterman's depression news

The respondents were asked: "After you first learned about John Fetterman's severe depression, how much attention did you pay to stories in the media (in any form, print, television, or online) or on social media about it?" The endpoints and midpoint of the 7-point Likert-type scale were labeled as 1: "None after I initially heard about it," 4: "Not a little, but not a lot of attention," and 7: "A great deal, I read or watched everything I could on the topic" ($M = 4.34$ and $SD = 1.57$).

Depression-related information seeking

The respondents were asked to report if they sought any information from any of the following sources after initially learning about Fetterman's depression diagnosis and hospital admittance: an online search engine (e.g., Google, Bing) (24.5%); social media (e.g., TikTok, Instagram) (18.1%); a healthcare provider (e.g., a nurse or a doctor) (12.3%); a friend or family member (18.1%); a specific medical website (e.g., Mayo Clinic, CDC, etc.) (14.7%); and a specific news source (e.g., CNN, Fox, MSNBC, New York Times, etc.) (24%). A summative index was formed if the box was checked and the value was coded as 1, with higher numbers indicating that more sources were used to seek information about depression ($M = 1.12$, $SD = 1.19$, and mode = 1). The index was kurtotic ($K = 5.42$); 59 out of the 204 respondents did not seek depression information. Hence, we converted the index into a binary index with 0 "for not searching" and 1 "for searching through any medium."

Results

H1 and H2 predicted that demographics, including political party affiliations, would be related to emotional responses to Fetterman's depression disclosure. Three linear regressions with hierarchical entry (block entry) were run, with the demographic variables, such as gender, race, political party, and age, in the first block, a personal depression diagnosis and knowing someone with depression in the second block, and a positive PSR and a negative PSR in the third block, with tender emotions, schadenfreude, and anger as separate outcome variables (see Table 2).

The final model with all three blocks predicting schadenfreude was significant, with $F_{(8, 193)} = 12.86$, $p < 0.001$, and adjusted $R^2 = 0.35$. Age ($\beta = -0.16$, $b = -0.02$, 95% CI [-0.028 and -0.003], and $p = 0.016$), a positive PSR ($\beta = 0.47$, $b = 0.43$, 95% CI [0.286 and 0.577], and $p < 0.001$), and a negative PSR ($\beta = 0.64$, $b = 0.55$, 95% CI [0.427 and 0.681], and $p < 0.001$) were the significant predictors of schadenfreude in the model. Notably, the final block added a

TABLE 1 Bivariate correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Democrat												
2. White	−0.21**											
3. Man	−0.08	−0.03										
4. Age	−0.14	0.28**	0.07									
5. Has depression	0.18**	0.12	−0.12	−0.23**								
6. Someone close has depression	0.14*	0.10	−0.15*	−0.20**	0.45**							
7. Positive PSR	0.56**	−0.15*	−0.01	−0.19**	0.18**	0.19**						
8. Negative PSR	−0.45**	0.02	0.06	−0.00	−0.10	−0.16*	−0.59**					
9. Post-disclosure anger	−0.15*	−0.04	0.17*	−0.11	−0.06	−0.10	0.00	0.39**				
10. Post-disclosure schadenfreude	0.02	−0.12	0.09	−0.23**	0.01	−0.03	0.13	0.36**	0.48**			
11. Post-disclosure tender emotions	0.44**	−0.06	−0.08	−0.11	0.20**	0.24**	0.76**	−0.57**	0.04	0.02		
12. Attention	0.34**	−0.07	0.94	−0.06	0.16*	0.19**	0.54**	−0.30**	0.12	0.07	0.50**	
13. Seeking information	0.14*	−0.11	−0.00	−0.26**	0.10	0.03	0.22**	0.06	0.25**	0.23**	0.15*	0.19**

*$p < 0.05$, **$p < 0.01$ (2-tailed). Democrat: 0 = not a Democrat and 1 = Democrat; White: 0 = not White and 1 = White; Man (gender): 0 = not a man and 1 = a man; Depression diagnosis: 0 = no diagnosis and 1 = has been diagnosed; and Knows someone with depression: 0 = does not know anyone with depression and 1 = knows at least one person. Pos. PSR = positive parasocial relationship and Neg. PSR = negative parasocial relationship.

significant amount of variance, demonstrating the importance of both positive PSR and negative PSR in predicting schadenfreude.

The final model with all three blocks predicting anger was also significant, with $F (8, 193) = 8.45$, $p < 0.001$, and adjusted $R^2 = 0.23$. Gender (man) ($\beta = 0.13$, $b = 0.49$, 95% CI [0 0.013 and 0.970], and $p = 0.044$), a positive PSR ($\beta = 0.37$, $b = 0.381$, 95% CI [0.207 and 0.555], and $p < 0.001$), and a negative PSR ($\beta = 0.55$, $b = 0.535$, 95% CI [0.382 and 0.687], and $p < 0.001$) were the significant predictors of anger. Regarding schadenfreude, the third block, which included the two PSR variables, added a significant amount of variance.

The final model with all three blocks predicting the tender emotions was significant, with $F (8, 192) = 37.80$, $p < 0.001$, and adjusted $R^2 = 0.60$. Only a positive PSR ($\beta = 0.65$, $b = 0.56$, 95% CI [0.454 and 0.665], and $p < 0.001$) and a negative PSR ($\beta = -0.18$, $b = -0.14$, 95% CI [−0.235 and −0.051], and $p = 0.002$) were the significant predictors of the tender emotions. In addition, the third block added a significant amount of variance.

RQ1 asked which variables would predict post-disclosure attention to the news about Fetterman's diagnosis and treatment. A linear regression model with hierarchical entry was run to predict news attention, with the demographic variables in Block 1, depression diagnosis or knowing someone with depression in Block 2, the two types of PSR in Block 3, and the three emotion groups in Block 4. The final model with all four blocks was significant, with $F (11, 189) = 9.12$, $p < 0.001$, and adjusted $R^2 = 0.31$ (Table 3). In the final model with all four blocks, a positive PSR ($\beta = 0.37$, $b = 0.31$, 95% CI [0.312 and 0.492], and $p < 0.001$) was the only significant predictor of this outcome, although knowing a close friend or family member ($\beta = 0.11$,

$b = 0.35$, 95% CI [−0.063 and 0.772], and $p = 0.096$), anger ($\beta = 0.12$, $b = 0.10$, 95% CI [−0.018 and 0.222], and $p = 0.095$), and the tender emotions ($\beta = 0.18$, $b = 0.18$, 95% CI [−0.015 and 0.364], and $p = 0.071$) had p-values under 0.10.

RQ2 asked which variables would predict post-disclosure information seeking about depression. A binomial logistic regression found that older age decreased the likelihood of seeking information about depression by 3% (odds ratio = 0.97), while a positive PSR (58%; odds ratio = 1.58), a negative PSR (45%; odds ratio = 1.45), and post-disclosure anger (34%; odds ratio = 1.34) all increased the odds of information seeking (Table 4). No other variables in the model were significant.

Discussion

Our data lend support to the notion that a politician can be a polarizing figure while simultaneously bring attention to and evoke compassionate feelings about people living with depression. Both positive parasocial relationships, akin to a mediated friendship, and negative parasocial relationships, akin to having an enemy or a disliked colleague, increased the antisocial emotional responses to Fetterman's depression disclosure (schadenfreude and anger) and information-seeking behavior about depression. However, only a positive parasocial relationship was associated with increased tender emotions, such as compassion and concern. Importantly, a positive parasocial relationship with Fetterman was related to people paying more attention to additional news about his depression. Paying attention

TABLE 2 Linear regression with hierarchical entry predicting emotional responses to depression disclosure.

	Schadenfreude			Anger			Tender emotions		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Democrat	−0.03	−0.02	0.03	**−0.15***	−0.14	−0.08	**0.44***	**0.41***	−0.01
White	−0.07	−0.06	−0.01	−0.03	−0.02	0.02	0.05	0.01	0.02
Man	.0.12	0.11	0.08	**0.17***	**0.16***	**0.13***	−0.04	−0.01	−0.05
Age	**−0.23****	**−0.25****	**−0.16***	−0.12	−0.14	−0.07	−0.06	−0.01	0.03
With a depression diagnosis		−0.01	−0.04		0.00	−0.03		0.06	0.03
Knows someone with depression		−0.06	−0.03		−0.08	0.506		**0.15***	0.07
Pos. PSR			**0.47***			**0.37***			**0.65***
Neg. PSR			**0.64***			**0.55***			**−0.18***
R^2	0.077	0.081	0.348	0.063	0.069	0.259	0.203	0.232	0.612
R^2 change			**0.267***		0.005	**0.191***		0.028	**0.380***

*$p < 0.005$; **$p < 0.01$; and ***$p < 0.001$. Coefficients are standardized. Democrat: 0 = not a Democrat and 1 = Democrat; White: 0 = not White and 1 = White; Man (gender): 0 = not a man and 1 = a man; Depression diagnosis: 0 = no diagnosis and 1 = has been diagnosed; and Knows someone with depression: 0 = does not know anyone with depression and 1 = knows at least one person. Pos. PSR = positive parasocial relationship and Neg. PSR = negative parasocial relationship. Values in bold are significant at $p < 0.05$.

TABLE 3 Linear regression with hierarchical entry predicting attention to depression disclosure news.

	Model 1	Model 2	Model 3	Model 4
Democrat	**0.34***	**0.31***	0.06	0.07
White	0.01	−0.04	−0.02	−0.03
Man	0.03	0.06	0.03	0.02
Age	−0.01	0.05	0.10	0.10
Depression diagnosis		0.08	0.06	0.05
Knows someone with depression		**0.16***	0.12	0.11
Pos. PSR			**0.53***	**0.37***
Neg. PSR			0.06	0.03
Anger				0.12
Schadenfreude				0.00
Tender emotions				0.18
R^2	0.116	0.153	0.318	0.347
R^2 change		**0.037***	**0.165***	**0.029***

*$p < 0.05$ and ***$p < 0.001$. Democrat: 0 = not a Democrat and 1 = Democrat; White: 0 = not White and 1 = White; Man (gender): 0 = not a man and 1 = a man; Depression diagnosis: 0 = no diagnosis, 1 = has been diagnosed; and Knows someone with depression: 0 = does not know anyone with depression and 1 = knows at least one person. Pos. PSR = positive parasocial relationship and Neg. PSR = negative parasocial relationship. Values in bold are significant at $p < 0.05$.

beyond the initial disclosure news is beneficial from a public health perspective as it means that audiences may learn more about treatment options and their effectiveness, thereby helping to counteract the common stigmatizing belief that mental illness is not treatable (19).

Interestingly, anger was associated with information seeking about depression; this finding was in contrast with the findings of some previous studies linking anger to decreased information seeking about

politics (16). Anger, unlike other negative emotions, is an approach emotion associated with risk-taking and action (20). People who had a positive parasocial relationship with Fetterman might have felt anger when others mocked him or expressed schadenfreude (as we found some people did), while others might have felt anger because they perceived him as not doing his job or as unfit for the job. Given that Fetterman is not up for reelection until 2028 and has no announced opponent for the distant election, it could be that the angry respondents discovered that information seeking about depression was one way to channel their emotions. However, they might have been seeking information in an effort to reinforce their existing views (depression can be treated vs. depression makes one unfit). More research is needed to investigate this possibility.

In our analysis, the respondents' political party affiliations were not a significant predictor of emotional responses, attention to subsequent news, or information seeking. This shows that partisanship may not be a simple sociodemographic factor for segmenting audiences for mental health messaging after a politician discloses a diagnosis. Contrarily, parasocial relationships (especially a positive one) were more strongly associated with our outcomes. Research across multiple media and contexts involving public figures has shown that additional, or repeated, exposure can strengthen parasocial relationships (21, 22). As such, it could be that frequent political news consumers are more likely to be moved by a politician's depression disclosure than the partisans of the same party.

This study has certain limitations. It included a small sample collected in relation to one (somewhat eccentric) senator who also had a recent stroke that was highly publicized. We do not know how the results might change with a different sample based on a depression disclosure from a different senator from a different political party and/ or with a different personality or health history. In addition, we did not assess general information-seeking tendencies or general media, which future research could consider as covariates.

Future research can build on our findings to assess how information seeking prompted by a politician's depression disclosure

TABLE 4 Logistic regression predicting depression-related information seeking.

Predictor	B	p	Exp(B)	95% CI for Exp(B)	
				LL	UL
Democrat	0.607	0.200	1.835	0.726	4.640
White	−0.197	0.772	0.821	0.218	3.099
Man	0.066	0.862	1.068	0.952	2.234
Age	**−0.027**	**0.016**	**0.973**	**0.510**	**0.995**
Depression diagnosis	0.167	0.691	1.182	0.520	2.687
Knows someone with depression	−0.238	0.552	0.788	0.360	1.726
Pos. PSR	**0.454**	**0.014**	**1.575**	**1.094**	**2.266**
Neg. PSR	**0.372**	**0.029**	**1.451**	**1.039**	**2.026**
Anger	**0.292**	**0.017**	**1.340**	**1.053**	**1.705**
Schadenfreude	0.065	0.676	1.067	0.767	1.446
Tender emotions	0.073	0.644	1.076	0.789	1.467
Constant	−1.698	0.241	0.183	–	–

Exp(B) are the odds ratios, CI = confidence interval; LL = lower limit; and UL = upper limit. Democrat: 0 = not a Democrat and 1 = Democrat; White: 0 = not White and 1 = White; Man (gender): 0 = not a man and 1 = a man; Depression diagnosis: 0 = no diagnosis and 1 = has been diagnosed; and Knows someone with depression: 0 = does not know anyone with depression and 1 = knows at least one person. Values in bold are significant at $p < 0.05$.

relates to stigma and eventual behaviors, be it advocacy for others or finding treatment for oneself. Another avenue for future research is to use experiments in which participants are presented with hypothetical disclosures from a variety of politicians to better understand the issues of causality, which our cross-sectional data could not show. Responses to political figures' disclosures versus celebrities' or other public figures' disclosures could also be examined to compare how differences in the source might impact results. In addition, future research could benefit from examining how mental health advocates and other interested organizations can capitalize on opportunities presented by media coverage of mental health disclosures by politicians, without inadvertently alienating certain subgroups of the general public.

This work also has implications for policies. Despite the growing awareness of the importance of mental health in the United States, there are a number of barriers to finding treatment (23). Policies are needed to support structural resources for those in need of mental healthcare so that when events such as public figure disclosures prompt information seeking, people are able to access trustworthy information and resources. In addition, with the plethora of information available online, some of which is inaccurate or deceitful, it is important for organizations with medically accurate information and resources to position themselves in ways that brings them to the top of search results. Future research can also employ these findings to target timing and audience segmentation.

Conclusion

In conclusion, we found that Fetterman's depression was associated with emotional responses and information behaviors, such as paying more attention to subsequent news and seeking out information about depression. These responses differed, slightly, for people who already felt positively or negatively connected to the Senator. Mental health advocates could use politicians' depression disclosures to provide information at a time when already sympathetic audiences are paying more attention. However, they may need to highlight other public figures to counteract the stigma generated by partisan opponents.

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 humans were approved by the Pennsylvania State University Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because of only minimal risk to participants and no invasive questions being asked.

Author contributions

JM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. JW: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

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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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Effectiveness of a resilience school-based intervention in adolescents at risk: a cluster-randomized controlled trial

Maria Llistosella[1,2]*, Pere Castellví[3], Mercedes García-Ortiz[1], Griselda López-Hita[1], Clara Torné[1], Ramona Ortiz[4], Erika Guallart[5], Estefanía Uña-Solbas[5] and Juan Carlos Martín-Sánchez[6]

[1]Primary Health Care, Consorci Sanitari de Terrassa (CST), Terrassa, Spain, [2]Department of Nursing, International University of Catalonia (UIC), Sant Cugat del Vallès, Spain, [3]Department of Medicine, International University of Catalonia (UIC), Sant Cugat del Vallès, Spain, [4]Primary Health Care, Servei Català de la Salut, Barcelona, Spain, [5]Primary Health Care, Hospital Mútua de Terrassa, Barcelona, Spain, [6]Department of Basic Sciences, International University of Catalonia (UIC), Sant Cugat del Vallès, Spain

Introduction: School offers a key context to promote resilience. The aim of this study was to assess the effectiveness of a school-based resilience intervention in 578 at-risk adolescents aged 12 to 15, emphasizing the significance of resilience improving mental health.

Methods: A cluster-randomized controlled trial with parallel arms was conducted during the 2021/22 academic course. A specific training of six 55-minute sessions over 6 weeks was carried out for the students. Each session consisted of 5 minutes of mindfulness, followed by 45 minutes of the corresponding activity: introduction to resilience, self-esteem, emotional regulation strategies, social skills, problem solving, community resources, and peer support. Primary outcomes were assessed by the Child Youth Resilience Measure-32 at baseline (T1), post-intervention (T2), and then at the 24-week follow-up (T3). Both groups were compared using the Student's t-test. The effect size was calculated using Cohen's *d* and linear regression models were used.

Results: A total of 578 adolescents were included, 323 in the control group and 255 in the intervention group. Significant differences in both crude and adjusted analyses for Child Youth Resilience Measure were observed at 24 weeks follow-up, showing higher resilience for the intervention group [IG, *M* = 128.7, *SD* = 14.2; CG, *M* = 125.3, *SD* = 18.4; *p* = 0.027; *d* = 0.2; *p* = 0.043, *d* = 0.16]. Furthermore, in Depressive symptoms, lower values were found for the intervention group in both crude and adjusted analyses [IG, M = 2.3 (SD = 2.5); CG, M = 2.8 (SD = 2.5); *p* = 0.04; *d* = −0.20; *p* = 0.037, *d* = −0.18].

Discussion: This study contributes to fostering resilience and positive adolescent development. It also reinforces the potential of multicomponent interventions. More continuous follow-up assessments are needed to identify possible long-term changes in resilience.

Clinical Trial Registration: Identifier: NCT05133115. https://clinicaltrials.gov/study/NCT05133115.

1 Introduction

Adolescence is characterized by biological, psychological, and social transformations with considerable changes in emotional and cognitive development (Blakemore et al., 2007; Azpiazu Izaguirre et al., 2021), being more vulnerable to developing mental health problems (Rew et al., 2014). These adolescent-specific vulnerability factors have been increased by the effect of long-term consequences of the COVID-19 pandemic and socio-economic inequalities that increase adolescents' risk of poverty and social exclusion and have a psychological impact on their mental health (Ryu and Fan, 2023).

The negative effect of COVID-19 on adolescent mental health was described in several studies (Gracia et al., 2021; Hermosillo-de-la-Torre et al., 2021). A systematic review published by Meherali et al. (2021) concluded that increased emotional stress, anxiety, and depression were the most common consequences of the COVID-19 pandemic (Meherali et al., 2021). Furthermore, a preliminary study of the effects of the COVID-19 pandemic on suicide attempts showed that suicide attempts among adolescents increased by 25% during the COVID-19 year (Gracia et al., 2021). However, not all risk-exposed adolescents develop psychological problems; this is where the phenomenon of resilience may emerge.

Resilience is a phenomenon observed in adverse contexts where risk factors can negatively affect psychological development (Wright et al., 2013). Resilience is defined in various ways, and there is no singular or universally recognized definition (Aburn et al., 2016). Connor and Davidson (2003) defined resilience as a psychological trait or quality that characterises individuals with an increased ability to cope with adversity (Connor and Davidson, 2003). Resilience is also defined as a dynamic process (Masten, 2001) involving the adoption of positive adaptive behaviors in response to a risky environment (Masten and Obradovic, 2006). Defining resilience as a dynamic process implies that there is an association between individual traits, the risk context, and social and psychological outcomes (Masten and Obradovic, 2006).

Resilience is a complex and dynamic process (Masten, 2001) in which many protective factors are engaged. Several protective factors have been described in the literature. For example, in the Individual and Environmental Resilience Model (IERM) described by Llistosella et al. (2022), more than 60 protective factors were identified in the literature. The IERM classifies them into (a) individual factors and (b) environmental factors and highlights them with the most scientific evidence: coping, self-esteem, emotional regulation strategies, or community resources and peer support, among others (Llistosella et al., 2022). In addition, other factors were also described in the literature, such as problem-solving (Suranata et al., 2020) and mindfulness (Tripa et al., 2020). Many of these protective factors can develop over time and modify an individual's ability to cope with adversity (Liebenberg, 2020).

Resilience is also considered a key in the perspective of positive development in adolescents and mental health (Aburn et al., 2016; Morrish et al., 2018); this is why several resilience training programs have been conducted in different contexts and populations (Chmitorz et al.,

2018). Most of the resilience-based interventions found in the literature were focused on individual protective factors. Among them, we highlight social–emotional competence (Volanen et al., 2020); self-awareness (Kuperminc et al., 2020; Tripa et al., 2020), or coping skills (Suranata et al., 2020). Concerning the protective factors related to the environment, most of the interventions focused on social and school support (Kuperminc et al., 2020) and peer relationships (Kuperminc et al., 2020; Maalouf et al., 2020). Furthermore, the cognitive problem-solving technique is one of the most used in resilience interventions (Suranata et al., 2020; Llistosella et al., 2023a).

Certain types of resilience-based interventions are significantly beneficial, in particular, interventions using multicomponent (Llistosella et al., 2023a) and cognitive behavior therapy [(CBT); Dray et al., 2017; Pinto et al., 2021; Llistosella et al., 2023a]. Given the many protective factors involved in resilient processes, other resilience-based interventions focused on social–emotional learning (SEL), counseling, or mindfulness did not increase resilience alone (Llistosella et al., 2023a). This implies that further research is needed in this field to increase the evidence on resilience-based interventions (Goldberg et al., 2019) and their impacts. Recently, two meta-analyses of resilience interventions showed that resilience interventions were only effective in adolescents, especially young adolescents (between 10 and 13) and at-risk populations (Llistosella et al., 2023a), but not in the general population (Llistosella et al., 2023a) and children (Pinto et al., 2021).

Furthermore, in the majority of studies included in a systematic review conducted by Samji et al. (2022), the COVID-19 pandemic has been associated with elevated levels of depressive and anxious symptoms among children and youth, along with a concerning deterioration in mental well-being (Samji et al., 2022). Consequently, innovative approaches to promote resilience and mental well-being should be developed, especially those focusing on higher-risk subgroups (Samji et al., 2022).

Given the evidence presented, and acknowledging that approximately 70 to 80% of the population lacks sufficient mental health support (Thornicroft, 2007), fostering resilience in adolescents may be an effective strategy for coping with challenges in stressful situations, such as the COVID-19 pandemic.

In summary, resilience plays a critical role in adolescent mental health outcomes. This study assesses the effectiveness of the Fostering Resilience in Adolescents at Risk (FRAK) intervention, an innovative intervention based on the recent IERM resilience model, described above. The FRAK intervention represents a comprehensive approach grounded in the recent IERM resilience model. This multicomponent intervention integrates social and emotional learning, mindfulness practices, and various protective factors, including emotional regulation, self-awareness, social support, and problem-solving skills. Developed in alignment with the ecological framework and empirical evidence, the FRAK intervention aims to enhance protective factors identified in the IERM model among at-risk adolescents (Llistosella et al., 2022).

This study was registered in the Clinical Trials (NCT05133115. November 2021) and the RCT protocol is available for review (Llistosella et al., 2023b). The established protocol was followed,

without variation in the primary and secondary outcomes. The proposed statistical analyses were followed adding the effect size calculation which was not previously taken into account. Furthermore, the sample size was set at a lower number than the final number of participants in the study. However, this was also commented on in the study protocol. There were also no variations in the implementation of the intervention.

2 Study objectives and hypotheses

2.1 Objectives

The objectives of this study were: (1) to assess the effectiveness of an intervention on resilience capacities; (2) to increase the emotional regulation strategies; and (3) to assess the association between resilience intervention and depressive symptoms in adolescents at risk aged 12-to-15 (Llistosella et al., 2023b).

2.2 Research hypothesis

We hypothesized that adolescents at risk between 12 and 15 years old who participated in a resilience school-based intervention would increase their resilience capacities and emotional regulation strategies compared to the control group. Resilience would also be associated with a decrease in depression symptoms in the intervention group compared to the control group.

3 Methods and analysis

3.1 Design

The study is a cluster-randomized controlled trial with parallel arms (NCT05133115. November 2021). Eligible schools were randomly allocated to intervention or control groups.

3.2 Participants

Participants were adolescents (boys and girls) from sixth and seventh grades (aged 12-to-15 years) in a risk context (risk of social exclusion and socioeconomic deprivation neighborhoods)-and all those who consented to participate in the project. Those who did not want to participate in the intervention activities were excluded. For more information, see the RCT protocol (Llistosella et al., 2023b).

3.3 Procedure

Recruitment of participants began after the start of the school year (November–December 2021) in nine schools in Terrassa, Manresa, and Barcelona (in neighborhoods at risk of social exclusion), Spain. Of the nine schools contacted, one declined to participate in the project as it was already involved in another research (Figure 1).

Firstly, schools were randomly assigned to the Intervention ($n = 11$ classes) and control ($n = 14$ classes) groups by an external researcher using computer-generated random numbers; secondly, both groups were randomized into the different school sixth and seventh grades. Finally, the intervention group was composed of 7 classes of seventh grade, four classes to sixth grade, and the control group was composed of nine classes of seventh grade and 5 classes of sixth grade. This recruitment process resulted in the enrollment of 584 participants in 8 schools. Participant groups and the research team were not blinded (Llistosella et al., 2023b).

Data collection started in January 2022 and finished in December 2022. Data were collected at baseline, after 6 weeks of the intervention (Post intervention I), and 24 weeks later (Post intervention II). For more details, please see the RCT protocol (Llistosella et al., 2023b).

3.4 Intervention

3.4.1 Intervention group

This intervention, Fostering Resilience in Adolescents at Risk (FRAK), was based on the IERM model described above and developed by a multidisciplinary and expert group. This multicomponent intervention was developed according to the empirical evidence and contextual information (Llistosella et al., 2023b). Each of the 6 weekly 55-min sessions included social and emotional learning, mindfulness, and activities to foster protective factors. Each session consisted of 5 min of mindfulness, followed by 45 min of the corresponding theme and 5 min to explain the activity to do in the reflective dossier. The sessions were outlined in the following themes: (1) introducing resilience, (2) self-esteem, (3) emotional regulation strategies, (4) social skills, (5) solving problems, (6) community resources and social and peer support. A complementary voluntary reflective dossier was designed with 6 individual activities to maintain the continuity of activities at home. For more details, please see the RCT protocol (Llistosella et al., 2023b).

Eleven primary health nurses, previously trained, carried out the intervention during school hours, and the teacher of each class was always present during all sessions. The sessions were held face-to-face and on time, despite the epidemiological situation of COVID-19. There were no significant variations during the intervention sessions.

3.4.2 Control group

The research questionnaires were completed by the participants from the intervention and control groups during the same time period (January to December 2022). Following the RCT protocol and the instructions of the ethics committee, all schools in the control group were put on a waiting list to receive the intervention (Llistosella et al., 2023b). The intervention is currently being implemented in these schools.

3.4.3 Monitoring procedure and risk participants

An independent monitoring committee endorsed the protocol and followed up on the process; there were no variations from the previously described protocol. During the intervention sessions, five risk cases were detected (three cases of bullying and two cases of eating disorders). Following the protocol designed (Llistosella et al., 2023b), parents and/or caregivers were informed by the nurses. A public list of resources was provided to each participant, a visit with a primary health care pediatrician was suggested, and the bullying

FIGURE 1
Consolidated standards of reporting Clinical Trial (CONSORT) flow chart.
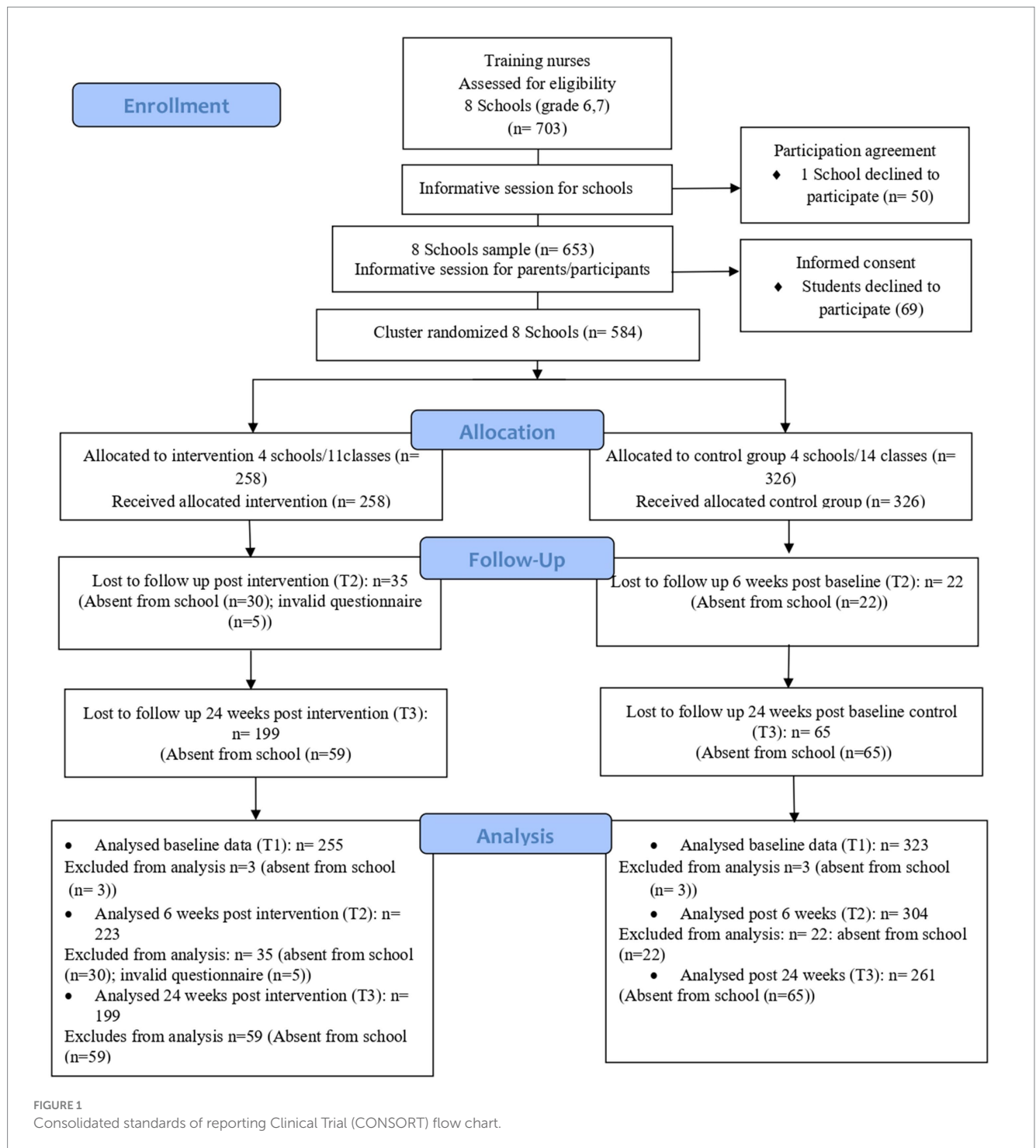
school protocol was activated for the cases detected. Confidentiality was maintained during the process.

3.5 Outcomes measures

Resilience as a primary outcome was assessed using the Child Youth Resilience Measure-32 [(CYRM-32); Llistosella et al., 2019]. Additionally, the Brief Resilience Coping Scale [(BRCS); Limonero et al., 2014] was also used to analyze resilience (Table 1).

Secondary outcomes were assessed with the Emotion Regulation Questionnaire [(ERQ); Gross and John, 2003; Cabello et al., 2013], and Depressive symptoms were assessed by assessing a single item: "Are you depressed or sad?" (Chochinov et al., 1997; for more information see Table 1).

In addition, demographic variables such as age, gender, and culture (European—including all countries from the European Union—and others, including Morocco, Asian countries, and Latin American countries, among others) were assessed. These variables were considered potential confounders.

TABLE 1 Primary and secondary outcomes in FRAK study.

Outcome	Scale	Psychometric proprieties
Primary outcome		
Resilience	CYRM-32 (Llistosella et al., 2019)	A 5-point Likert-scale. 32 items designed to assess resilience in adolescents and young people (aged 12 to 23 years) in three factors (Individual Skills, Interaction with others, and Family interaction). Cronbach's α was 0.88. Temporal stability was assessed by Pearson correlation and it was 0.695 for the total score of the scale. Total scores equal to or less than 132 indicate low resilience, and total scores equal to or greater than 132 indicate high resilience.
	BRCS (Limonero et al., 2014)	Self-reported measure composed of four items; for each item, participants use a 5-point Likert scale (1 = "does not describe you at all" and 5 = "it describes you well"). Cronbach's α was 0.7; temporal stability at 6 weeks was measured by Pearson correlation, and its value was 0.69. Total scores equal to or less than 13 indicate low resilience, and total scores equal to or greater than 17 indicate high resilience.
Secondary outcome		
Emotion regulation strategies	ERQ (Cabello et al., 2013)	This questionnaire was used to assess two emotion regulation strategies: cognitive reappraisal (6 items) and expressive suppression (4 items). Participants responded using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Cronbach's α coefficients were: 0.75 (Suppression) and 0.79 (Reappraisal). Pearson coefficient was used to evaluate test–retest reliability over 3 months, values were 0.66 (Suppression) and 0.64 (Reappraisal).
Depressive symptoms	Are you depressed or sad? (Chochinov et al., 1997)	Numerical scale range 0–10 (0-not depressed, 10-worst possible depression). A high sensitivity (1.00) and specificity (1.00) to identify depressed mood, and absence of false positive and negative rate (0.00) were presented.

CYRM-32, Child Youth Resilience Measure-32; BRCS, Brief Resilient Coping Scale; ERQ, Emotion Regulation Questionnaire.

3.6 Sample size calculation

Initially, the GRANMO tool (Antaviana, n.d.) was used to calculate the sample size with the standard deviation (SD) of the CYRM-32 scale, requiring a minimum of 70 participants per group (Llistosella et al., 2023b). However, because no randomization by classes was performed, but rather initially by schools and then by grades, as explained in the procedure section, it was decided, at the request of the schools and the ethical committee, to include all classes from each grade, resulting in a total sample of 584 participants from eight schools located in vulnerable neighborhoods; distributed as 323 students in the control group and 255 students in the intervention group.

3.7 Data analysis

An intention-to-treat analysis was performed. The data was described with frequency and percentage for qualitative variables, mean and standard deviation for normal quantitative variables, and median and quartiles for non-normal quantitative variables. In order to compare the two groups (control and intervention), the chi-square test was performed for qualitative variables, the t-student test was performed for normal quantitative variables, and the Mann–Whitney test was performed for non-normal quantitative variables. A regression linear model was fitted to adjust the difference between groups for gender, grade, culture, and baseline scores. To check normality, the Kolmogorov–Smirnov test and the Shapiro–Wilk test were used. All the confidence intervals will be performed with a 95% confidence level. The effect size was calculated using Cohen's d. All the analyses were performed with the software R version 4.4.1 and following the research protocol (Llistosella et al., 2023b).

4 Results

4.1 Implementation

Out of 584 participants enrolled in 6th and 7th grades, 578 (98.9%) provided baseline data (T1) and were included in the analysis: 255 were assigned to the intervention group and 323 to the control group. Participants in the intervention group had high adherence: 61% (n = 155) attended all 6 sessions, 24.5% (n = 63) 5 sessions, 3.2% (n = 8) 4 sessions, 5.1% (n = 14) 3 sessions and 4.7% (n = 13) attended ≤2 sessions. Furthermore, 58.8% filled out the reflective dossier.

At 6 weeks of follow-up (T2), 527 (90%) participants were included in analysis. In the intervention group, 30 (11.6%) participants were absent from school and 5 (1.9%) had an invalid questionnaire; in the control group, 22 (6.7%) participants were absent from school. Finally, in 24 weeks of follow-up (T3), a total of 460 (80%) participants were included in the analysis; 59 (22.8%) participants in the intervention group and 65 (20%) in the control group were absent from school (sick, changed schools or repeated grades). Considering both groups, the missing sample did not exceed 10% in T1 and T2 and 20% in T3.

4.2 Baseline sample characteristics

The baseline characteristics of the total sample and in both control and intervention groups were described in Table 2. Out of the 578 participants, 46.9% were female, 72.7% were European, and 61.9% were students from 7th and 38.1% from 6th grade. The mean scores for the main variables were: CYRM-32 [M = 26.2 (SD = 16.3)]; BRCS [M = 12.8 (SD = 3.0)]; ERQ-suppression [M = 3.8 (SD = 1.3)]; and ERQ-reappraisal [M = 4.3 (SD = 1.1)]. The mean Depressive symptoms score was 2.9 (SD = 2.7). No

statistically significant difference appeared in the distribution characteristics between the intervention and control groups (see Table 2).

4.3 Findings of the intervention

Results from 6 weeks after the intervention (T2) were presented in Table 3. No significant differences were found in all the scores for the main variables in crude and adjusted comparisons: CYRM-32 ($p = 0.272$; $p = 0.092$); BRCS ($p = 0.697$, $p = 0.080$); ERQ-suppression ($p = 0.723$; $p = 0.193$); ERQ-reappraisal ($p = 0.723$; $p = 0.973$) and Depressive symptoms ($p = 0.954$; $p = 0.610$).

Concerning results from 24 weeks follow-up (T3), there were significant differences in both crude and adjusted analyses for CYRM-32, showing higher scores for the intervention group [IG, $M = 128.7$, $SD = 14.2$; CG, $M = 125.3$, $SD = 18.4$; $p = 0.027$; $d = 0.2$; $p = 0.043$, $d = 0.16$]. Furthermore, in Depressive symptoms, there were lower values for the intervention group in both crude and adjusted analyses [IG, $M = 2.3$ ($SD = 2.5$); CG, $M = 2.8$ ($SD = 2.5$); $p = 0.04$; $d = -0.20$; $p = 0.037$, $d = -0.18$]. No significant difference between groups was found in BRCS ($p = 0.229$) and ERQ scales [ERQ-reappraisal ($p = 0.256$); and ERQ-suppression ($p = 0.750$); Table 4].

Table 5 describes and compares changes in the control group and in the intervention group from the baseline (T1) to the 6-week (T2) and from the 6th week to the 24-week follow-up (T3), respectively. In the control group, the only statistically significant change was for the BRCS score in T2, although had a small increase (M = 0.4, SD = 3.0, $p = 0.048$). Regarding the intervention group, there was also a statistically significant increase in the BRCS score in T2 (M = 0.6, SD = 2.9, $p = 0.004$). In T3, the intervention group had an increase in CYRM-32 score total (M = 3.3,

SD = 13.9, $p = 0.002$). Comparing the change in the two groups, there were also statistically significant differences for CYRM-32; all with a greater change in the intervention group.

5 Discussion

The Fostering Resilience in Adolescents at Risk (FRAK) study is the first trial developed to promote resilience in high schools for adolescents who live in socioeconomic deprivation neighborhoods in Spain.

An important outcome was that at the end of the study, higher resilience levels were obtained for the Child Youth Resilience Measure −32 (CYRM-32), along with lower levels of depressive symptoms, were observed in the intervention group compared to the control group at the 24-week follow-up (T3). Although, no significant correlation was observed with the Brief Resilient Coping Scale (BRCS) single-dimensional scale. This discrepancy may be attributed to the broader scope of dimensions assessed by the CYRM-32 scale beyond solely individual protective factors.

Contrary to our expectation, no significant difference in resilience, emotional regulation, and depressive symptoms was found immediately after the intervention (T2) between the intervention and control groups. Despite this, after 24 weeks of follow-up (T3), a significant difference was observed in resilience and depressive symptoms between groups (intervention and control), showing higher scores in resilience and lower scores in depression symptoms in the intervention group. Regarding the literature, mixed results were found in multicomponent resilience intervention studies in adolescents. On the one hand, some studies report improvements in psychological variables and resilience just after the intervention (Hyun et al., 2010; Suranata et al., 2020), and others did not

TABLE 2 Baseline characteristics of the study population in control and intervention group.

	Overall		Control group		Intervention group		Comparison	
	n	%	*n*	%	*n*	%	X^2	*p*
Gender								
Male	307	53.1	173	53.6	134	52.5	0.02	0.875
Female	271	46.9	150	46.4	121	47.5		
Grade								
6th	220	38.1	126	39	94	36.9	0.19	0.659
7th	358	61.9	197	61	161	63.1		
Culture	420							
European	158	72.7	240	74.3	180	70.6	0.81	0.367
Others		27.3	83	25.7	75	29.4		
	M	SD	M	SD	M	SD	*t*	*p*
CYRM-32	126.2	16.3	127.3	16.1	124.8	16.5	−1.77	0.078
BRCS	12.8	3	12.9	3.1	12.7	3	−0.71	0.476
ERQ-suppression	3.8	1.3	3.7	1.3	3.9	1.3	1.53	0.126
ERQ-reappraisal	4.3	1.1	4.3	1.1	4.4	1.2	0.85	0.397
Depressive symptoms	2.9	2.7	2.7	2.6	3	2.7	1.3	0.195

CYRM-32, Child Youth Resilience Measure-32; BRCS, Brief Resilient Coping Scale; ERQ, Emotion Regulation Questionnaire; M, mean; n, absolute frequency; p, p-value; SD, standard deviation; t, t-student test statistic; X^2, chi-square test statistic.

TABLE 3 Outcomes at six-week follow-up in the control group and in the intervention group. Crude and adjusted comparison, including gender, grade and baseline scores of dependent variables.

	Control group		Intervention group		Crude comparison			Adjusted comparison	
	M	SD	M	SD	t	p	d [95% CI]	p	d [95% CI]
CYRM-32	127.0	17.9	125.3	15.9	−1.10	0.272	−0.10 [−0.27, 0.08]	0.092	−0.10 [−0.22, 0.02]
BRCS	13.1	3.0	13.2	3.0	0.39	0.697	0.03 [−0.14, 0.21]	0.808	0.02 [−0.14, 0.17]
ERQ-suppression	3.8	1.3	3.9	1.2	1.58	0.115	0.14 [−0.03, 0.32]	0.193	0.10 [−0.05, 0.25]
ERQ-reappraisal	4.2	1.1	4.2	1.1	0.35	0.723	0.03 [−0.14, 0.21]	0.973	0.00 [−0.16, 0.16]
Depressive symptoms	2.9	2.8	2.9	2.8	−0.06	0.954	0.00 [−0.18, 0.17]	0.610	−0.04 [−0.18, 0.10]

CYRM-32, Child Youth Resilience Measure-32; BRCS, Brief Resilient Coping Scale; ERQ, Emotion Regulation Questionnaire; CI, confidence interval; M, mean; p, p-value; SD, standard deviation; t, t-student test statistic; and d (effect size). Adjusted for gender, grade, culture, and baseline outcome.

(Stapleton et al., 2017). Interventions using SEL, mindfulness, or problem-solving techniques did not show changes in resilience immediately after the intervention, contrary to some studies using counselling, mentoring or CBT-based interventions (Sugiyama et al., 2020; Suranata et al., 2020; Zhang et al., 2021).

Our results did indeed report changes in resilience after 24 weeks of follow-up. Other studies with interventions similar to ours did not give short-term results (Maalouf et al., 2020; Kelley et al., 2021) but did not have a follow-up to verify whether changes occurred in the long term. In contrast, studies with interventions of 12 to 23 weeks with follow-ups for longer periods showed an increase in resilience just after the intervention (Castro-Olivo, 2014; Leventhal et al., 2015; Mirza and Arif, 2018). Multicomponent interventions based on these techniques, which involve a reflective capacity and fear on the part of the learner, likely need a certain time frame to show their effects. Consequently, more studies are required in order to determine the time of effectiveness.

Our findings showed that the improvement in resilience remained at the 24-week follow-up, suggesting that FRAK has long-term effects, although more follow-up assessments should have been done. It might have been caused by the structure of the program itself, with facilitators frequently reiterating ideas like individual strengths and valuing the strengths of others. In addition, participants were invited to apply the concepts at home and report back the following week on what they had done; the new learning was embedded and retained. Some effective interventions should include homework between sessions (Shabani et al., 2019; Helland et al., 2022).

Furthermore, the improvement in problem-solving skills was probably the result of students' experiences in groups that often included discussions and goal-setting activities, peer relationships, transition to secondary school, and family relationships (Furness et al., 2017). Our results were also consistent with the suggestion that the development of internal assets occurs as a result of transactions between individuals and positive environmental contexts (e.g., family, school, peers, and community; Constantine et al., 1999; Kuperminc et al., 2020). It is possible that short-term improvements in external assets related to the intervention may help lay the groundwork for an eventual increase in internal assets. This suggests longer follow-ups to detect internal changes reflected in external changes and resilience. Longitudinal research with longer follow-ups is needed to test this possibility.

Regarding depressive symptoms, our results also suggested a correlation between resilience scores and depressive mood. When resilience was improved, depressive symptoms decreased, in concordance with other studies such as Sugiyama et al. (2020). Moreover, resilience is often defined as good mental health (Collishaw et al., 2016) and higher levels of resilience are associated with lower levels of depressive symptoms (Kidd and Shahar, 2008).

Contrary to our expectations, no significant differences between groups were found concerning emotional regulation strategies. We expected an increase in cognitive reappraisal strategy and a decrease in expressive suppression. This could be explained by the fact that although mindfulness was used in every session, emotional regulation was solely addressed during one session using CBT therapy (Moltrecht et al., 2021; Helland et al., 2022). Probably, more sessions and more techniques should be used to achieve a clear increase in emotional regulation strategies (Moltrecht et al., 2021; Helland et al., 2022).

Following Cohen's criteria (Cohen, 1988), the effect size values obtained were small, but this was predictable given the characteristics of psycho-educational interventions, such as other similar studies (Díaz-González et al., 2018; Volanen et al., 2020). Probably more lasting interventions in schools in terms of time and curriculum are needed. Additionally, to continue improving resilience in adolescents, interventions specifically targeting emotional regulation strategies should be developed and assessed (Moltrecht et al., 2021), especially if they include techniques such as mindfulness-based cognitive therapy (MBCT), dialectical behavioral therapy (DBT) or acceptance-based behavioral therapy (ACT; Moltrecht et al., 2021).

5.1 Strength and limitations

The FRAK intervention was delivered within school hours. This represents an important strength as it does not impose personal time

TABLE 4 Outcome results 24 weeks after the intervention in the control group and the intervention group. Crude comparison and adjusted comparison including gender, grade and baseline scores of the outcome.

	Control group		Intervention group		Crude comparison			Adjusted comparison	
	M	SD	M	SD	t	p	d [95% CI]	p	d [95% CI]
CYRM-32	125.3	18.4	128.7	14.2	2.22	0.027	0.20 [0.02, 0.39]	0.043	0.16 [0.01, 0.32]
BRCS	13.0	1.3	13.4	2.9	1.20	0.229	0.11 [−0.07, 0.30]	0.112	0.14 [−0.03, 0.32]
ERQ-suppression	3.7	1.3	3.6	1.3	−0.31	0.750	−0.03 [−0.22, 0.16]	0.669	−0.04 [−0.21, 0.14]
ERQ-reappraisal	4.2	1.1	4.4	1.2	1.14	0.256	0.11 [−0.08, 0.30]	0.333	0.09 [−0.09, 0.28]
Depressive symptoms	2.8	2.5	2.3	2.5	−2.06	0.040	−0.20 [−0.38, −0.01]	0.037	−0.18 [−0.34, −0.01]

CYRM-32, Child Youth Resilience Measure-32; BRCS, Brief Resilient Coping Scale; ERQ, Emotion Regulation Questionnaire; CI, confidence interval; M, mean; p, p-value; SD, standard deviation; t, t-student test statistic; and d (effect size). Adjusted for gender, grade, culture and baseline outcome.

TABLE 5 Change scores in the dependent variables from baseline and 6 weeks after the intervention and from 6 weeks to 24 weeks after the intervention in the control group and the intervention group and comparison.

	Control group					Intervention group					Crude comparison		
	M	SD	t	p	d [95% CI]	M	SD	t	p	d [95% CI]	t	p	d [95% CI]
From baseline to 6th week (T1-T2)													
CYRM-32	1.0	11.7	1.35	0.177	0.08 [−0.21, 0.04]	−0.3	11.2	−0.41	0.680	−0.03 [−0.16, 0.11]	−1.21	0.223	−0.11 [−0.30, −0.07]
BRCS	0.4	3.0	1.98	0.048	0.12 [0.00, 0.24]	0.6	2.9	2.94	0.004	0.20 [0.07, 0.34]	0.84	0.404	0.08 [−0.10, 0.26]
SERQ-suppression	−0.0	1.2	−0.58	0.562	−0.04 [−0.16, 0.09]	−0.0	1.2	−0.09	0.931	0.00 [−0.14, 0.13]	0.32	0.746	0.03 [−0.15, 0.21]
ERQ-reappraisal	−0.1	1.2	−1.23	0.218	−0.08 [−0.20, 0.05]	−0.1	1.1	−1.66	0.099	−0.12 [−0.25, 0.02]	−0.33	0.742	−0,03 [−0,21, 0,15]
Depressive symptoms	−0.0	2.1	−0.03	0.977	0.00 [−0.12, 0.12]	−0.3	2.6	−1.30	0.194	−0.09 [−0.23, 0.05]	−1.05	0.296	−0.10 [−0.28, 0.08]
From 6th week to 24th week (T2-T3)													
CYRM-32	−0.1	15.4	−0.04	0.967	0.00 [−0.13, 0.12]	3.3	13.9	3.21	0.002	0.24 [0.09, 0.39]	2.32	0.021	0.23 [0.03, 0.42]
BRCS	−0.0	2.9	0.09	0.931	0.00 [−0.13, 0.12]	0.1	3.2	0.51	0.610	0.04 [−0.11, 0.18]	0.46	0.646	0.04 [−0.15, 0.24]
ERQ-suppression	−0.1	1.4	−0.96	0.336	−0.06 [−0.19, 0.06]	−0.2	1.3	−2.21	0.029	−0.17 [−0.32, −0.02]	−0.98	0.328	−0.10 [−0.30, 0.10]
ERQ-reappraisal	0.0	1.2	0.39	0.696	0.03 [−0.10, 0.15]	0.1	1.2	1.09	0.277	0.08 [−0.07, 0.23]	0.58	0.560	0.06 [−0.14, 0.26]
Depressive symptoms	−0.3	2.5	−1.68	0.095	−0.11 [−0.23, 0.02]	−0.4	2.8	−1.93	0.055	−0.15 [−0.30, 0.00]	−0.54	0.593	−0.05 [−0.25, 0.14]

CYRM-32, Child Youth Resilience Measure-32; BRCS, Brief Resilient Coping Scale; ERQ, Emotion Regulation Questionnaire; CI, confidence interval; M, mean; p, p-value; SD, standard deviation; t, t-student test statistic; and d (effect size).

on the participants and their families, which could have decreased the time available for homework and increased academic stress during the intervention.

In addition, the intervention was developed by a multidisciplinary team of resilience experts and was based on an IERM resilience model and the protective factors with more evidence-based (Llistosella et al., 2022). It has also been successfully delivered to over 478 adolescents at risk, where resilience interventions were shown to be effective (Llistosella et al., 2023a).

In order to reduce bias, the nurses who delivered the intervention were previously trained using a standardized protocol, and the same nurses conducted the sessions in the same classes. Considering that one of the keys to the success of mental health promotion activities aimed at young people is the collaboration between educators and

health professionals (Weist et al., 2012; O'Mara and Lind, 2013) teachers were involved in all sessions.

Although this study makes important contributions, some limitations should be considered when interpreting the results. First, the Brief Resilient Coping Scale was used to assess resilience. This scale has only four items and is a one-dimensional scale measuring individual protective factors. However, the resilience process has been described in the literature as multidimensional. Consequently, a multidimensional resilience scale was also used, namely, the Child Youth Resilience Measure-32, which includes Individual skills, Interaction with others, and Family interaction. Second, Depressive symptoms were assessed with only one item. Still, this item was used in the validation of the CYRM-32 scale in the Spanish population, giving a significantly negative correlation with resilience (Llistosella et al., 2019). Third, the sizeable attrition rate at follow-up (T3; almost 20%). However, compared with the percentage found in the literature, a retention rate of 80% is highly acceptable and similar to previous studies that have implemented this intervention (Lock and Barrett, 2003). Fourth, the RTC has been conducted exclusively within at-risk adolescents. Research indicates that resilience interventions tend to be effective only among at-risk groups (Llistosella et al., 2023a). Additionally, while all variables under investigation were measured using standardised scales, qualitative studies are needed to thoroughly examine the advantages of the FRAK intervention.

6 Conclusion

Adolescence represents a critical developmental phase marked by elevated stress levels, and the COVID-19 pandemic has exacerbated challenges surrounding adolescent mental health. The school-based resilience intervention in 578 at-risk adolescents aged 12 to 15 described in this article has demonstrated substantial positive outcomes, notably enhancing resilience and diminishing depressive symptoms, but only 24 weeks after it was implemented. On the other hand, it seems that it has not been effective regarding emotional regulation strategy. It is imperative to conduct extended follow-ups to ensure sustained benefits over time, as well as, to develop specific interventions to improve emotional regulation strategies in adolescents.

Data availability statement

Data will be available upon reasonable request to the corresponding author, ensuring the privacy and confidentiality of the participants.

Ethics statement

Ethical approval was obtained from the Ethics Committee Institutional Review Board of the "Consorci Sanitari de Terrassa" (Ref: 02-21-160-016) on July 26, 2021. A written informed consent was obtained from all participants and parents. Additionally, the principals of the secondary schools participating in the study signed an agreement to join the project. The study protocol of this cluster-randomized controlled trial with parallel arms was registered at ClinicalTrails.gov: NCT05133115 and published (Llistosella et al., 2023b).

Author contributions

ML: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. PC: Validation, Writing – review & editing. MG-O: Conceptualization, Investigation, Writing – review & editing. GL-H: Conceptualization, Investigation, Writing – review & editing. CT: Conceptualization, Investigation, Writing – review & editing. RO: Conceptualization, Investigation, Writing – review & editing. EG: Conceptualization, Investigation, Writing – review & editing. EU-S: Conceptualization, Investigation, Writing – review & editing. JC: Methodology, Software, Writing – review & editing.

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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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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2024.1478424/full#supplementary-material

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Communication dynamics and media interactions of young adults who have attempted suicide: a qualitative thematic analysis

Emel Arık[1], Mustafa İnce[2]*, Mevlüt Can Koçak[3], Yasemin Bilişli[4], Emrah Onur Karataş[1], Hakkı Akgün[5]* and Faruk Aşlakçı[2]

[1]Department of Journalism, Faculty of Communication, Akdeniz University, Antalya, Türkiye, [2]Department of Journalism, Turker Inanoglu Faculty of Communication, Karabuk University, Karabuk, Türkiye, [3]Department of Radio, Television and Cinema, Turker Inanoglu Faculty of Communication, Karabuk University, Karabuk, Türkiye, [4]Department of Office Services and Secretariat, Social Sciences Vocational School, Akdeniz University, Antalya, Türkiye, [5]Department of Journalism, Faculty of Communication, Suleyman Demirel University, Isparta, Türkiye

Objective: The study examines the potential effects of communication processes and media consumption habits on suicide ideation among male and female young adults aged 18–29 who have attempted suicide at least once.

Methods: In-depth interviews were analyzed using MAXQDA Analytics Pro 2024, and thematic analysis was applied according to Braun and Clarke's model.

Results: Four themes emerged: (1) Family-related factors, (2) sociopsychological factors, (3) sociocultural factors, and (4) media-related factors. Regarding family-related factors, most participants come from broken family structures and commonly report issues with family communication and experiences of violence. Regarding sociopsychological factors, anger issues, despair, and addictions among participants were observed to increase suicide tendencies. Regarding sociocultural factors, most participants expressed difficulties in conforming to society and feeling pressures from cultural or religious expectations. Regarding media-related factors, it was noted that a vast majority of participants spend long hours consuming media daily and frequently interact with content that leads them into adverse emotional states, primarily for time passing on social media platforms.

Discussion: This research not only reinforces information in the literature but also presents unique findings compared to similar studies, particularly in cultural and geographical contexts. The results uniquely highlight the diversity in perceptions of the relationship between religion and suicide. While literature generally notes religion as a deterrent to suicide, this study reveals that intense religious pressure could increase suicidal tendencies through effects like rejection and hatred of religious values. Media also plays a reinforcing role in this context.

Conclusion: In conclusion, this study elucidates the complex interactions underlying suicide attempts among young adults and provides a solid foundation for policies and interventions aimed at better managing media interactions, which play a critical role in suicide prevention efforts.

1 Introduction

Suicide can be defined as the act of intentionally killing oneself. In other words, suicidal behavior includes attempts, threats, thoughts, and actions that result in self-harm (World Health Organization, 2024). Although these actions are not classified as a disease, behaviors leading to suicide attempts constitute a significant public health issue (Turecki et al., 2019). This public health problem seriously affects many families worldwide (Ortiz-Sánchez et al., 2023). According to data from the World Health Organization (2024), more than 700,000 people die from suicide each year, with an estimated 20 suicide attempts for every completed suicide. In 2019, suicide was the fourth leading cause of death among young people aged 15–29 worldwide. Risk factors for suicide include experiences of loss, loneliness, discrimination, relationship breakdowns, financial problems, chronic pain and illness, violence, abuse, and conflict or other humanitarian emergencies (World Health Organization, 2023). Many factors play a role in the development of suicide risk, including biological (such as genetic factors), psychological, social, and environmental influences (Turecki et al., 2019). In other words, suicidal behavior is associated with personal, familial, and social factors.

Suicide can be considered a complex phenomenon with multiple dimensions. Therefore, it is not feasible to analyze or understand suicides that occur due to a single reason alone. All changes and transformations within the societal structure affect the phenomenon of suicide, leading to variations in its incidence. With this characteristic, the phenomenon of suicide is studied by different disciplines, seeking solutions (Diktaş Yerli, 2023). When approached as a multidisciplinary phenomenon, suicide can greatly benefit from the perspectives of various disciplines. Communication science, which examines communication processes, the use of language and symbols, communication media, and the social dimensions of communication, can provide significant contributions to understanding and analyzing the phenomenon of suicide. This study, which takes into account all the communicational dynamics of individuals who have attempted suicide, also encompasses data on media usage behavior and interactions, underscoring the importance of the information it will provide.

The study examines the potential effects of communication processes and media consumption habits on suicide ideation among male and female young adults aged 18–29 who have attempted suicide at least once. Therefore, answers to the following research questions will be sought throughout the study:

RQ1: What is the relationship between different family structures, communication styles, and suicide attempts?

RQ2: How do personality traits and psychological disorders influence the risk of suicide?

RQ3: How do societal communication patterns and cultural norms affect the risk and prevalence of suicide?

RQ4: In what ways do media usage habits, social media interactions, and content consumption influence suicidal tendencies?

By addressing the stated questions, this study may provide a comprehensive understanding of the personal, social, and media-related factors that contribute to suicidal behavior.

According to data from the Turkish Statistical Institute for 2022, a total of 4,061 individuals committed suicide in Türkiye in 2022. The distribution of suicides by age group indicates that the highest number of cases occurred in the 15–19 age group with 387 individuals, the 20–24 age group with 546 individuals, and the 25–30 age group with 554 individuals. These age groups constitute 36% of the total suicide cases (Turkish Statistical Institute, 2022). This data highlights that suicide rates among young adults are a significant concern. Additionally, according to TÜİK's Household Information Technology Usage Survey, 95.5% of individuals in Türkiye have used the internet in the last 3 months. The survey notes that internet usage rates are higher in the 16–24 and 25–34 age groups. The most widely used social media platforms among participants are as follows: WhatsApp at 84.9%, YouTube at 69%, Instagram at 61.4%, Facebook at 51.4%, Twitter at 23.7%, and TikTok at 17.1% (Turkish Statistical Institute, 2023). Thus, young adults aged 18–29, who are both at high risk for suicide and are heavy internet users, have been chosen as the sample for this study.

The literature predominantly features quantitative studies. However, this research will obtain qualitative data through in-depth interviews with the target population, providing a more detailed exploration of individual experiences related to suicide tendencies and their relationship with media.

1.1 Literature review

Suicide is a complex phenomenon influenced by a wide range of personal, familial, societal, and environmental factors. In the existing literature, researchers have explored how these factors interact to shape suicidal tendencies, especially among vulnerable populations like adolescents and young adults. Among these factors, family dynamics, socio-psychological traits, and cultural norms play crucial roles in either exacerbating or mitigating suicidal behavior. Additionally, media influences, particularly through social media, have become increasingly relevant in the modern context. This section reviews key studies that examine these dimensions and their relationship to suicidal behavior.

Family relationships can significantly influence the suicidal behaviors of adolescents. Particularly, high levels of conflict, mistreatment, and violence are known to produce negative outcomes. Situations such as parental divorce, separation, and the use of alcohol and substances also have a strong association with suicidal actions (Wagner et al., 2003). Parental separations can affect the likelihood of contemplating and attempting suicide. A study in Sweden found that experiencing parental separation/divorce during childhood

significantly impacts the presence of suicidal thoughts. This effect is notably higher in parental separations occurring between the ages of 0–4 (Lindström and Rosvall, 2015).

Victims of domestic violence are known to be at high risk for suicidal thoughts and attempts. Various studies have demonstrated the level of this risk. In Victoria, Australia, a study was conducted on cases of interpersonal violence exposure among people who died by suicide. For this study, 2,153 suicide cases between 2009 and 2021 were examined. The research found that 42% of the women who died by suicide had been exposed to interpersonal violence. Furthermore, while 23% of these women were subjected to physical violence, 18% experienced psychological violence, and 16% were subjected to sexual abuse. It was also found that a significant portion of men who died by suicide had been exposed to interpersonal violence before their death (MacIsaac et al., 2018). Similarly, suicide actions can increase in situations of economic uncertainty (Tolga et al., 2023). Economic violence and hardships can lead to a prevalence of depression in people (Marcotte and Hansen, 2024), which in turn can lead to suicidal actions.

Early childhood sexual abuse can be a risk factor for suicide. Research supports this assertion. In the United States, a study by Molnar et al. found that the likelihood of attempting suicide among those who had experienced sexual abuse in childhood was 4–11 times higher for men and 2–4 times higher for women compared to those who had not been abused (Molnar et al., 2001). According to Brent and Mann (2005), sexual abuse is also a risk factor for suicide. Different potential mechanisms can increase the contagion risk of suicidal behavior. Suicidal behaviors can be familial and may be hereditary due to at least two components. The first is psychiatric disorders, and the second is a predisposition to impulsive aggression. A predisposition to psychiatric disorders combined with a predisposition to impulsive aggression results in the highest risk for suicide. Particularly, the presence of impulsive aggression in a parent can also set the stage for domestic abuse, thereby increasing the risk of suicidal behavior in children (Brent and Mann, 2005). In their research, Afifi et al. (2009) found that when parental divorce accompanies child abuse, the likelihood of a suicide attempt is much higher compared to cases of child abuse alone (Afifi et al., 2009). Children at risk of attempting suicide include those with separated parents, those with weak parent–child interactions, and those who have suffered sexual abuse. Early exposure to such events, combined with depression and anxiety disorders, can trigger suicidal behavior (Fergusson et al., 2000).

In the realm of youth suicides, several risk factors emerge as particularly significant, including mental illness and family histories of suicide (Agerbo et al., 2002). Family histories of suicide are especially noteworthy (Brent and Melhem, 2008). A study by Hawton and colleagues supports this, finding that 35.6% of 146 patients had a known family history of suicidal behavior (Hawton et al., 2002). The presence of a family member who has previously attempted suicide—whether a sibling or another relative—significantly increases the risk for children (Brent and Mann, 2005). Family communication plays a crucial role in preventing suicides among family members prone to such actions. Conversely, suicides can adversely affect other family members. Research by McLaughlin et al. (2014) on families of individuals prone to suicide found that family members spend prolonged periods with the individual out of concern for repeated suicide attempts. Suicide not only harms the individuals' own lives but

also negatively impacts their close circles (McLaughlin et al., 2014). Families who lose loved ones to suicide can experience feelings of despair, guilt, and anger. Additionally, these families may face societal stigma (Lee, 2022). Suicidal actions can create a "climate of fear" among other family members. The fear that other suicide attempts may occur within the family can negatively impact their lives (Creuzé et al., 2022). Research by Rubenstein et al. (1989) on high school students who are and are not prone to suicide found that family cohesion balances the impact of stress. Adolescents who perceive their families as highly harmonious are significantly less likely to be prone to suicide compared to those who see their families as discordant and disconnected (Rubenstein et al., 1989).

Suicide acts are a significant cause of death among youth (Arango et al., 2024; Xuan, 2023; Hill et al., 2023). Particularly, three factors are considered major risk elements: personality traits, psychological factors, and stressful life conditions. Experiences of abuse or mistreatment in childhood and stressful living conditions can lead to a higher risk of suicide (Caro-Cañizares et al., 2024). Specifically, women who have previously been exposed to physical and sexual abuse are at a higher risk of developing mental disorders, which can make suicide actions more likely (Armoon et al., 2024).

Personality traits, which describe an individual's characteristic behaviors, thoughts, and emotional attributes, often guide their responses. While personality traits can influence suicide risk, they are not solely responsible for causing suicide. Various studies have shown that anger and aggressive behaviors can be precursors to a propensity for suicide (Dillon et al., 2020; Hill et al., 2020). Additionally, factors such as hopelessness, helplessness, and lack of self-confidence have been identified as significant elements in individuals' tendencies toward suicide, as seen in various studies (Brott and Veilleux, 2024; Liu et al., 2020; Grigienė et al., 2022).

Negative personal traits such as anger and aggressive behaviors, hopelessness and helplessness, low self-esteem, and poor communication not only increase tendencies toward suicide but also adversely affect substance use and involvement in crime (Toumbourou and Gregg, 2002). Alcohol use and suicide actions among youth are serious public health issues. Impulsivity and aggression can be high among those who attempt suicide. Disorders like alcohol and substance use disorders, antisocial personality disorders, impulse control disorders, and behavioral disorders can also be linked to suicidal behavior (Carballo et al., 2006). Similarly, drug use is considered a significant risk factor for suicidal behavior. Drug use can increase suicidal thoughts (Amiri and Behnezhad, 2020; Devin et al., 2023). Situations involving both substance use and social fragmentation can significantly increase the likelihood of death by suicide (Hunter et al., 2023). The connection between suicidal thoughts and substance use appears more frequently among university students. There is also a relationship between suicidal tendencies and alcohol use. Those who consume alcohol are at higher risk for suicidal behavior compared to non-users. Therefore, early intervention in tobacco and alcohol use among students is important for preventing suicidal thoughts and attempts (Wang et al., 2023; Conner et al., 2014; Giesbrecht et al., 2024). The rate of suicide is much higher among young and middle-aged adult men who consume alcohol (Yeskendir et al., 2023).

There is extensive research demonstrating the relationship between an individual's psychological health and suicidal actions. One such study conducted by Bae et al. (2022) in South Korea found that

87% of those who died by suicide had mental health issues (Bae et al., 2022). It was also discovered that a significant portion of those who committed suicide had given warning signs prior to the act (Fernando et al., 2022). One of these warning signs was these individuals reaching out to mental health services. In other words, those contemplating suicide often contact health services before carrying out the act. These consultations can serve as indicators of suicide risk, thus providing an opportunity for intervention before a suicide attempt occurs. For example, if an individual has major depressive disorder, they may be more prone to attempt suicide (Feng et al., 2023; Yang et al., 2023).

Sociocultural factors are significant elements that influence suicide actions. Suicide typically emerges as a result of complex and multiple causes and is affected by the convergence of social, cultural, economic, and psychological factors. The societal system in which a person lives and relies upon not only empowers them with values and ideas but also ensures they are part of a balanced network of relationships. When this balance is not achieved, individuals may face problems maintaining their integrity (Fromm, 2017). For instance, looking at the relationship between suicide and religious ideology, it is evident that individuals join groups for religious reasons and that religious ideology primarily influences behaviors. Accordingly, there are differences in the relationships between suicide and religious ideologies across different beliefs. In Catholic societies, stronger social control and tighter family bonds provide significant psychological support and act as a deterrent to suicide. Thus, a high sense of belonging fosters a deeper understanding of life that prevents self-destruction (Zirojević and Marković, 2020).

The reasons for suicide actions can range from a loss of the will to live to sometimes creating social excitement or the notion of becoming a hero for a cause. Suicide can result from both positive and negative acquisitions (Durkheim, 2013). In other words, the absence of any action toward life can also be a form of suicide (Küçük et al., 2022). Often, the underlying reason for many suicides is the individual's sense of isolation. An isolated individual "cannot establish a fundamental unity with the world" (Stellino, 2020). Adler (2024) states that people who choose individual lives are those who are distant from collaborative living and have chosen this life themselves. After this process, they may lack social interest and may attempt suicide because they see themselves as failures (Adler, 2024). As much as loneliness underlies many societal ailments, people often cite loneliness as a reason for suicide (Durkheim, 2013). Those who attempt suicide might do so believing their lives have been unsuccessful and are no longer worth continuing. In a sense, they think that by committing suicide, their failures will end (Fromm, 2017). People who feel defeated in life, who have faced disappointments and shattered dreams, may choose suicide. They believe that by committing suicide, they will be freed from their internal pain (Schopenhauer, 2013). Kirmayer's study (2022) highlights the role of social factors and an individual's communication with society in suicidal thoughts (Kirmayer, 2022). Another study on suicide found that social ostracism plays a significant role in suicidal actions (Wiglesworth et al., 2022).

Suicide can be considered a complex phenomenon with multiple dimensions. Therefore, it is not feasible to analyze or understand suicides that occur due to a single reason alone. All changes and transformations within the societal structure affect the phenomenon of suicide, leading to variations in its incidence. With this characteristic, the phenomenon of suicide is studied by different disciplines, seeking solutions (Diktaş Yerli, 2023). When approached as a multidisciplinary phenomenon, suicide can greatly benefit from the perspectives of various disciplines. Communication science, which examines communication processes, the use of language and symbols, communication media, and the social dimensions of communication, can provide significant contributions to understanding and analyzing the phenomenon of suicide. This study, which takes into account all the communicational dynamics of individuals who have attempted suicide, also encompasses data on media usage behavior and interactions, underscoring the importance of the information it will provide.

It is known that specific ways of reporting suicide in the media can increase suicide rates (Niederkrotenthaler et al., 2020). Research indicates that the more frequently suicides are reported in the media, the greater the increase in suicide rates (Pirkis et al., 2018). In Hong Kong, an increase in suicide cases among men aged 25–39 has shown the presence of a copycat effect in the media (Schmidtke and Schaller, 2000). The presentation of suicide in media reports can particularly affect imitative actions. Thus, there is a consistent relationship between media and suicidal behavior. Case studies have shown that reading news about suicide on internet media or joining social media groups that share content related to this topic can influence individuals prone to suicide (Pirkis et al., 2018). A study examining the relationship between social media and suicidal behaviors among youths in Ohio found that exposure to suicide content on social media significantly increased suicidal thoughts (Swedo et al., 2021). Similarly, a study conducted in Türkiye on individuals aged 18 and over has found that over 70% of participants specifically read news about suicide on the internet and social media. Another finding from the study is that more than 30% of the participants had previously considered suicide (Küçük et al., 2022).

Technology leads to the easy clustering of suicides among young individuals who heavily use social media, facilitating the spread of this idea through their peer groups (Massing-Schaffer and Nesi, 2020). Particularly for adolescents, social media has become a tool for recognizing and understanding what they see. A feeling of being misunderstood in offline environments has strengthened the impulse to interact more online, helping to normalize suicidal thoughts among adolescents and making them feel less alone in their struggles (Balt et al., 2023). The Coronavirus pandemic in 2020, which deeply affected the entire world, triggered depression, stress, and loneliness. Public health messages in the media, such as "stay home" and "social distancing," have increased the sense of isolation and loneliness, particularly making young individuals more prone to suicide (Czeisler, 2020). A study in China highlights the importance of social communication for individuals prone to suicide and notes that social media platforms can effectively be used in preventative measures for individuals dealing with social integration and isolation issues, who are contemplating suicide (Cheng et al., 2015).

A scoping review found that social media has both positive and negative effects on suicidal thoughts. Since the advent of social media, individuals have increasingly used online platforms to express their suicidal tendencies (Malhotra and Jindal, 2022). People often tend to open up on social media platforms while concealing their identities, where many texts related to suicide can be found. From this point, social media as an open forum can provide great convenience for researchers who seek to view the "digital footprint" (Teo and Fu, 2021). It has been observed that young people who self-harm

frequently use social media to express their distress and numerous cases have been identified where individuals have committed suicide after posting on social media. Furthermore, according to research, expressing suicidal intent through social media platforms can be seen as an unconventional way of seeking help. This situation has encouraged researchers to leverage the power of social media to prevent suicides. Thus, preventing suicides might be feasible by monitoring social media posts and analyzing online behavior, leading us back to social media platforms, which can be used to detect depression and similar health issues (Wongkoblap et al., 2017). Producing quality content in the media to raise awareness about suicide prevention and formulating programs and strategies is crucial (Kirchner and Niederkrotenthaler, 2024). Determining beliefs and attitudes related to suicide has become possible through social media. Identifying an individual's attitudes on social media and the way technology and social media are used plays a key role in reducing suicidal tendencies and developing interventions (Keating and Rudd-Arieta, 2021).

The literature review has comprehensively addressed research on the communication dynamics and media usage behaviors of individuals prone to suicide but has also highlighted some significant gaps. Primarily, most existing studies focus on Western countries, and there is a noticeable lack of research in different cultural and geographical contexts. There are limited studies on the media usage behaviors of individuals who have attempted suicide and how these behaviors vary across different sociodemographic and cultural contexts. Moreover, detailed analyses of the media consumption habits of these individuals and the effects of these habits on their psychological states are lacking. This research aims to contribute to the existing literature by examining suicide tendencies and the role of media in different cultural and geographical contexts. The study conducted in the context of Türkiye will provide significant insights into suicide tendencies and the role of media in countries outside the West.

2 Materials and methods

2.1 Study design

The aim of this study is to qualitatively examine all communication dynamics and media interactions of young adults who have attempted suicide. The research focuses on the impacts of personal, familial, and socio-cultural factors on suicidal thoughts and behaviors, while emphasizing the effects of media consumption habits, social media usage, and media content on mental health. Data for the study was collected through in-depth interviews with 13 participants, based on a semi-structured guide. In qualitative research, sample size is often determined by the concept of data saturation, which is reached when no new themes or insights emerge from the data (Braun and Clarke, 2006). Studies with homogeneous groups and specific objectives, such as ours, often achieve saturation with sample sizes between 9 and 17 participants (Hennink and Kaiser, 2021). Given that our study focuses on young adults aged 18–29, a relatively homogeneous group, the sample size of 13 participants is consistent with these guidelines for achieving thematic saturation. After transcription, the research material was analyzed using MAXQDA Analytics Pro 2024 software. Thematic analysis began

with the creation of initial codes from raw data, followed by stages of theme development to capture core patterns. This approach ensured the derivation of inductive insights from the data and alignment with existing theoretical frameworks. Thematic analysis has facilitated the identification of critical factors influencing suicidal tendencies and the role of media.

The interview guide was specifically designed for this study by the research team, with the support of two different academics specialized in the field of psychology (IK and AI), and based on the literature. The guide contains a list of open-ended questions to be addressed during the interviews. The questions cover topics such as family structure and cultural characteristics, habits, internet and media usage, psychosocial traits, influential individuals, societal perceptions, reasons behind suicidal tendencies, and the search for solutions. This guide was pilot-tested on 3 different participants before the main study. These interviews were not included in the study.

2.2 Setting

This study used two main inclusion and exclusion criteria. Young adults aged 18–29 who had previously attempted suicide at least once were included. However, those who had attempted suicide but were currently diagnosed with an acute psychiatric condition were excluded to avoid compromising the validity of the research findings. The interviews were conducted between February 1, 2024, and May 15, 2024. All interviews were carried out face-to-face in locations such as the participants' homes or cafeterias, which they described as safe and comfortable. The interviews were recorded by the interviewers and then transcribed. The transcripts were not returned to the participants for comments, and the interviews were not repeated. No feedback on the findings was requested from the participants.

2.3 Data collection

The study was guided by the Consolidated Criteria for Reporting Qualitative Research COREQ (Tong et al., 2007). EA and Mİ designed the study and supervised its implementation. The interviews were conducted by MCK, FA, EA, YB, HA, and Mİ. The entire interviewing team consisted of academics from communication faculties in Türkiye. All interviewers had previous experience in conducting various qualitative studies and some researchers from the team had previously worked on topics related to the research subject. Research participants were informed in advance about what the interviewers aimed to achieve with this study and about their personal goals. Field notes were taken during and after the interviews. The interviews, lasting an average of 30 min (ranging from 20 to 60 min), were digitally recorded and then professionally transcribed verbatim. The interviews were translated into English and coded as participants (P1, P2…). During the translation, textual quotations were initially translated word-for-word and later adjusted to achieve equivalence in meaning and interpretation. EA and YB conducted the coding and thematic analysis. EOK performed the data analysis of the study using MAXQDA data analysis software. Information on how each of the 32 items of COREQ was addressed is provided in the Supplementary Table S1.

2.4 Data analysis and trustworthiness

In analyzing the data, Braun and Clarke's six-phase thematic analysis framework (Braun and Clarke, 2006) was utilized. The initial data analysis began during the transcription of interviews, as comments and codes were recorded while transcribing and reviewing observation notes. All data sheets were systematically structured and organized by transferring them into the qualitative analysis tool, MAXQDA Analytics Pro 2024. Relevant data were systematically coded into comprehensible codes using the MAXQDA software. Thematic analysis, as outlined by Braun and Clarke (2006, 2019), does not require large sample sizes to generate meaningful insights. Instead, the focus is on identifying patterns and themes in the data, which can often be achieved with smaller, well-defined samples. We coded raw data examples representing a specific meaning unit (sentences, phrases, single words) and classified codes according to potential themes. Subsequently, the validity of the themes was confirmed through a meticulous examination of all codes and the entire dataset. Themes were refined and named, resulting in a definitive thematic hierarchy. The final report was written with the help of a literature review (Braun and Clarke, 2019).

The coding was performed by two researchers: the principal investigator (EA) coded all transcripts, while a researcher with expertise in data processing (EOK) independently co-coded them. When inconsistencies or conflicts in coding arose, the coders engaged in discussion until a consensus was reached. If disagreements persisted, a third referee (YB) with expertise in health and communication fields was consulted to make the final decision. The inter-coder agreement rate is 90%. To ensure reliability in the analytical process, EA, EOK, and YB held regular meetings to discuss and defend the expression and content of the codes, as well as the conceptual relationships and arrangement between codes, themes, and sub-themes. Peer debriefing was employed to enhance the reliability of the analysis. As Mason (2010) and Vasileiou et al. (2018) emphasize, smaller sample sizes are often sufficient in qualitative research as long as data saturation is achieved. The focus on depth over breadth ensures that smaller sample sizes, such as the 13 participants in our study, can still provide significant insights into the research question. During the analysis process, the researchers of this study and members of the research group engaged in discussions on codes and themes for validation of the findings. Themes were established based on an extensive review of the existing literature and a combination of codes and interpretations emerging from the analysis of previous data.

2.5 Ethics statement

The study has received approval from the Karabük University Social and Humanities Scientific Research and Publication Ehics Board (Decision no. 2024/02 dated January 26, 2024). All interviewed individuals were informed about the purpose and methods of the study. Written informed consent was obtained from the interviewees before starting the interviews. The files containing the interview recordings and transcripts have been coded as P1, P2, etc., to ensure confidentiality. The recordings and transcripts do not contain any personal data that could identify the individuals interviewed.

3 Results

The initial participants were selected using a convenience sampling method, and as the study progressed, the snowball technique was employed. The first participant was recruited through a psychologist (A.I) who had experience working with individuals who had attempted suicide, allowing us to begin the recruitment process for this sensitive topic. The interviewers conducted interviews with individuals with whom they had no close relationships, such as family or friends. As a result, a total of 13 interviews were conducted, comprising 6 women and 7 men. The age range of the participants is between 18 and 29. The participants reside in different cities. All participants had attempted suicide at least once, and these attempts were unsuccessful. Detailed sociodemographic characteristics of the study group are provided in Table 1.

The analyses conducted concluded that data saturation was achieved, and additional interviews did not provide new themes relevant to the objectives of the study. Therefore, the number of participants was limited to 13.

The data obtained from the interviews can be summarized in four main themes: (1) Family-related factors, (2) Psychosocial factors, (3) Sociocultural factors, and (4) Media-related factors. For the first theme, four subthemes have been identified: (1) Family structure, (2) Family communication, (3) Domestic violence and abuse, (4) Family history. The second theme includes two subthemes: (1) Personality traits and behavioral factors, (2) Personal psychological disturbances and traumas. The third theme also contains two subthemes: (1) Societal communication, (2) Cultural norms and beliefs. Lastly, in the fourth theme, six subthemes have been determined: (1) Media usage habits, (2) Purpose of media use, (3) Content interacted with during media consumption, (4) Depiction of life on social media, (5) Emotional reflections of consumed media content, and (6) Content interacted with in media for mood management. All themes and subthemes are displayed in Figure 1. Each theme is explained sequentially with illustrative quotes selected from the participants' data.

3.1 Family related factors

The family is the first social environment for individuals and plays a significant role throughout their lives. Family dynamics can profoundly affect individuals' personal development, relationships, and psychological health. For this reason, four sub-themes have been identified for the first theme: (1) Family structure, (2) Family communication, (3) Domestic violence and abuse, and (4) Family history. The sub-themes of the family-related factors theme and the categories related to these sub-themes are displayed in Figure 2.

3.1.1 Family structure

Family structure is a crucial factor that determines the interaction and communication style among family members. This sub-theme has been analyzed in three categories: (1) fragmented family structure, (2)

TABLE 1 Detailed sociodemographic characteristics of the study group.

Participant	Age	Gender	Education	Marital status	Income rate	Occupation
Participant 1	25	Man	University	Single	Middle	Customer representative
Participant 2	22	Woman	University	Single	Middle	Journalist
Participant 3	29	Man	High school	Married	Middle	Sales assistant
Participant 4	24	Man	University	Single	Low	Student
Participant 5	25	Woman	University	Single	Middle	Instructor
Participant 6	23	Woman	University	Single	Middle	Marketing Officer
Participant 7	24	Man	University	Single	Middle	Student
Participant 8	18	Woman	High school	Single	Middle	Unemployed
Participant 9	19	Woman	High school	Single	Low	Executive Assistant
Participant 10	21	Man	University	Single	Low	Nurse
Participant 11	27	Woman	High school	Married	Low	Cashier
Participant 12	24	Man	High school	Single	Low	Unemployed
Participant 13	26	Man	High school	Single	Low	Courier

FIGURE 1
The coding tree of the thematic analysis.
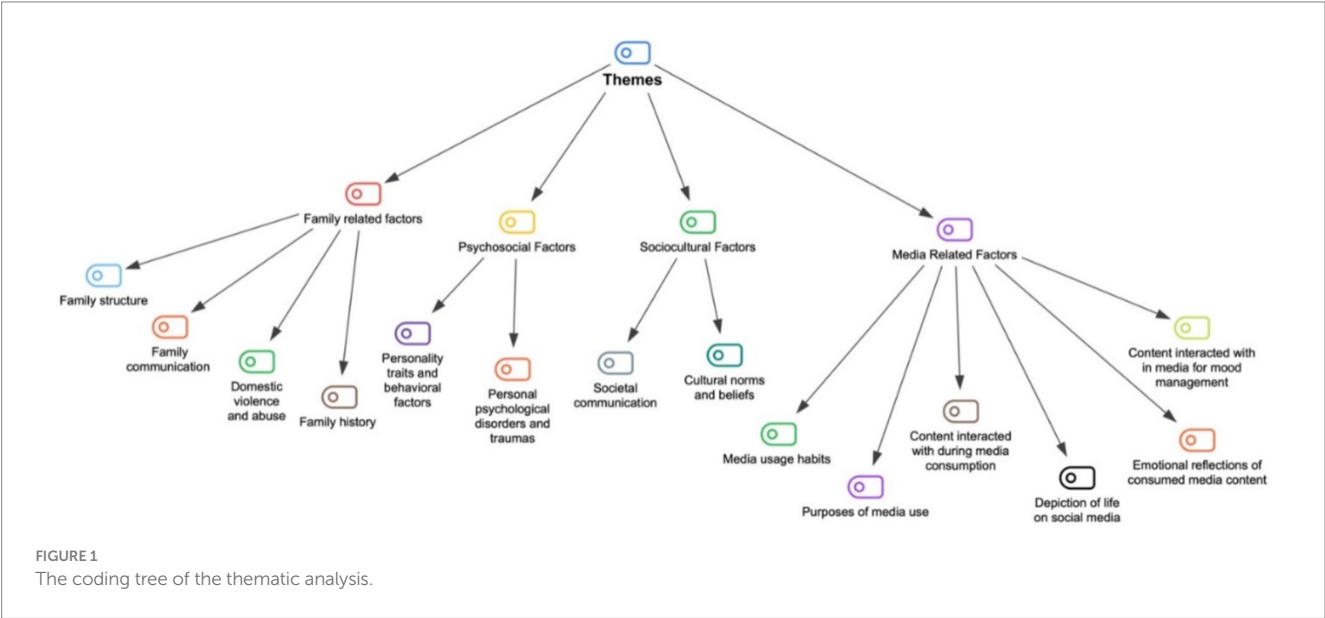
nuclear family structure, and (3) extended family structure. Interviews reveal findings related to participants' family structures, showing that many belong to fragmented families where marital or cohabitation relationships have ended:

> (P5; woman): My parents are officially married but have been living separately as long as I can remember. So, on paper, they are married. My siblings and I live with our mother.

> (P10; man): My parents are separated. I have not seen my father for 7 years. He was abroad before that. So, I can say I hardly know him.

> (P12; man): My parents have been separated for years. (..) I do not see my father much.

Participants with nuclear families highlight violence and issues within the family:

> (P3; man): My parents are alive and together. However, I had a very bad childhood.

> (P6; women): My parents are together. However, there are problems in our family, my father is oppressive.

> (P13; man): My parents live together. (...) We had a lot of arguments at home because we had very different views on the same subject.

One participant comes from an extended family structure. The participant living with grandparents emphasizes that this situation limits individual freedom and privacy and increases pressure:

> (P4; man): My parents are alive and we live together. We are 8 siblings. (...) We have a traditional culture. Our family structure is dominated by a clan system. So grandparents, uncles, cousins all live

The coding tree of family related factors.
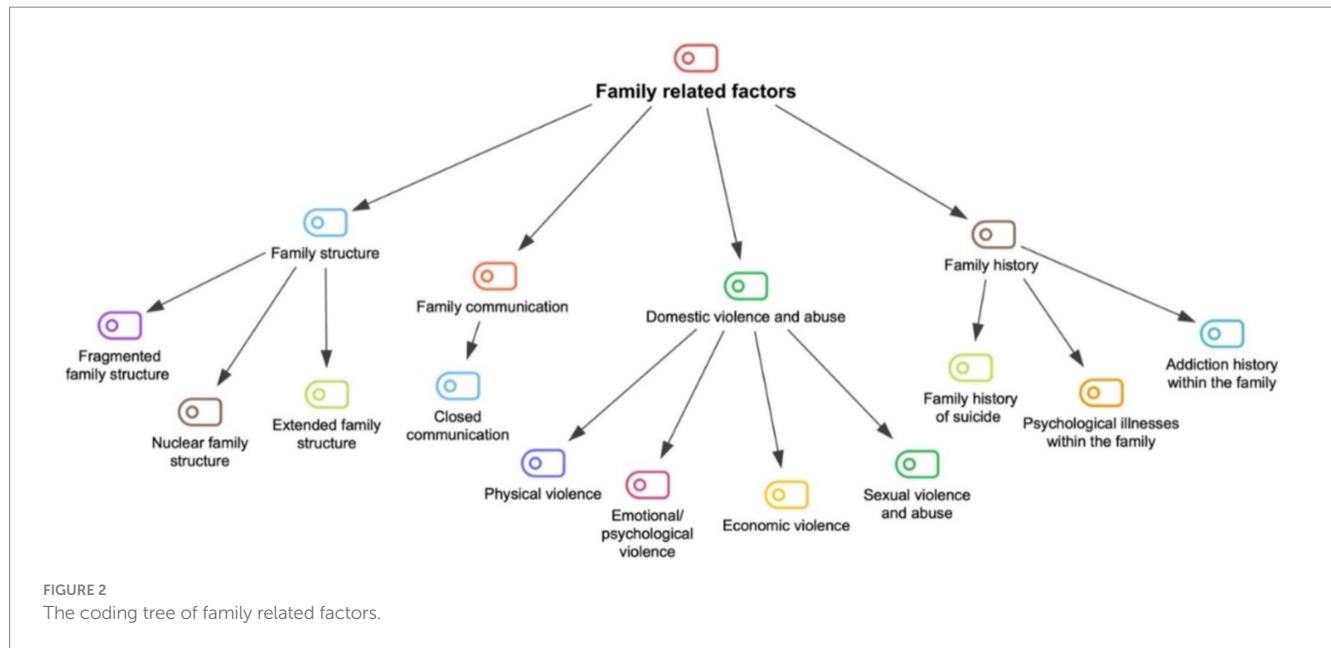
together. There is no privacy, you cannot move freely. It's a family structure where everyone interferes, treats their own child like an object, devalues them. Individually, we are deprived.

3.1.2 Family communication

Family communication is extremely important for strengthening emotional bonds among family members, increasing trust, and maintaining healthy relationships. All participants describe their family communications as closed and emphasize communication issues:

(P4; man): I do not call him father, nor her mother. I do not think they deserve it. (…) I have no emotional ties to my family. Right now, I do not miss them. (…) I do not want to know what they are doing or experiencing.

(P7; man): The lack of communication and love was at its peak in my family. (…) We hardly shared anything anyway.

(P9; woman): I do not really talk much with my parents. I usually spend time by myself in my room.

3.1.3 Domestic violence and abuse

For this sub-theme that threatens security, health and well-being within the family, four categories were determined: (1) physical violence, (2) emotional/psychological violence, (3) economic violence, (4) sexual violence and abuse. Participants are also exposed to four types of violence within the family: Physical violence refers to one family member being physically aggressive toward another. Most of the participants are exposed to this type of violence, and they describe the violence they experience with the following words:

(P3; man): I grew up with extreme pressure and extreme beating. I was subjected to violence by my father.

(P7; man): There would not be a day without fighting, noise and violence in the family.

(P12; man): There were problems within the family, including physical violence. There were bloody knife fights between my mother and father, and between me and my brother.

Emotional or psychological violence is when a family member psychologically harms another by methods such as humiliating or threatening. This type of violence can seriously affect the victim's self-esteem and emotional well-being. Most participants experience this type of violence:

(P5; woman): So, for as long as I can remember, my father has been unfaithful, uncaring and did not fulfill his parental duties. There was no physical violence, but psychological violence was always in our lives.

(P6; woman): It interferes with my preferences, my clothing style, and the places I go to. We have constant arguments at home.

(P11; woman): It is not physical violence, but we have said a lot of bad words to each other. This affected me negatively.

Economic violence refers to one family member controlling another financially or limiting their independence. Most of the participants who expressed economic difficulties are exposed to this type of violence and emphasize the violence they suffered as follows:

(P5; woman): My father would meet our financial needs, but if he wanted to, he would sometimes not send money for months. He caused poverty in the midst of wealth, and left him fatherless while he was still alive.

(P8; woman): My father was very angry. My mother wanted to work, but she did not let me. He said stay at home and take care of your children. (…) he could not meet the needs on his own. This situation had a negative impact on us.

When a person sexually harms or abuses another person, it can lead to very deep and traumatic consequences. This type of abuse is usually carried out through means of force, control, or manipulation and without the victim's consent. One of the participants experienced sexual violence and abuse:

> *(P4; man): I was sexually abused by my own uncle for 14 years and I could not tell anyone. It is a difficult process (…). Complete helplessness, loneliness, misunderstanding, fear. (…) You have no hope, you have no life energy, you have no enthusiasm, you are tired of everything.*

3.1.4 Family history

This sub-theme is divided into three categories: (1) family history of suicide, (2) psychological illnesses within the family, and (3) addiction history within the family. A family history of suicide can be a painful experience that causes deep sorrow and trauma among family members. Generally, participants have a history of suicide in their families or close environments:

> *(P1; man): There are relatives who have experienced suicide. My father, my uncle.*

> *(P5; woman): My cousin hanged himself in his dormitory during his university years.*

> *(P6; woman): In my surroundings, there are relatives who have committed suicide or shown suicidal tendencies. My father's aunt hanged herself; I've often questioned this.*

The psychological illness of a family member can leave deep impacts among family members and significantly affect family dynamics. Some participants mention psychological illnesses in their family:

> *(P3; man): My father used to break my arms and legs with iron. He was a psychopath.*

> *(P8; woman): My father had insomnia issues. He would watch TV, unable to sleep at all. It's still like that; he has problems with it. We were disturbed by this.*

> *(P13; man): My mother was very anxious, and this was reflected at home. (…) I know that she used medication from time to time.*

A family history of addiction can lead to serious stress and difficulties among family members. Some participants highlight an addiction history in their family:

> *(P1; man): My father drinks a lot, coming home every day and tormenting us.*

> *(P2; woman): My father used to gamble, which led to a lot of domestic violence. There was hardly any family structure.*

> *(P12; man): My father has calmed down a bit due to his age, but he is fond of pleasure and drinks alcohol. (…) All the fights started because of alcohol.*

3.2 Psychosocial factors

Psychosocial factors are used to explain the relationship between an individual's social environment and their psychological state. Under this main theme, there are two sub-themes: (1) personality traits and behavioral factors, and (2) personal psychological disorders and traumas. The sub-themes of the psychosocial factors theme and the categories related to these sub-themes are shown in Figure 3.

3.2.1 Personality traits and behavioral factors

Personality traits and behavioral factors are significant determinants that shape how individuals think, feel, and behave. These factors profoundly affect individuals' relationships, emotional well-being, and overall life satisfaction. Based on the data from participants, this sub-theme has been divided into four categories: (1) anger and aggressive behaviors, (2) hopelessness and helplessness, (3) low self-esteem and lack of confidence, and (4) addictions. Anger and aggressive behaviors are commonly observed symptoms among individuals at risk of suicide. Participants who express themselves often articulate this condition clearly:

> *(P1; man): I try to treat myself with medications as much as I can, but sometimes (…) I have bursts of anger. (…) I cannot control myself, I lose control. Someone else comes out. I do not recognize myself.*

> *(P9; woman): There is an angry and very anxious side of me. I get overly attached to people and turn it into an obsession.*

> *(P12; man): My anger problems, my constantly changing and unstable moods, my constant search for flaws in myself, and my feeling of inadequacy (…) affect my life greatly.*

Hopelessness and helplessness express the emotional state where individuals generally have a negative expectation for the future and believe they cannot change their current situation. Participants indicate that hopelessness and helplessness play a central role in their actions and have led them toward suicidal tendencies:

> *(P2; woman): I was at rock bottom and felt like I had reached the end of the road. I actually loved life but felt helpless. I avoided fighting. There were many moments when I thought it could not get any worse.*

> *(P4; man): Maybe it's helplessness, maybe to draw attention. I am here too. (…) See me. I wanted them to notice the pain I was living, to feel pain. I wanted to punish them. I wanted them to take responsibility.*

> *(P9; woman): Due to certain events I experienced, I attempted suicide because I felt it would be better since I could not resolve the situation and felt helpless.*

Low self-esteem and lack of confidence refer to a state where an individual feels undervalued or inadequate, lacking belief in oneself. Among the participants, dissatisfaction with oneself is also a common behavioral factor. Low self-esteem and lack of confidence have been significant triggers for the suicidal act in many participants:
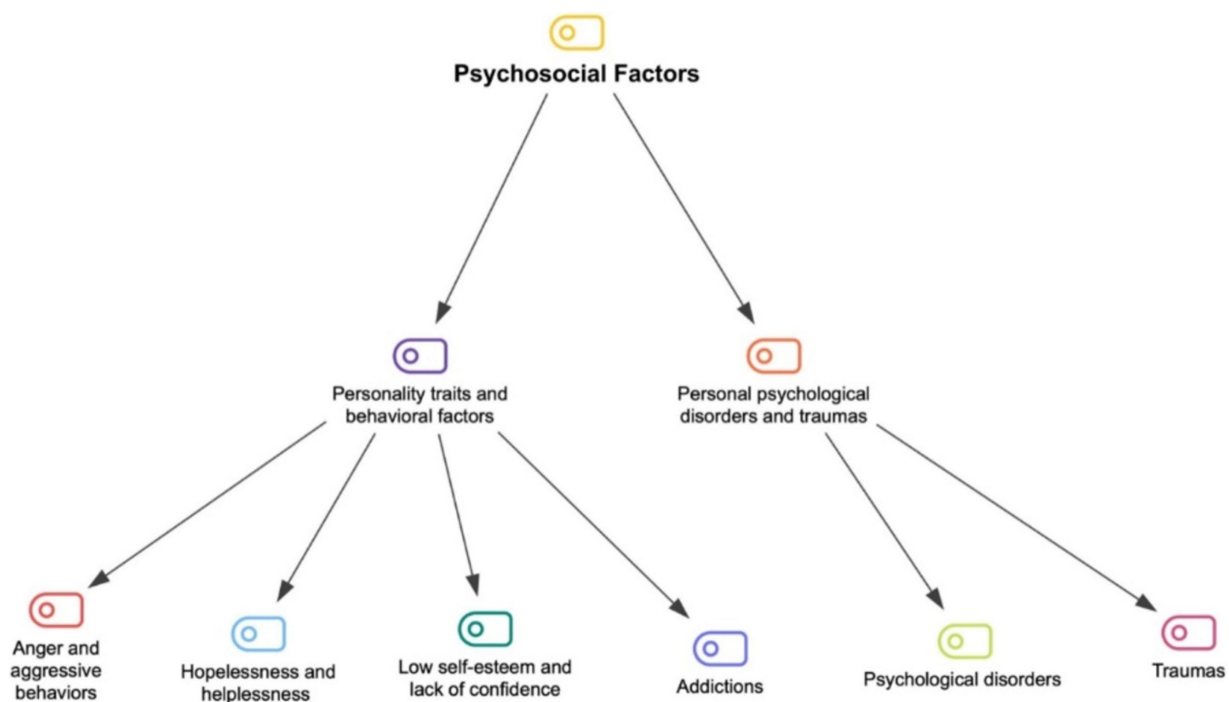
FIGURE 3
The coding tree of psychosocial factors.

(P4; man): Feelings of unlove, worthlessness make you hate yourself. Because of this, you are more prone to suicide. That's how you start the attempt.

(P5; woman): I always feel my emotions very intensely. I question myself a lot and take too much responsibility in every problem, thinking it's because of me. (...) I never like myself.

(P7; man): I used to value my friendships a lot and tried to make them happy. But I realized I wasn't getting back what I gave, they did not think about me as much as I thought about them, they did not value me.

(P11; woman): I question myself about why I am an insecure person, but that is my habit.

Addiction is an overwhelmingly strong desire for a substance or activity. It can affect an individual's normal functioning and daily life, leading to personal and social problems. Most participants smoke cigarettes. Approximately half of them consume alcohol, and three of them state that they are addicted to alcohol. Five participants use marijuana/weed/drugs, and three declare themselves as addicted to smartphones/social media.

(P1; man): I use weed and cigarettes. I also constantly use Instagram. My phone is always in my hand; it's become a habit. (...) It never drops.

(P6; woman): I smoke cigarettes. I have been using them since 8th grade. I think I have a phone addiction. Several times, police have warned me about not putting down my phone when crossing the street.

(P10; man): I use cigarettes and alcohol but am trying to quit alcohol. (...) Besides, I used marijuana in high school and college.

(P13; man): I have used various substances many times before.(...) For a while I thought that I was really addicted to alcohol.

3.2.2 Personal psychological disorders and traumas

Personal psychological disorders and traumas refer to various conditions that affect an individual's emotional and mental health. This sub-theme has been divided into two categories: (1) psychological disorders and (2) traumas. Approximately half of the participants express their opinions on this issue and state that they have psychological disorders:

(P4; man): During the treatment process, I was diagnosed with depression, anxiety, borderline personality disorder by different doctors.

(P5; woman): I received psychiatric support after the suicide incident. I was diagnosed with major depression.

(P7; man): I discovered I had social anxiety when I started treatment. (...) I also have Agoraphobia.

(P11; woman): I have anxiety, I have a very anxious nature.

Trauma refers to an event where an individual experiences significant physical or psychological danger or harm, leading to fear or distress. Such events can disrupt an individual's normal functionality and emotional balance. Many participants' life

stories involve traumas, typically resulting from shocking and frightening experiences like violence, abuse, sudden losses, or abandonment:

> *(P1; man): My life was going very well. I had everything—my job, relationship, house, car, shop, (…) one day I lost everything.*

> *(P4; man): Especially the physical violence and sexual abuse from my uncle, which was constant and systematic for 14 years. That was the worst. After those events, I shut myself in my home, led an asocial life. (…) I had a very traumatic childhood. During my childhood and adolescence, I made plans to end my life.*

> *(P5; woman): Unfortunately, during that period, my mother also lost her mother. She was very sad. (…) Soon after, my mother fell ill and there was a risk of cancer. This situation led to a fear of losing my mother and being utterly alone. I thought every day brought me one day closer to the day I would lose her.*

3.3 Sociocultural factors

Sociocultural factors refer to various elements that shape the social and cultural structures of a society and affect individuals' behaviors, values, and relationships. They explain how individuals adapt to the values, norms, beliefs, and social structures of their society. Under this main theme, there are two sub-themes: (1) societal communication, and (2) cultural norms and beliefs. The sub-themes of the sociocultural factors theme and the categories related to these sub-themes are shown in Figure 4.

3.3.1 Societal communication

Societal communication refers to the process of interaction among individuals within a society and plays a crucial role in shaping individuals' roles, identities, and relationships. This sub-theme is divided into three categories: (1) social conformity, (2) exclusion and marginalization, and (3) social isolation.

Social conformity is the process by which individuals in a society adapt to accepted norms, values, and behaviors, shaping their interaction with the community. Many participants experience difficulties in socially conforming to their community:

> *(P2; woman): I do not feel like I belong to this society. I am different. (…) My lifestyle, thoughts, and way of living are different.*

> *(P6; woman): I see myself as different. My political views and my dress code do not align with my surroundings. I am against the current system. (…) I make it known to my surroundings that I keep a distance from society and have many objections. I am not in complete harmony with society.*

> *(P10; man): I do not really get along with society. I often find myself holding opposing views. What they think is right is usually what I think is wrong. I get tired of trying to conform to them.*

> *(P11; woman): I do not feel that I belong to this society. I think everyone lives for their own benefit.*

Participants who struggle to adapt to their society and others also face exclusion and marginalization:

FIGURE 4
The coding tree of sociocultural factors.
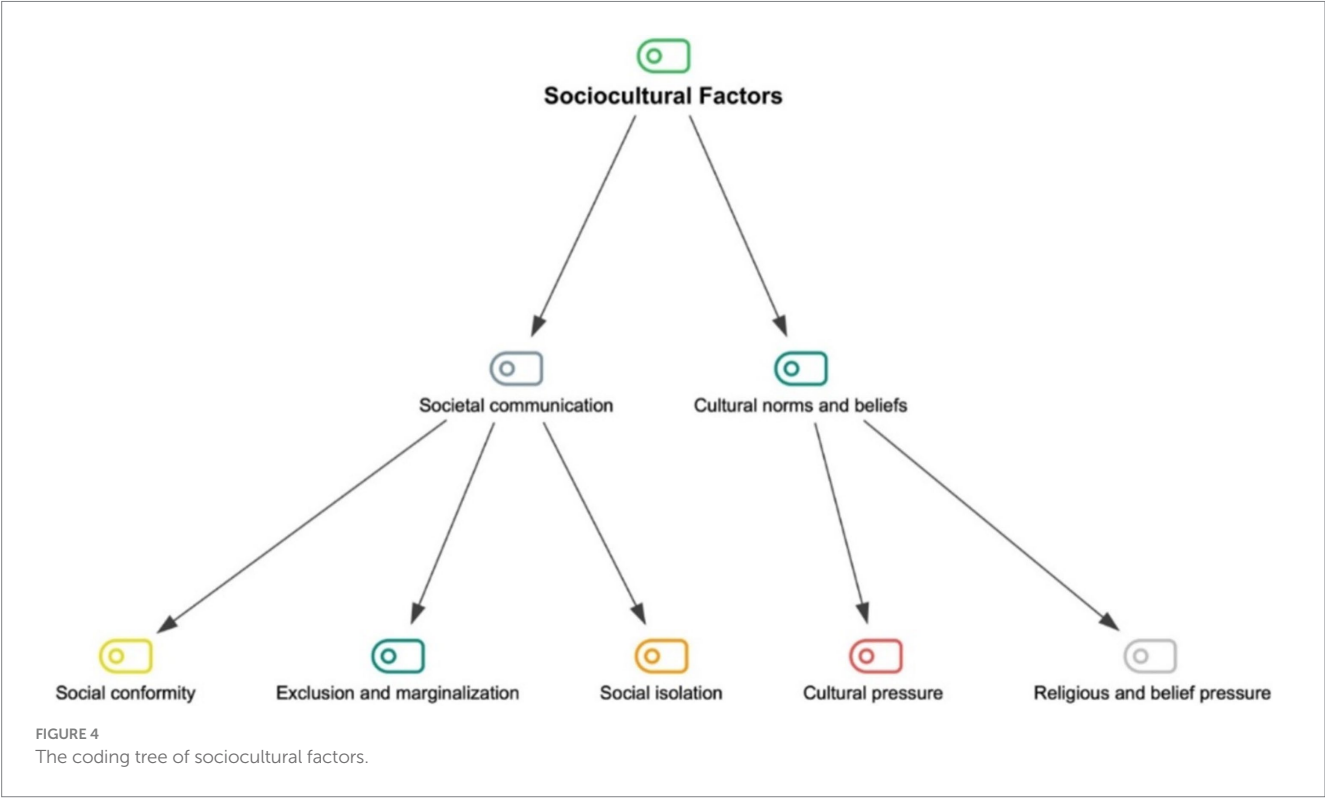
(P1; man): Even our neighbors would frown upon the tattoo on my arm. That's why I felt excluded.

(P4; man): I feel excluded, looked down upon. Because I am different emotionally, intellectually, physically, in terms of clothing, religious beliefs, political views. I do not think the same as the society I live in.

(P7; man): I used to have long hair. I'm ginger, I have freckles, and I'm very thin. Because of my different appearance, people inevitably insult me. When insults happened, I hated society and felt marginalized.

Social isolation refers to the tendency of an individual to avoid social interactions or weaken their social ties. Three participants have adopted a limited relationship with the people around them and an isolated lifestyle:

(P5; woman): I have never liked the society I live in. I think they are intolerant, selfish, oppressive, gossipy, jealous. It feels like no one wishes well for others. I do not know if it's about not fully belonging to society, maybe I prefer to stay away.

(P8; woman): For example, there are times in my life when I cannot even go outside, I cannot step out of the house.

(P13; man): In general, I do not feel like I belong to this society, people are very stupid and thoughtless. They have fixed ideas, (…) that's why I do not establish social relations (…) I do not have a circle of friends.

3.3.2 Cultural norms and beliefs

Cultural norms and beliefs are fundamental elements that determine a society's values, beliefs, behaviors, and social interactions. They shape the identity and social fabric of the community. This sub-theme has been divided into two categories: (1) cultural pressure and (2) religious and belief pressure.

Cultural pressure refers to the tendency of a society to impose its specific cultural norms, values, or practices on other individuals or groups. Many participants experience cultural pressure within family and societal relationships, and they find this distressing:

(P2; woman): I feel pressured about my lifestyle from people around me (mostly from those I do not know well). This makes me very uncomfortable.

(P9; woman): I constantly feel under pressure. I am always concerned about what people will think about my behavior or the way I dress, whether they will talk about me, or judge me.

(P10; man): At home, my mother interferes with my lifestyle and clothing. (…) At work, I also feel cultural pressure. I see myself as different from the general society.

Religious and belief pressure involves the tendency of an individual or a group to force another individual or group to adhere to a specific religion or belief system or to apply pressure against these beliefs. Three participants have been intensely subjected to religious and belief pressure, emphasizing the impact of this imposition on themselves:

(P4; man): My family/clan is extremely oppressive, ultra-conservative. (…) They are also very religious. They pray when they lie down and get up. They tell us to pray when we lie down and get up. Until a certain period, I performed my religious duties under family pressure, but now I do not.

(P7; man): My father's family comes from people important in religious circles. (…) They have been devout for generations. They live their religion and perform their religious duties. They want us to do the same. There is an inevitable pressure. (…) They impose their religion and beliefs on us. Due to my family, I have come to hate religion. I am an agnostic.

(P11; woman): Even though my family is very conservative, I cannot be like them. I always feel this pressure, but I do not feel like it.

3.4 Media related factors

Media has the power to shape the thoughts, behaviors, and perceptions of individuals and societies and can significantly influence the general opinions and behaviors of a community. However, the impact of media is complex and varies among individuals. Factors such as personal experiences, values, beliefs, and education shape how individuals respond to media messages. Under this main theme, six sub-themes have been identified: (1) media usage habits, (2) purposes of media use, (3) content interacted with during media consumption, (4) depiction of life on social media, (5) emotional reflections of consumed media content, and (6) content interacted with in media for mood management. The sub-themes of media-related factors and the categories related to these sub-themes are shown in Figure 5.

3.4.1 Media usage habits

Media usage habits have been categorized into (1) duration of media use and (2) media usage devices. According to data obtained from interviews, most participants heavily use media, consuming media content for an average of 6–7 h per day. The longest media usage among participants is 16 h, and the shortest is 1 h. All participants who use media heavily prefer digital media as their media usage device. Participants who do not have a regular practice of using traditional media read books as a traditional media device. Media usage habits are listed in Table 2.

3.4.2 Purposes of media use

The purposes of media use among participants have been shaped by interviews and categorized into four headings: (1) entertainment and passing time, (2) acquiring information and news, (3) establishing social connections, and (4) isolating from the social environment. Most participants describe their purpose for using media as entertainment and passing time:

(P1; man): My purpose on social media is to follow popular topics, popular people, and to fill the void, basically to pass time.

(P2; woman): I use it to pass the time and to see what's going on, but I get bored after a while.

FIGURE 5
The coding tree of media related factors.
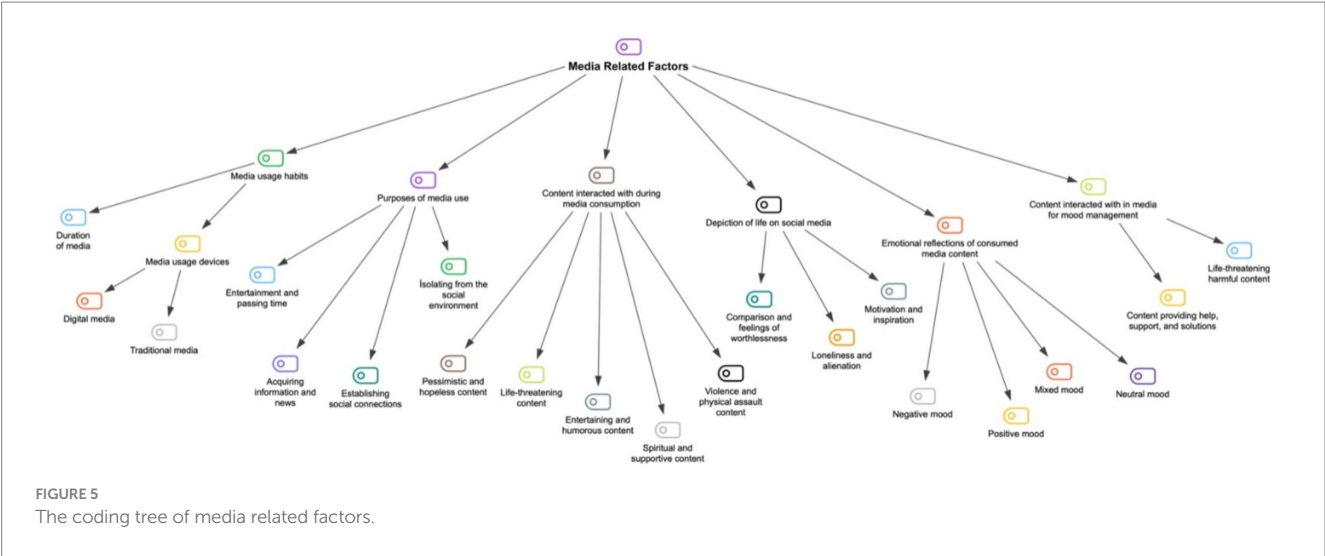
TABLE 2 Media usage habits.

Media usage habits			
Participants	Duration of media use	Media usage devices	
		Digital media	Traditional media
P1	10 h/per day	Facebook, Instagram, Spotify, X, vkontakte, WhatsApp, Youtube	Book
P2	5 h/per day	Instagram, X, WhatsApp, Youtube	Book
P3	4–5 h/per day	Facebook, Instagram	–
P4	16 h/per day	Facebook, Instagram, Spotify, X, WhatsApp, Youtube, Tinder, Telegram	Book
P5	7–8 h/per day	Instagram, Spotify, X, WhatsApp, Youtube	Book
P6	8–9 h/per day	Instagram, TikTok, WhatsApp	Book
P7	2–3 h/per day	Facebook, Instagram, Spotify, X, Xbox, WhatsApp, Youtube	Book
P8	1 h/per day	Instagram, WhatsApp	–
P9	10 h/per day	Instagram, TikTok, X, WhatsApp	–
P10	4–5 h/per day	Instagram, Spotify, Telegram, X, WhatsApp	Book
P11	5–6 h/per day	Facebook, Instagram, Spotify, X, WhatsApp, Youtube	–
P12	8 h/per day	Facebook, Instagram, TikTok, Spotify, X, WhatsApp, Youtube	–
P13	4–5 h/per day	Instagram, TikTok, X, WhatsApp, Youtube	–

(P3; man): I look at it to distract myself from my troubles, to be occupied with something else.

(P12; man): I use social media to temporarily forget the psychological problems in my head, which are caused by emptiness.

One participant expresses the purpose of media use as acquiring information and news:

(P10; man): I generally follow pages related to scientific research. I use Instagram for this. I follow health pages and pages that describe what to do in emergencies. (…) This way, instead of mindlessly scrolling through social media, it adds something to me.

Two participants mention that, in addition to entertainment and passing time and acquiring information and news, they use media for establishing social connections:

(P5; woman): On X, I follow the current affairs. On Instagram, I follow content related to celebrities, travel, etc. I use YouTube for movies and series. I intensely watch people's lives on social media platforms. I'm curious about who is doing what, with whom, and where. I also engage with them.

(P9; woman): I follow informative and political content on social media. (…) Through apps like TikTok, Instagram, etc., I frequently spend my active free time to clear my mind. Mostly, I look at what people are doing on social media, follow their posts.

Two participants prefers to use media to isolate from the social environment; that is, they deliberately use media to distance themselves from the outside world and environmental influences:

(P7; man): I prefer not to engage in social relationships in everyday life; I struggle a lot with relationships. I do not use social media to

socialize. On the contrary, I use it to isolate myself from the environment. I do not even follow the news. I want to stay away from current affairs. I only watch reels, cat and dog videos.

(P13; man): Since I do not have a circle of friends, I like spending time on social media more. I would rather stay at home and surf the internet than listen to their empty conversations. (…) I am aware that I isolate myself from society. But I'm happier this way.

3.4.3 Content interacted with during media consumption

The content with which participants engage during media consumption is classified according to their choices in movies, series, music, books, blogs, and social media preferences. Based on their responses, five categories have emerged: (1) pessimistic and hopeless content, (2) life-threatening content, (3) entertaining and humorous content, (4) spiritual and supportive content, and (5) violence and physical assault content.

Although most participants cite entertainment and passing time as their primary media use, the content they interact with prominently features pessimistic and hopeless content, and life-threatening content:

(P1; man): When I feel bad, I watch videos, which are generally of a pessimistic nature.

(P4; man): I often come across depressive, gloomy quotes, poems, suicide-related posts on my feed. There was a time when my explore page was full of such pages. I constantly read them and find myself falling into depression.

(P11; woman): I watch family dramas, loneliness, stories of people who have suffered in life, and people who cannot make their voices heard. (…) I do not feel like watching hopeful, exciting, joyful things.

Life-threatening content includes physical, mental, or emotional health-threatening materials, covering elements such as violence, harassment, suicide, promotion of dangerous habits, and hate speech. Some content, particularly harmful to the youth, can severely impact mental health and even contribute to suicide risk. Two participants have explicitly described the content they interact with as life-threatening:

(P4; man): There's a series called '13 Reasons Why.' (…) It discusses peer bullying, suicide, sexual abuse. A girl commits suicide. After her death, she leaves behind 13 tapes. Each tape describes people who left her alone, harmed her. That series plunged me back into depression because every episode describes what I've gone through. (…) I thought, I could do what she did in the series.

(P5; woman): During the period I attempted suicide, I extensively followed content related to suicide on YouTube, Instagram, and X, even getting lost in it.

Four participants engage with entertaining and humorous content in their media consumption, attempting to distract from their issues:

(P2; woman): Initially, I was very troubled and interested in violent content videos. But now they no longer interest me. Negative content

bothers me, so I've been choosing comedy series and entertaining content lately.

(P7; man): I cannot watch series that contain violence, suicide content; they stress me out too much. (…) I do not even follow the news anymore; to avoid negative content, I prefer funny, lighthearted content.

(P13; man): I love speed. That's why I mostly watch motorsport-related activities. (…) I generally engage in funny and entertaining content.

Spiritual and supportive content includes materials that enhance or strengthen an individual's mental well-being, inner peace, and motivation. Such content is created with the aim of spiritual healing, positive thinking, and improving quality of life. Two participants mention interacting with spiritual and supportive content:

(P3; man): On social media, I often come across beneficial sayings. They spiritually affect me, and I feel relaxed when I read them.

(P5; woman): I read books related to my field. I try to read personal development books but never manage to apply them.

Two participants interact with content primarily featuring physical, verbal assaults, harassment, beatings, and bullying:

(P6; woman): On TikTok, suicide, cutting, stabbing scenes often appear. I had liked some videos before. Then they started appearing more often. (…) Suicide and injury scenes from movies come up. These scenes negatively affect me, make me feel worse, and lower my spirits.

(P9; woman): Sometimes violent content videos pop up, and I've watched them a few times. They still appear. I do not want to watch too much, but it feels like there's nothing else.

3.4.4 Depiction of life on social media

Depiction of life on social media refer to how individuals represent themselves and their lives on online platforms. This includes how they portray themselves, what aspects they highlight, and what they choose to conceal. Often, life depictions on social media can include idealized, filtered, or selectively curated versions that may not fully reflect real life. All participants describe their media usage habits as digital, with the majority spending long hours on social media. The interviews have resulted in three categories under this sub-theme: (1) comparison and feelings of worthlessness, (2) loneliness and alienation, and (3) motivation and inspiration. Nearly all participants compare themselves to the life depictions on social media and feel worthless:

(P5; woman): The lives I see on social media negatively affect me. I feel like I'm both aspiring to be like them and facing my deficiencies, constantly feeling inadequate. It's as if everyone has everything, and I have nothing. (…) I feel a lack of desire to live and hopelessness.

(P6; woman): Seeing the luxurious life on social media, not having to work and being able to buy anything, go anywhere, it depresses

me. (...) They do not have financial issues. Despite working, I cannot afford the things I want or go places I wish to. I question myself why.

(P11; woman): Everyone is very rich on social media, everyone is very friendly, everyone is very peaceful. I look at myself and I am not this peaceful. (…) I do not find myself very valuable.

Those who compare themselves and feel worthless due to social media life depictions also tend to experience feelings of loneliness and alienation:

(P1; man): Sometimes when I feel lonely, I go on social media. Other times, while on social media, I realize how alone I am, especially when I see my friends together.

(P4; man): Considering I consume media for 16 h a day, of course, it increases my feeling of loneliness. Just me and my phone, how much more alone can one be?

(P12; man): I feel worthless and lonely. I keep thinking that the life I'm living is not worth living.

However, two participants mention that depictions of life on social media have a positive impact on them, serving as encouragement. The content they see on platforms inspires them to make positive changes in their lives and provides motivation and inspiration:

(P3; man): The content on social media, at least what I follow, distracts me from overthinking and negative thoughts. The pages I follow are somewhat spiritual. (...) They say things like "Hang in there, beautiful days are waiting for you. Bright days are ahead." (...) I keep finding life-giving words one after another.

(P8; woman): I take inspiration from Britney Spears; her experiences had a big impact on me. (...) They tried to put her in a mental hospital. I had gone through similar things. Even my mother had thought about "whether we should hospitalize her." Seeing how she got through her situation, found something to hold onto affected me (...) it made me happy. At that moment, despite my problems, I felt like I could move forward somehow.

3.4.5 Emotional reflections of consumed media content

Mood refers to the emotional state experienced by an individual at a particular time, typically lasting a few hours to several days. The emotional responses individuals experience while consuming media content are often dependent on how that content interacts with their personal experiences, interests, and emotional state. This sub-theme examines the reflections of consumed media content on participants' moods and has been divided into four categories: (1) negative mood, (2) positive mood, (3) mixed mood, and (4) neutral mood. Most participants experience a negative mood in response to the media content they consume:

(P5; woman): Content shared by people about the meaninglessness of life seemed to describe me. During that period, social media had the most negative impact on me; I could not look up. It affected my entire daily routine.

(P10; man): The ideal lives people present on social media actually make me question myself. The lifestyle presented as ideal on social media does not align with my life and ideas.

(P11; woman): The ideal life shown there affects me negatively. Because I do not see myself at that level. Everyone talks about psychological health. I do not fit any of them.

One participant experiences a positive mood in response to the media content consumed:

(P8; woman): Since I do not consume much media, I cannot say it negatively affects me. When I researched Britney Spears' life story in the media, her achievements gave me hope.

Some participants experience a mixed mood in response to the media content they consume:

(P3; man): It actually helps me. Yes, social media helps me get rid of negative thoughts. I do not think about anything. (…) Sometimes I let myself go, meaning I feel sad. I enter a mode of 'whatever happens, happens, enough is enough'.

(P6; woman): I listen to rap music, especially tracks with swearing and insults, to let off steam. I listen to them against people I'm angry with. Sometimes, I also (…) watch comedy movies, series, and videos to distract myself from my own mood.

(P12; man): When I see people living luxurious lives, I often become pessimistic and depressed. (…) But when I watch motivational videos about sports, on the contrary, I feel at peace and my morale increases.

Three participants experience a neutral mood in response to the media content they consume:

(P1; man): I used to look at the beautiful lives shared on social media and wish I could be there, do what they do. It seemed nice. Now I realize those lives are fake, so they no longer affect me.

(P7; man): I'm not very affected by external factors; the music I listen to, the books I read, or the movies and series I watch do not really influence my emotions.

(P13; man): What I see on social media does not affect me. (…) There is no change in my emotional state, I laugh at what I see, I am not affected.

3.4.6 Content interacted with in media for mood management

Mood management refers to an individual's ability to identify, understand, and regulate their emotional responses. It focuses on the capability to reduce negative emotions or enhance positive ones. When used correctly, media can provide emotional support or improve emotional states, but it can also negatively impact emotional states if used improperly. Under this sub-theme, two categories have emerged: (1) content providing help, support, and solutions, and (2) life-threatening harmful content.

Only three participants turn to content that provides help, support, and solutions while engaging with media for mood management:

> (P1; man): Whenever I feel down, I listen to music on Spotify. For instance, I believe music calms me down a bit. It could be slow tracks or sometimes energetic, Turkish rap songs when I'm very cheerful.

> (P3; man): When I'm in a negative emotional state, I go on social media looking for solutions, and what I find are words that keep me alive. I do not do any other research.

> (P12; man): Content containing help, support and solutions are more prominent. (…) I listen to a lot of music, one of the two or three things I enjoy in life and the most important one is music. The dreams I have about this field connect me to life.

Most participants, however, engage with life-threatening harmful content for mood management:

> (P4; man): I did not seek help, but being prone to suicide, and using media frequently, I searched on Google for ways to commit suicide. How can I commit suicide? (...) I asked artificial intelligence. How can a person kill themselves? (...) I researched a lot about which method can kill faster and easier. I looked at blogs written about it.

> (P5; woman): When negative thoughts come to mind, I did not search the internet for solutions to cope with my feelings. Rather, I used the internet or social media not to find a cure for my depression, but to intensify my confusion or materialize my suicidal thoughts during depressive times.

> (P6; woman): I also thought about jumping off a building. (...) I researched it in the media. Jumping height, the way to jump, etc… For instance, head-first (head-down) jumping is more certain, landing on feet reduces the chance of dying. (...) I researched train suicides, watched videos about jumping in front of a train.

4 Discussion

The purpose of the study is to investigate how communication processes and media consumption habits may influence suicidal thoughts among young adult males and females, aged 18–29, who had attempted suicide at least once. The data obtained from the interviews have been summarized in four main themes: (1) Family related factors, (2) psychosocial factors, (3) sociocultural factors, and (4) media related factors. For the first theme, four subthemes were identified: (1) Family structure, (2) family communication, (3) domestic violence and abuse, (4) family history. The second theme includes two subthemes: (1) personality traits and behavioral factors, (2) personal psychological disorders and traumas. In the third theme, there are two subthemes: (1) Social communication, (2) cultural norms and beliefs. Finally, the fourth theme is divided into six subthemes: (1) media usage habits, (2) purposes of media use, (3) content interacted with during media consumption, (4) depiction of life on social media, (5) emotional reflections of consumed media content, and (6) content interacted with in media for mood

management. The data from the interviews have been summarized under these four main themes, relevant subthemes, and explanatory categories.

Family-related factors constitute the first main theme of the study. The subtheme of family structure, a crucial factor determining interactions among family members, has been examined as fragmented, nuclear, and extended family structures. In response to RQ1, the study found that family structure and communication patterns within the family were significant contributors to suicidal tendencies. Most participants came from fragmented families, with high levels of conflict and violence, which exacerbated their emotional distress. Research on suicide shows that family structure is extremely decisive in influencing individuals' inclinations toward suicide (McLaughlin et al., 2014; Brent and Melhem, 2008; Brent and Mann, 2005; Wagner et al., 2003; Turecki et al., 2019). In this research, most participants come from fragmented family structures. Some non-fragmented families also reported facing issues of violence and conflict, which contributed to suicidal tendencies in individuals. One participant, living within a traditional culture's tribal system, has described their family structure as lacking privacy, limiting freedom, and excessively intrusive, framing it as lacking individuality and highlighting the enduring problems this creates. These findings align with the literature, which suggests that poor family communication and structure can increase the likelihood of suicidal behaviors.

In addition to family structure, the way families communicate also plays a crucial role. Nearly all participants reported poor communication within their families, describing their family environments as closed and emotionally distant. This finding aligns with previous studies indicating that communication breakdowns within families are a significant factor in suicidal behavior (Lindström and Rosvall, 2015; Trovato, 1987; Lee, 2022; Creuzé et al., 2022). Thus, the study supports RQ1 by demonstrating how both the structural characteristics of families and their communication dynamics contribute to an increased risk of suicide.

Participants in the subtheme of domestic violence and abuse have reported experiencing physical, emotional, economic, and sexual violence within the family. Literature indicates that domestic violence and abuse increase the risk of suicide (Afifi et al., 2009; Brent and Mann, 2005; Molnar et al., 2001; Durkheim, 2013). Findings also address RQ1 and demonstrate how these negative family interactions, combined with poor communication, create an environment that increases the risk of suicidal ideation and behavior.

Participants have shared experiences of physical violence and pointed to its negative effects. They have also reported psychological violence, emphasizing its detrimental impact on their and their family's emotional well-being. Economic insufficiencies are recognized as a significant cause of suicide in international literature (Alvarez-Galvez et al., 2017; Rivera et al., 2017; Tolga et al., 2023; Hu et al., 2020; Marcotte and Hansen, 2024). Some participants have mentioned experiencing economic hardships, stating that this situation has made them unhappy. There is a participant who has experienced systematic sexual violence, leaving profound effects on their life; however, this type of violence has not been mentioned by other participants.

In the subtheme of family history, family suicide history, psychological disorders, and addictions have been focused on. Studies in the literature show that suicides within the family or close circle can have encouraging effects and may increase suicidal tendencies

(Agerbo et al., 2002; McLaughlin et al., 2014; Brent and Melhem, 2008; Hawton et al., 2002). It has been observed among participants that suicide cases are frequent within their families or surroundings, and there are psychological disorders and issues like alcohol dependency within the family members.

The interaction between individuals' social environment and their psychological state is addressed under the second main theme of the study, psychosocial factors. In the study conducted for RQ2, it was found that personality traits such as aggression, hopelessness and low self-esteem were frequently observed in suicidal individuals. The subtheme of personality traits and behavioral factors includes anger and aggressive behavior, hopelessness and despair, low self-esteem and lack of confidence, and addictions, where extensive literature has been found (Fromm, 2017; Schopenhauer, 2013; Durkheim, 2013). Various studies show that anger and aggressive behaviors can increase the tendency toward suicide (Hill et al., 2020; Dillon et al., 2020). Additionally, factors such as hopelessness, despair, and lack of confidence are emphasized in academic literature as increasing individuals' propensity for suicide (Brott and Veilleux, 2024; Liu et al., 2020; Grigienė et al., 2022). Aggressive behaviors are commonly observed among participants. They often experience feelings of anger and struggle to control this emotion continuously. Hopelessness and despair are identified as commonly seen personality traits. Participants have expressed feeling helpless when unable to make desired changes, and this feeling leads to suicidal thoughts. Lack of confidence and dissatisfaction with themselves are also common among participants, while feelings of unloved and worthlessness are frequently expressed. Moreover, most participants possess various addictions that could affect their daily lives and social relationships. Smoking is common among participants; about half of them consume alcohol, with three of them stating they are alcohol-dependent. Five participants use marijuana or other drugs, and three describe themselves as addicted to smartphones or social media. These addictions contribute to worsening life quality and increasing suicidal tendencies (Carballo et al., 2006; Wang et al., 2023; Conner et al., 2014; Giesbrecht et al., 2024; Yeskendir et al., 2023).

In another subtheme, personal psychological disorders and traumas affecting an individual's emotional and mental health were examined. According to international literature, traumas and severe events can lead individuals to suicide (Fergusson et al., 2000; Rubenstein et al., 1989; Caro-Cañizares et al., 2024; Armoon et al., 2024). Half of the participants realized that they had psychological disorders such as depression, anxiety, borderline, and social anxiety during their treatment process after a suicide attempt. Moreover, many of the participants' life histories include traumatic experiences, typically resulting from violence, abuse, sudden losses, or abandonment. One participant expressed having a highly traumatic childhood due to abuse from an early age and clearly stated that during this period, they harbored thoughts of ending their life. This finding directly answers RQ2, as it can be said that personality traits and psychological disorders have an important role in influencing suicidal behavior.

Regarding RQ3, the study found that societal pressures, cultural norms, and feelings of social isolation played a significant role in participants' suicidal thoughts.

Sociocultural factors, which shape the social and cultural structures of a society and influence individuals' behaviors, are the third main theme of the study. The subtheme of social communication has been considered in terms of social adaptation, exclusion, and alienation, and social isolation. Participants frequently felt alienated due to societal expectations, particularly around family and religious norms. Numerous studies exist suggesting that social isolation and social maladaptation can trigger suicide (Stellino, 2020; Adler, 2024; Wiglesworth et al., 2022; Durkheim, 2013). Most participants state that they have difficulty in adapting to society. These difficulties can lead to experiences such as exclusion and alienation. Some participants adopt an isolated lifestyle by forming limited relationships with their surroundings, attempting to balance this situation. These findings are consistent with the literature, which indicates that cultural pressures and social isolation increase the risk of suicidal behavior. The second subtheme under sociocultural factors, cultural norms and beliefs, has been examined in the context of cultural pressure and religious and belief pressure. Most participants are subjected to cultural pressure in family and social relationships, feeling uncomfortable and experiencing cultural division. Some participants consistently and intensely feel the pressure of religion and beliefs. The literature often discusses the relationship between religion and suicide, typically finding that religion acts as a deterrent factor preventing self-destruction (Zirojević and Marković, 2020). However, some participants feeling intense religious pressure report that this pressure causes them to reject religious values, develop hatred, and create a profound perspective difference. This addresses RQ3, as it shows that societal communication patterns and the weight of cultural norms can exacerbate suicidal tendencies, particularly when individuals feel disconnected from or pressured by their social environments.

As for RQ4, the study found that participants' media consumption, particularly exposure to pessimistic and life-threatening content, exacerbated their suicidal thoughts.

Media related factors constitute the fourth main theme of the study. The subtheme of media usage habits has been examined and categorized into media usage duration and media usage tools. Participants consume media content for an average of 6–7 h a day, with all of them preferring digital media as their tool of media usage. Their traditional media preferences generally lean toward reading books. The subtheme of media usage purpose has been shaped into entertainment and passing time, information gathering and news consumption, forming social connections, and isolating from the social environment. Most participants have stated that their purpose for using media is for entertainment and passing time. The third subtheme, content interacted with during media consumption, has been analyzed based on preferences for films, series, music, books, blogs, and social media. Categories have emerged as pessimistic and hopeless content, life-threatening content, entertaining and humorous content, spiritual and supportive content, and violence and physical assault content. Although most participants state they use media for entertainment and passing time, the most interacted content in their media consumption has been identified as pessimistic and hopeless content and life-threatening content. Research on individuals prone to suicide has shown that pessimistic content can lead individuals to suicide (Czeisler, 2020; Pirkis et al., 2018; Niederkrotenthaler et al., 2020; Park et al., 2012).

The depiction of life on social media expresses how individuals represent themselves on online platforms. This includes highlighted or hidden aspects and can be manipulative. Often, the depiction of life on social media may not fully reflect real life. However, numerous studies indicate that messages emanating from the media universe can

have a negative impact on individuals' psychologies (Schmidtke and Schaller, 2000; Balt et al., 2023). All participants describe their media usage habits through digital media, and the majority spend long hours on social media. The subtheme depiction of life on social media has been examined within the categories of comparison and feeling worthless, loneliness and alienation, and motivation and inspiration. Nearly all participants compare themselves to the life portrayals on social media and feel worthless. Almost all of them also experience feelings of loneliness and alienation. However, two participants mention that the life depiction on social media have had a positive impact on them and have been motivational. The content they see on platforms inspires them to make positive changes in their lives and provides motivation and inspiration to achieve better. These findings answer RQ4 by demonstrating the dual role that media can play in either exacerbating or alleviating suicidal tendencies, depending on the type of content consumed and how it interacts with the individual's emotional state.

Mood expresses an individual's emotional state at a particular moment and typically describes an emotional condition that lasts for several hours or days, reflecting the person's overall emotional status. The emotional responses individuals exhibit while consuming media content are generally dependent on how that content interacts with their personal experiences, interests, and emotional states. This subtheme, examining the mood reflections of consumed media content, focuses on negative mood, positive mood, mixed mood, and neutral mood. Most participants experience a negative mood due to the media content they watch (Wongkoblap et al., 2017). Some participants exhibit a mixed mood, three participants experience a neutral mood, and one reports a positive mood response to the media content consumed.

Mood management refers to the ability to identify, understand, and control one's emotional responses. This process focuses on reducing negative emotions or enhancing positive emotions. Media can provide emotional support or improve emotional conditions when used correctly, but can adversely affect emotional states if misused. In this context, the subtheme of content interacted with in media for mood management is examined in two categories: content that includes help, support, and solutions, and harmful content that threatens life. Only three participants turn to content that includes help, support, and solutions in managing their moods. Most interact with harmful content that poses life threats in mood management. Our findings emphasize that while media can contribute to negative emotional states, it also holds the potential for positive interventions, such as raising awareness and providing emotional support for at-risk individuals. Producing quality content in media to increase awareness for suicide prevention and developing strategies is of great importance. Social media has also become an effective tool for identifying beliefs and attitudes related to suicide (Keating and Rudd-Arieta, 2021; Turkish Statistical Institute, 2023; Kirchner and Niederkrotenthaler, 2024).

4.1 Study strengths and limitations

The study has several significant strengths. Firstly, the research examines suicidal tendencies not only from a psychological or medical perspective, but also across multiple interdisciplinary factors such as social, cultural, and media interactions. This approach provides a better understanding of the multidimensional nature of suicidal

tendencies. This research not only reinforces information in the literature but also presents unique findings compared to similar studies, particularly in cultural and geographical contexts. Additionally, the fact that the number of participants is equal to men and women increases the generalizability of the study in terms of gender differences in suicide attempts. Morever, the results uniquely highlight the diversity in perceptions of the relationship between religion and suicide. While literature generally notes religion as a deterrent to suicide, this study reveals that intense religious pressure could increase suicidal tendencies through effects like rejection and hatred of religious values.

Despite its strengths, this exploratory study has some limitations. Firstly, the selection of participants was done through convenience sampling and snowball techniques, which might have restricted the diversity of the participants. Convenience sampling can introduce sampling bias, as the participants may share similar characteristics, limiting the generalizability of the findings to populations outside the sample group. Data obtained through these methods may not fully represent the general population. Additionally, snowball sampling can also lead to sampling errors, as participants are more likely to refer individuals with similar traits, which may further reduce the diversity of the sample. Also, as the study is limited to only 13 participants, the generalizability of the findings is constrained. Furthermore, the participants in this study were predominantly young adults (ages 18–29) with high levels of education (54% holding university degrees). This homogeneity in age and education limits the ability to generalize the findings to the broader Turkish population, which is more diverse in terms of age, educational attainment, and professional backgrounds. Future research should aim to include a larger and more diverse sample group to better represent various sociodemographic characteristics, such as age, education level, and professional commitment. The use of larger and randomized sampling techniques in future research would help reduce potential biases and increase the external validity of the findings. Secondly, there might be uncertainties regarding the sincerity and honesty of participants in discussions on a sensitive topic like suicide. Participants might not have shared some information fully due to social pressure or personal concerns. Thirdly, the study considered only specific sociodemographic characteristics and did not collect information about the medical histories of the participants. This could lead to overlooking other significant factors that could influence suicidal tendencies.

5 Conclusion

This research has thoroughly analyzed the factors influencing individuals' suicidal tendencies and the role of media on these tendencies. Through in-depth interviews, it has identified the impacts of complex relationships among personal, familial, and socio-cultural factors on suicidal thoughts and behaviors. One of the key findings is how digital media can shape individuals' mental health. The study demonstrates how media consumption patterns and interactions on social media platforms can affect individuals' emotional states positively and negatively.

Another significant outcome from the research is the variability in how individuals perceive and react to media content. This highlights the importance of tailored interventions and support mechanisms for individuals vulnerable to suicidal thoughts. Additionally, by

emphasizing the impact of the socio-cultural context on suicidal tendencies, the study underscores the necessity for cultural sensitivity in research and interventions.

The themes identified in this research provide a robust framework for understanding the interplay between media usage and mental health. These findings offer valuable guidance for future research, particularly on how media can be leveraged to support at-risk individuals more effectively. Moreover, this study contributes to the ongoing conversation about creating a healthier media environment, one that both mitigates the risks of harmful content and maximizes the potential for positive mental health interventions.

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 humans were approved by Karabük University, Social and Humanities Scientific Research and Publication Ethics Board (protocol code 2024/02 and dated January 26, 2024). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

EA: Writing – review & editing, Validation, Supervision, Methodology, Formal analysis, Data curation. Mİ: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. MK: Writing – review & editing, Investigation, Data curation, Conceptualization. YB: Writing – review & editing, Validation, Methodology, Formal analysis, Data curation. EK: Writing – review & editing, Visualization, Validation, Software.

HA: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. FA: Writing – review & editing, Investigation, Conceptualization.

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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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2024.1460348/full#supplementary-material

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Research for association and correlation between stress at workplace and individual mental health

Mi-Jeong Lee[1,2] and Wanhyung Lee[3]*

[1]Graduate School of Gachon University in Public Health, Incheon, Republic of Korea, [2]Department of Nursing, Andong Science College, Andong, Republic of Korea, [3]Department of Preventive Medicine, College of Medicine Chung-Ang University, Seoul, Republic of Korea

Background: Occupational stress negatively affects mental health and productivity. Managing worker mental health has been equated to assessing workplace stressors, although there are challenges in screening and managing the mental health of vulnerable workers. This study aimed to determine the correlation between workplace stress characteristics and two depression assessment questionnaires to guide workplaces on assessing job stress more effectively.

Methods: A cross-sectional survey study was conducted with 812 workers from manufacturing sector in Korea. Depression was measured using the CES-D and PHQ-9 questionnaires, and the KOSS-SF was used to assess job stress.

Results: The results showed that 26.2% of participants had high job stress levels, with job control and demands being the highest subfactors. The CES-D and PHQ-9 were positively correlated with job stress factors, with the PHQ-9 showing stronger correlations than the CES-D.

Conclusion: The CES-D and PHQ-9 were associated with workplace stress; however, the CES-D was not associated with job control, whereas the PHQ-9 was not associated with job demands or relationship conflicts. Additionally, the PHQ-9 showed a higher correlation with workplace stress than the CES-D. The correlation between depression screening tests differed according to workplace stress characteristics, but the PHQ-9 was helpful in screening workers for depression.

KEYWORDS

job stress, depression, KOSS-SF, CES-D, PHQ-9, manufacturing sector

Background

Occupational stress is stress from the workplace or organization, defined by the National Institute for Occupational Safety and Health as "harmful physical and emotional reactions that occur when job demands are inconsistent with a worker's abilities, resources, and desires" (1). In 2009, the International Social Survey Program released data on the rate of job stress, which means "feeling stressed at work," by country; the rate of job stress was 87% in Korea, higher than the Organization for Economic Cooperation and Development average of 78%. Compared to 78% in the U.S. and 72% in Japan, job stress in Korea is exceptionally high. A study by Chang et al. (2) surveyed 6,977 workers in 254 businesses and found that 5% were in the healthy group, 73% were in the potentially stressed group, and 22% were in the high-risk stressed group (2).

Job stress leads to job dissatisfaction, turnover, absenteeism, and decreased productivity (3, 4), which not only causes economic losses through accidents, deaths, and lost wages but

also physically increases the prevalence of cardiovascular diseases and diabetes and affects mental health by causing conditions such as depression and anxiety (5, 6). In particular, depression has been shown to increase the frequency of depressive symptoms by approximately four times compared with job stress (7). Depression in workers not only increases the risk of cardiovascular diseases but also leads to psychiatric side effects such as drug abuse, alcoholism, and suicide (8). Therefore, it is very important to prevent and manage depression in advance. According to statistics from the World Health Organization, approximately 3.8% of the population in worldwide experiences depression, and approximately 280 million people suffer from depression worldwide. In Korea, depression screening was introduced in 2018 as part of a national health checkup for employed members of the National Health Insurance to reduce suicide risk. There are various strategies for preventing severe mental health problems, including suicide, in Korean workplaces (9). According to Article 5 (2) of the Occupational Safety and Health Act, the current system for managing workers' occupational stress in Korea requires employers to "create a pleasant working environment and improve working conditions to reduce physical fatigue and mental stress."

According to a previous report, structural interventions are based on the principle of prevention, introducing methods to alleviate stress factors through education on basic mental health management as the primary prevention technique and employing screening using mental health examinations for workers as the secondary prevention method (10). Most large-sized enterprises establish mental health programs to manage psychological wellness among their employees, but it is difficult for small-and medium-sized enterprises to achieve this due to a lack of cost and interest. Therefore, for job stress management, health managers or health management-entrusted organizations at workplaces use the Korean Job Stress Measurement Tool to evaluate job stress and manage it according to the results of the Guide (H-67-2022), a guideline for measuring job stress factors created and distributed by the Korea Occupational Safety and Health Administration.

The Korean version of the tool does not include items on personal characteristics or stressors other than work and has limitations in that it does not measure symptom levels as a result of stress, but rather assesses job stress factors and interprets the results by the workplace unit rather than by the individual (2).

To date, there has been few studies on the relationship of stress characteristics at the workplace and which questionnaires are suitable for measuring individual mental health among workers. Therefore, this study was conducted to determine the extent to which the Center for Epidemiological Studies-Depression Scale (CES-D) and the Patient Health Questionnaire-9 (PHQ-9) questionnaires, which are relatively popular depression assessment tools used in primary health care, correlate better with workplace stress according to domains of the Korean Occupational Stress Scale-Short Form (KOSS-SF).

Methods

Study participants and data collection

This study was conducted from February to August 2022. After obtaining consent from workers of small-and medium-sized manufacturing businesses that receive healthcare entrusted to them by the health management specialist institution of a hospital in Incheon, the purpose of the study and how to complete the questionnaire were explained. Before the self-completion questionnaires were received, assurance was provided that the contents of the questionnaires will be used only for the study. Data were collected by asking workers at high-risk workplaces in healthcare consignment sites to complete the KOSS-SF and CES-D questionnaires. The KOSS-SF and PHQ-9 questionnaires were distributed to the health workers in charge of the workplace and submitted on the day of the medical examination. A total of 647 workers (565 men and 82 women) responded to the KOSS-SF and CES-D, while 165 workers (125 men and 40 women) responded to the KOSS-SF and the PHQ-9 depression questionnaires.

After excluding 20 individuals who did not consent to the use of their results at the time of screening or who responded insufficiently to the survey questions, data from 812 workers were included in the final analysis.

Main variables

Occupational stress assessment

Occupational stress was assessed using a shortened version of the KOSS-SF (2). The KOSS-SF has a basic form consisting of a questionnaire with 43 items in eight areas and a short form consisting of 24 items in seven areas after factor analysis and validity testing. This study used a short form that can identify important sources of stress among Korean workers that can be easily applied in the field. For each question, the respondents were asked to answer on a 4-point scale of "not at all," "not true," "true," "yes," and "very true." Items with higher scores were given 1–4 points, and items with lower scores were reverse-coded from 4 to 1 points. We obtained a scaled score for each area by using the scoring method proposed by the developers, with higher scores indicating higher job stress.

The scores were calculated as follows;

Scaled score for each area = (actual score - number of questions) × 100/(highest possible score - number of questions) = Job Stress Total Score = (sum of scaled scores in each of the seven domains) / 7

The gender reference value indicates the actual score of the target employees and the quartile of national employees, with the top 50% as high and the bottom 50% as low.

Depression

CES-D

The current study used a Korean version of the CES-D developed by Radloff (11) and translated by Cho and Kim (12). The CES-D is a self-reported depression scale consisting of 20 items including depressed mood, positive emotions, physical symptoms, sluggish behavior, and interpersonal factors. Each item measures the frequency of experience in the past week as "extremely rarely," "sometimes," "often," and "most of the time" on a 4-point scale, and the positive items are reverse-scaled so that a higher mean score indicates higher depression. In this study, the 21 points suggested by a previous study

(12) were used as cutoff points to determine depression, with 0–20 points indicating normal and 21 points or more indicating depressed.

PHQ-9

The Korean version (13) of the PHQ-9 developed by Spitzer et al. (14) was used for measurement. The PHQ is a self-administered questionnaire developed to promote the recognition and diagnosis of common mental disorders in primary care settings. Among them, the PHQ-9, which consists of nine questions for the diagnosis of major depressive disorder, measured the frequency of symptom occurrence in the past 2 weeks on a 4-point scale, with 0 for "never," 1 for "several days," 2 for "more than a week," and 3 for "almost every day." The sum was calculated to determine the depressive state if the total score was 10 or more out of 27 points or if the score of item 9 was 1 or more (13).

Statistical analysis

We conducted the following analyses. Owing to the differing KOSS criteria for men and women, all results were analyzed by considering this difference between the two sexes.

1. The general characteristics and job stress levels of the participants were statistically processed as means and percentages.
2. The CES-D and PHQ-9 levels according to general characteristics and job stress were analyzed using the Chi-squared test.
3. The relationships between job stress and CES-D and PHQ were analyzed using multiple logistic regression.
4. The association between job stress and CES-D and PHQ was analyzed using the Pearson correlation coefficient.
5. Statistical significance was set at $p < 0.05$. All statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results

The demographic information and job stress levels are shown in Table 1. In total, 812 respondents participated in the survey. A total of 418 (51.5%) were aged 20 to 39 years, 380 (56.8%) were aged 40 to 59 years, and 14 (1.7%) were aged 60 years or older. There were 690 (85.0%) males and 122 (15.0%) females, with 518 (63.8%) working production jobs and 294 (36.2%) working office jobs. In terms of job stress factors, 213 (26.2%) of the participants had a total score of 213, 247 (30.4%) had job demands, 353 (43.5%) had job autonomy, 242 (29.8%) had relationship conflicts, 137 (16.9%) had job insecurity, 230 (28.3%) had organizational systems, 182 (22.4%) had inadequate compensation, and 138 (17.0%) had workplace culture, with the highest number being job autonomy factors and the lowest number being job insecurity factors.

The CES-D scores according to the participants' general characteristics and job stress factors are shown in Table 2. A cross-tabulation analysis was conducted to examine the CES-D level according to general characteristics and job stress factors. A total of 647 participants responded to the KOSS-SF and CES-D questionnaires, of whom 602 (93.0%) scored as CES-D-normal and 45 (7.0%) were

TABLE 1 General characteristics and occupational stress according to the KOSS-SF.

Variable	Categories	N (%)
Characteristics		
Age	20 ~ 39	418 (51.5%)
	40 ~ 59	380 (56.8%)
	>60	14 (1.7%)
Sex	Male	690 (85.0%)
	Female	122 (15.0%)
Occupational classification	White-collar	518 (63.8%)
	Blue-collar	294 (36.2%)
KOSS-SF domains		
Total score	Low	599 (73.8%)
	High	213 (26.2%)
Job demand	Low	565 (69.6%)
	High	247 (30.4%)
Job control	Low	459 (56.5%)
	High	353 (43.5%)
Interpersonal conflict	Low	570 (70.2%)
	High	242 (29.8%)
Job insecurity	Low	675 (83.1%)
	High	137 (16.9%)
Organization system	Low	582 (71.7%)
	High	230 (28.3%)
Lack of reward	Low	630 (77.6%)
	High	182 (22.4%)
Occupational climate	Low	674 (83.0%)
	High	138 (17.0%)

high-risk. In terms of age, out of those aged 20–39 years, 335 (92.3%) were normal and 28 (7.7%) were at risk; out of those aged 40–59 years, 255 (94.1%) were normal and 16 (5.9%) were at risk; and out of those aged 60 years and older, 12 (92.3%) were normal and 1 (7.7%) was at risk, with the highest proportion of those aged 20–39 years considered at risk of depression. In terms of sex, 523 males (92.6 per cent) were normal and 42 (7.4 per cent) were high-risk for depression, while 79 females (96.3 per cent) were normal and 3 (3.7 per cent) were high-risk for depression, with males having a higher proportion of high-risk depression, though this was not statistically significant ($p = 0.20$). In terms of occupation, 252 (91.3%) office workers were normal and 24 (8.7%) were high-risk; 350 (94.3%) were normal and 21 (5.7%) were high-risk, with a higher proportion of high-risk depression among office workers; however, this was not statistically significant ($p = 0.13$).

The statistically significant factors were the total score, job demands, job autonomy, organizational system, inadequate compensation, and workplace culture. The total score was 447 (95.8%) normal and 21 (4.2%) high-risk in the low-risk group, and 125 (83.9%) normal and 24 (16.1%) high-risk in the high-risk group, with a higher proportion of high-risk in the high-risk group, which was statistically significant ($p < 0.0001$). The job demands score was 419 (95.7%) normal and 219 (4.3%) high-risk in the low-risk group

TABLE 2 General characteristics and domains of KOSS-SF according to depression by the CES-D.

		Depression by CES-D, N(%)		p-value
		No	Yes	
No. of participants		602 (93.0)	45 (7.0)	
Age (years)				0.4450
20~39		335 (92.3)	28 (7.7)	
40~59		255 (94.1)	16 (5.9)	
>60		12 (92.3)	1 (7.7)	
Sex				0.2096
Male		523 (92.6)	42 (7.4)	
Female		79 (96.3)	3 (3.7)	
Occupational classification				0.1337
White-collar		252 (91.3)	24 (8.7)	
Blue-collar		350 (94.3)	21 (5.7)	
KOSS-SF domains				
Total score	Low	477 (95.8)	21 (4.2)	<0.0001
	High	125 (83.9)	24 (16.1)	
Job demand	Low	419 (95.7)	19 (4.3)	0.0002
	High	183 (87.6)	26 (12.4)	
Job control	Low	379 (94.5)	22 (5.5)	0.0610
	High	223 (90.66)	23 (9.4)	
Interpersonal conflict	Low	440 (94.2)	27 (5.78)	0.0589
	High	162 (90.0)	18 (10.0)	
Job insecurity	Low	522 (94.7)	29 (5.26)	<0.0001
	High	80 (83.3)	16 (16.7)	
Organization system	Low	456 (95.2)	23 (4.8)	0.0003
	High	146 (86.9)	22 (13.1)	
Lack of reward	Low	496 (95.0)	26 (5.0)	<0.0001
	High	106 (84.8)	19 (15.2)	
Occupational climate	Low	513 (94.5)	30 (5.5)	0.0011
	High	89 (85.6)	15 (14.4)	

TABLE 3 General characteristics and domains of KOSS-SF according to depression by the PHQ-9.

		Depression by PHQ-9, N(%)		p-value
		No	Yes	
No. of participants		140 (84.4)	25 (15.1)	
Age (years)				0.009
20~39		41 (74.5)	14 (25.5)	
40~59		98 (89.9)	11 (10.1)	
>60		1 (100)	0 (0.0)	
Sex				0.0101
Male		101 (80.8)	24 (19.2)	
Female		39 (97.5)	1 (2.5)	
Occupational classification				<0.0001
White-collar		13 (72.2)	5 (27.8)	
Blue-collar		118 (80.3)	29 (19.7)	
KOSS-SF domains				
Total score	Low	95 (94.0)	6 (29.7)	<0.0001
	High	45 (70.3)	19 (29.7)	
Job demand	Low	113 (88.9)	14 (11.0)	0.0002
	High	27 (71.0)	11 (28.9)	
Job control	Low	52 (89.7)	6 (10.3)	0.0610
	High	88 (82.2)	19 (17.8)	
Interpersonal conflict	Low	90 (80.7)	13 (12.6)	0.0589
	High	50 (80.7)	12 (19.3)	
Job insecurity	Low	112 (90.3)	12 (9.7)	<0.0001
	High	28 (68.3)	13 (31.7)	
Organization system	Low	94 (91.3)	9 (8.7)	0.0003
	High	46 (74.2)	16 (25.8)	
Lack of reward	Low	99 (91.7)	9 (8.3)	<0.0001
	High	41 (71.9)	16 (28.0)	
Occupational climate	Low	118 (90.1)	13 (9.9)	0.0011
	High	22 (64.7)	12 (35.3)	

and 182 (87.6%) normal and 26 (12.41%) high-risk in the high-risk group, with a higher proportion of high-risk in the high-risk group, which was statistically significant ($p = 0.0002$). The job insecurity score was 522 (94.2%) normal and 29 (5.26) high-risk in the low-risk group and 80 (83.3%) normal and 16 (16.7%) high-risk in the high-risk group; the proportion of high-risk was significantly higher in the high-risk group ($p = 0.001$). The organizational system score was 456 (95.2%) normal and 23 (4.8) high-risk in the low-risk group and 146 (86.9%) normal and 22 (13.1%) high-risk in the high-risk group; the proportion of high-risk in the high-risk group was higher and statistically significant ($p = 0.003$). The compensation inadequacy score was 496 (95.20%) normal and 26 (5.0%) high-risk in the low-risk group and 106 (84.8%) normal and 19 (15.2%) high-risk in the high-risk group; the proportion of high-risk in the high-risk group was higher and statistically significant ($p = 0.001$). The organizational culture score was 513 (94.5%) normal and 30 (5.5%) high-risk in the low-risk group and 89 (85.6%) normal and 15

(14.4%) high-risk in the high-risk group; the proportion of high-risk in the high-risk group was higher and statistically significant ($p = 0.001$).

The PHQ levels of the participants according to their general characteristics and job stress factors are shown in Table 3. A cross-tabulation analysis was conducted to examine the PHQ-9 level according to general characteristics and job stress factors. A total of 165 participants responded to the KOSS-SF and PHQ questionnaires, of whom 140 (84.4%) were PHQ-normal and 25 (15.1%) were high-risk. Regarding age, 41 (74.5%) were normal and 14 (25.5%) were at risk in the 20–39 years age group, 98 (89.9%) were normal and 11 (10.1%) were at risk in the 40–59 years age group, and 1 (100%) was normal and 0 (0%) was at risk in the 60 years and above age group, with a higher proportion of high-risk in the 20–39 years age group, which was not statistically significant ($p = 0.09$). In terms of sex, 101 (80.8%) were normal and 24 (19.2%) were high-risk, while 39 (97.5%) were normal and 1 (2.5%) was high-risk, with males having a higher

TABLE 4 The risk of depression according to the level of KOSS-SF by multiple logistic regression.

Odd Ratio (95% confidence intervals)			
KOSS-SF domains		CES-D	PHQ-9
Total score	Low	Reference	Reference
	High	4.83 (2.56–9.10)	7.98 (2.70–23.56)
Job demand	Low	Reference	Reference
	High	2.95 (1.57–5.55)	2.45 (0.98–6.14)
Job control	Low	Reference	Reference
	High	2.08 (1.11–3.89)	2.31 (0.82–6.52)
Interpersonal conflict	Low	Reference	Reference
	High	2.06 (1.07–3.95)	1.66 (0.68–4.05)
Job insecurity	Low	Reference	Reference
	High	4.14 (0.35–16.64)	4.33 (1.65–11.40)
Organization system	Low	Reference	Reference
	High	3.20 (1.71–6.00)	4.14 (1.59–10.74)
Lack of reward	Low	Reference	Reference
	High	3.89 (2.03–7.41)	5.09 (1.97–13.18)
Occupational climate	Low	Reference	Reference
	High	3.02 (1.53–5.94)	7.28 (2.65–19.99)

All results were adjusted by age, sex, and occupational classification.

TABLE 5 Correlations between KOSS-SF domains and depression (CES-D/PHQ-9).

Correlation coefficient (p-value)		
KOSS-SF	CES-D	PHQ-9
Total score	0.41 (<0.0001)	0.47 (<0.0001)
Job demand	0.31 (<0.0001)	0.40 (<0.0001)
Job control	0.15 (<0.0001)	0.01 (0.99)
Interpersonal conflict	0.19 (<0.0001)	0.19 (0.01)
Job insecurity	0.35 (<0.0001)	0.46 (<0.0001)
Organization system	0.33 (<0.0001)	0.30 (<0.0001)
Lack of reward	0.32 (<0.0001)	0.35 (<0.0001)
Occupational climate	0.29 (<0.0001)	0.20 (0.01)

proportion of high-risk, which was statistically significant ($p = 0.01$). Regarding occupation, 13 office workers were (72.2%) normal and 5 (27.8.7%) were high-risk, and 118 (80.3%) non-office workers were normal and 29 (19.7%) were high-risk, with a significantly higher proportion of high-risk office workers ($p = 0.03$).

The statistically significant factors were the total score, job demands, job autonomy, organizational system, compensation inadequacy, and workplace culture. The total score was 95 (94.0%) normal and 6 (29.7%) high-risk in the low-risk group and 45 (70.3%) normal and 19 (29.7%) high-risk in the high-risk group; the proportion of high-risk in the high-risk group was significantly higher ($p = 0.001$). Job demand scores were 113 (70.3%) normal and 14 (11.0%) high-risk in the low-risk group, and 27 (71.0%) normal and 11 (28.91%) high-risk in the high-risk group, with a higher proportion of high-risk in the high-risk group that was statistically significant ($p = 0.007$). The job insecurity score was 112 (90.3%) normal and 12

(9.7%) high-risk in the low-risk group, and 28 (68.3%) normal and 13 (31.7%) high-risk in the high-risk group; the proportion of high-risk in the high-risk group was higher and statistically significant ($p = 0.0007$). The organizational system score was 94 (91.3%) normal and 9 (8.7%) high-risk in the low-risk group, and 46 (74.2%) normal and 16 (25.8%) high-risk in the high-risk group, with a higher proportion of high-risk in the high-risk group, which was statistically significant ($p = 0.003$). The compensation inadequacy score was 99 (91.7%) normal and 9 (8.3%) high-risk in the low-risk group and 41 (71.9%) normal and 16 (28.0%) high-risk in the high-risk group, with a higher proportion of high-risk in the high-risk group, which was statistically significant ($p = 0.0008$). The occupational climate score was 118 (90.1%) normal and 14 (9.9%) high-risk in the low-risk group and 22 (64.7%) normal and 12 (35.3%) high-risk in the high-risk group; the proportion of high-risk in the high-risk group was higher and statistically significant ($p = 0.0002$).

Logistic regression analyses were performed to adjust for confounding variables such as age, sex, and occupational classification. The odds ratio (OR, 95% confidence interval [CI]) for depression according to the CES-D scores was calculated, and the high total score of the KOSS-SF was 4.83 (2.56–9.10). The high level of job demands was 2.95 (1.57–5.55) and the high level of job control was 2.08 (1.11–3.89) in the depression group. The depression group according to the CES-D showed a higher risk for a high level of relationship conflict (2.06 [1.07–3.95]), job insecurity (4.14 [0.35–16.64]), organizational structure (3.2 [1.7–6.04]), compensation inadequacy (3.89 [2.03–7.41]), and occupational climate (3.02 [1.53–5.04]) than the non-depression group, respectively. The depression group according to the PHQ-9 also showed an increased risk of high levels of each job stress item. Specifically, a higher risk for a high level of job stress was seen with a total score of 7.98 (2.70–23.56), 4.33 (1.65–11.40) for job insecurity, 4.14 (1.59–10.74) for organizational system, 5.09 (1.97–13.18) for compensation inadequacy, and 7.28 (2.65–19.99) for occupational climate, respectively (Table 4).

A correlation analysis was conducted between job stress and depression (Table 5). The CES-D score was positively correlated, with a higher total score for job stress being statistically associated with higher depression (r = 0.41, $p < 0.0001$). When analyzed by the job stress subdomains, there were significant positive correlations with job demands (r = 0.31, $p < 0.0001$), job autonomy (r = 0.15, $p < 0.0001$), relationship conflict (r = 0.19, $p < 0.0001$), job insecurity (r = 0.35, $p < 0.0001$), organizational system (r = 0.33, $p < 0.0001$), inadequate compensation (r = 0.32, $p < 0.0001$), and occupational climate (r = 0.29, $p < 0.0001$). Job stress and the PH-9 were positively correlated, with higher total job stress scores being statistically associated with higher levels of depression (r = 0.47, $p < 0.0001$). When analyzed by the sub-domains of job stress, there were significant positive correlations with job demands (r = 0.4, $p < 0.0001$), relationship conflict (r = 0.19, $p = 0.01$), job insecurity (r = 0.46, $p < 0.0001$), organizational systems (r = 0.3, $p < 0.0001$), compensation inadequacy (r = 0.35, $p < 0.0001$), and occupational climate (r = 0.19, $p = 0.01$).

Discussion

This study examined the correlation between tools for assessing job stress in organizations and mental health assessment tools for

individuals. The KOSS-SF was compared to the CES-D and PHQ-9, which are screening instruments for major depression.

The results showed that 213 (26.2%) of the 812 participants in the survey had high levels of job stress, and the highest percentage of sub-factors were job autonomy (247 [43.5%]) and job demands (30.4%). This was higher than the 22% reported in the high-risk stress group (2). Job stress not only physically increases the prevalence of cardiovascular disease and diabetes but also affects mental health, such as causing depression and anxiety, with the frequency of depressive symptoms increasing fourfold as job stress increases (7). The risk of depression among all workers who responded to the KOSS-SF, CES-D, and PHQ-9 questionnaires was 7.0 and 15.1%, respectively. This was significantly higher than the 3.3% of the population classified as being at risk of depression (15).

Screening for depression based on the CES-D showed that higher KOSS-SF total scores and most of the seven items, except for job insecurity, were associated with a significantly higher risk of depression. Additionally, the correlation analysis showed that the KOSS-SF and CES-D scores were significantly positively correlated in all domains, with the highest correlation being the total score.

This is consistent with previous studies indicating that job stress contributes to an increased risk of depression (16–18). In addition, higher job stress was significantly associated with higher depression, and job demands, relationship conflicts, job insecurity, organizational systems, and compensation inadequacy were significantly and positively related to depression according to the total score and subdomains of job stress (19).

The results of the depression screening based on the PHQ-9 showed that the higher the total score of the KOSS-SF and the seven items, job insecurity, organizational system, lack of reward, and occupational climate, the higher the risk of depression. Correlation analysis showed that the KOSS-SF and PHQ-9 were significantly positively correlated in all areas except for the total score and job control among the seven items, with the highest correlation being the total score. This is similar to the results of the previous study, which showed a significant correlation between the KOSS-SF and PHQ-9 (20).

In summary, the CES-D was associated with all factors of job stress, except job autonomy, and was correlated with all factors. In addition, the PHQ-9 was associated with all job stress factors except job demands and relationship conflicts, correlated with all factors except job autonomy, and had higher correlations than the CES-D.

A previous study found that repeatedly experiencing high job stress was associated with a risk of high levels of depressive symptoms in both men and women (18). Likewise, a study on job stress and depression in female workers also found work-related stress associated with depression and anxiety (21).

According to the World Health Organization statistics, approximately 3.8% of the Korean population experiences depression, and approximately 280 million people suffer from depression worldwide. In Korea, depression screening was introduced in 2018 as part of a national health checkup for employed members of the National Health Insurance. The risk of suicide was significantly higher in the high-risk group for depression, as measured by the PHQ-9, than in the low-risk group (22).

A study by Yoon and Kim (23) found that the number of applicants with occupational mental illnesses increased approximately 1.74 times from 70 in 2008 to 122 in 2012, and the proportion of

occupational mental illnesses among the occupational illnesses was 0.72% in 2008, but increased every year to 1.70% in 2012. In addition, the number of applicants for work-related suicides increased 8-fold from six in 2008 to 48 in 2012, and the proportion of applicants for work-related suicides among those with occupational diseases increased from 0.06% in 2008 to 0.64% in 2012 (23).

According to data on industrial accident decisions released by the Korea Labor Welfare Corporation, the number of workers who applied for industrial accidents due to mental illness in Korea increased from 331 in 2019 to 581 in 2020 and 720 in 2021. The approval rate of workers' compensation has also been increasing year by year, soaring to 67.9% from 34.3% in 2014. The most common conditions were adjustment disorders, followed by depression, post-traumatic stress disorder, acute stress disorder, and anxiety disorders.

Unlike physical illnesses, mental illnesses are not easily visible and are often unrecognized by those around the affected employees, as well as by the employees themselves. Therefore, it is necessary to periodically evaluate mental health. In 2018, a depression screening test was introduced during the national health checkup for employees enrolled in the National Health Insurance. The test was conducted every 10 years for people aged 20–70 years. At the time of its introduction, it was conducted for 40–70-year-olds, but as depression among young people has become a social problem in recent years, the test was expanded to include 20–30-year-olds in 2019. However, there are limitations to checking and managing workers' mental health on a regular basis by conducting the screening only once every 10 years. Therefore, it is necessary to complement job stress assessments for organizations and individual mental health; however, no study has investigated the association and correlation between job stress and depression using questionnaires. This study examined depression-screening tests commonly used in primary healthcare from multiple perspectives.

This study had several limitations. First, there are sex-related differences in mental health and the small sample size of women did not allow for stratified analyses. However, the KOSS-SF scoring system was different and was used in all analyses. Based on this information, it is necessary to increase the sample size in future studies. Second, the study did not reflect occupational characteristics such as experience, shift work, and long working hours. Therefore, it is necessary to consider occupational characteristics in future studies.

Conclusion

The study found that the CES-D and PHQ-9 were both associated with job stress factors; however, the CES-D was not associated with job control, whereas the PHQ-9 was not associated with job demands or relationship conflicts. Both measures were correlated with all job stress factors. Moreover, the PHQ-9 showed a higher correlation than the CES-D. To manage job stress in the workplace, the first step is to evaluate the current status of job stress factors in an organization and to assess the mental health of workers in relation to these factors. Based on the results of these evaluations, organizations should work to lower job stress and provide therapeutic interventions for high-risk groups. This study recommends the use of the KOSS-SF to evaluate job stress factors in organizations. A questionnaire that showed a high correlation with job stress factors in this study should be selected to evaluate and manage the mental health of individual workers for more effective job stress management in the workplace. In summary, this study

emphasized the importance of evaluating job stress factors in the workplace and assessing the mental health of workers to manage job stress effectively. This study also recommends the use of the KOSS-SF and a specific questionnaire to evaluate and manage job stress.

Data availability statement

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

Ethics statement

This study was approved by the Institutional Review Board (IRB) of Gachon University Gil Hospital (IRB No. GFIRB2020-038). The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements.

Author contributions

M-JL: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing

– original draft, Writing – review & editing. WL: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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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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The mediating role of psychological resilience in the relationship between physical exercise and sense of security among left-behind junior high school students: multi-group comparative analysis of only children and children with siblings

Qifei Xia[1,2], Qi Liu[3] and Guoyou Qin[4]*

[1]School of Physical Education, Ankang College, Ankang, China, [2]Institute of Sports Training, Xi'an Institute of Physical Education, Xi'an, China, [3]Qingshui County No. 5 Middle School, Tianshui, China, [4]College of Physical Education, Hanjiang Normal University, Shiyan, China

Background: This study aims to explore the mediating role of psychological resilience in the relationship between physical exercise and the sense of security among junior high school students, with a particular focus on variations based on only-child status.

Methods: A survey was conducted among 649 left-behind junior high school students in Gansu Province, China, utilizing the Physical Activity Rating Scale-3 (PARS-3), Security Questionnaire (SQ), and Resilience Scale for Chinese Adolescents (RSCA).

Results: Among the participants, the mean scores for physical exercise, psychological resilience, and sense of security were 40.78 ± 29.49, 51.14 ± 10.08, and 55.75 ± 14.35, respectively. A significant positive correlation was observed between physical exercise and sense of security ($r = 0.210$, $p < 0.01$), physical exercise and psychological resilience ($r = 0.164$, $p < 0.01$), and psychological resilience and sense of security ($r = 0.443$, $p < 0.01$). Mediation analysis revealed that psychological resilience partially mediates the effect of physical exercise on the sense of security, accounting for 33.9% of the total effect. Multi-group analysis indicated significant differences in this mediating effect between only children and children with siblings, with a stronger predictive role of psychological resilience for the sense of security among non-only children.

Conclusion: Participation in physical exercise can promote the improvement of sense of security through the individual power factor of improving the psychological resilience of left-behind junior high school students, and this improvement effect is more significant for non-only children.

KEYWORDS

physical exercise, sense of security, psychological resilience, left-behind junior high school students, only children, children with siblings

1 Introduction

The COVID-19 pandemic reduced daily travel activities, affecting general health and leading to a significant deficit in total physical activity. This decline contributed to negative psychological conditions, such as anxiety and stress, caused by feelings of insecurity and fear (Silva et al., 2020). Worldwide, public health physical activity guidelines emphasize children (usually 6–11 years old) and adolescents (12–19 years old) (Services and Branch, 1998). The international Convention on the Rights of the Child defines a child as any person under the age of 18 (UNCRC, 1989). Left-behind children refer to children whose parents (either one or both) have been away from their hometowns for work for at least 6 months without the provision of adequate family supervision (Zhao et al., 2014; Fellmeth et al., 2018). The latest official definition in China describes left-behind children as those under the age of 16 years old whose parents are absent due to work, or where one parent is absent, and the other is unable to provide proper guardianship, and who are unable to live normally with their parents (State Council of the PRC, 2016). It is estimated that by the turn of the millennium, about 24 million children under the age of 18 were left behind, a number expected to increase to 61 million in the following decade. This issue has raised concerns about their health and other social problems (Li et al., 2015). With the drastic increase in social pressure, the phenomenon of left-behind children has become a major social challenge in China (Lei et al., 2018).

A sense of security is defined as the anticipation of physical or mental danger, as well as the individual's sense of powerlessness in coping with such risks, it mainly manifests as a sense of certainty and control (Zhong, 2004). A lower sense of psychological insecurity corresponds to a greater likelihood of emotional tension, timidity, vigilance, and a reluctance to engage socially (Liao et al., 2014). Humanistic theory (Hall and Lindzey, 1957) suggests that early adolescents are prone to a high degree of dependence on their parents due to personal incapacity, but as they age, the stability and durability of their sense of security changes with their objective environment, and the connection with their family decreases, making it necessary to create conditions that enhance self-security. In a "disturbed" life situation, adolescents often exhibit psychological characteristics such as sadness, shame, confusion, helplessness, etc. (Dursun et al., 2022). It has been found that the psychological security of left-behind children is significantly lower than that of non-left-behind children (Chen et al., 2020). These children habitually demonstrate fear, resistance and rejection in unfamiliar environments, with increasing uncertainty and a significant decrease in self-acceptance (Liu et al., 2023). In a sense, as young people come to become independent from their parents, the security issues of left-behind children are also becoming even more serious, and there is an urgent need for scientific and effective interventions to make up for this lack of security.

Previous research indicates that physical activity, as a routine social activity in which individuals form regular habits, can effectively promote a sense of security (Piestrzyński et al., 2021). For example, physical activities such as weight lifting, swimming, and walking trigger the release of endorphins, which produce relaxation and well-being (Abdulaziz Muhsen and Abdulaziz Muhsen, 2020), and also enhance memory, mood, and sleep, improving physical and mental health (Liddle et al., 2017; Al-Qahtani et al., 2018). For left-behind children, participation in various sports activities can give an interactive space where they can cooperate with and help each other,

which fosters self-confidence, respect, care, and love (Shu and Wang, 2016). Another study has shown that exercise, as an important intervention, can alleviate adverse mood and behavioral disorders such as depression, anxiety and tension among adolescents (Rui et al., 2021). However, the global spread of COVID-19 has significantly reduced opportunities for adolescents to engage in physical activity (Salath et al., 2020). School curricula, including physical education, began to change from group-based to individual activities, primarily conducted online (Burke, 2020). Online exercise has become an important strategy, and one study points out that the exercise punch card model can be used to monitor and motivate students and help them maintain an interest in sports and avoid negative emotions such as fear, anxiety, and depression during the pandemic (Patriajati et al., 2020). A review of the existing literature reveals that no research has been conducted on the relationship between physical activity and the sense of security among Chinese left-behind students. Based on this gap, we hypothesize that physical exercise would help left-behind junior high school students control their self-defeating behaviors, regulate their emotional state, and overcome sociopathic barriers, thus increasing their sense of security. Accordingly, Hypothesis H1 is proposed:

> H1: Physical activity positively predicts a sense of security among left-behind junior high school students.

Resilience refers to an individual's ability to self-regulate or pressures to flexibly adapt to complex and changing environments when confronted with different pressures or challenges (Mak et al., 2011). The mental resilience process model suggests that resilience develops a combination of increasing protective factors and external risk factors acting simultaneously after a stressful situational event (Richardson, 2002). Two main areas include individual human factors (goal focus, emotional control, positive cognition) and supportive factors (family support, interpersonal assistance) (Hu and Gan, 2008). Among them, personal human factors act as a positive source of motivation and contribute to the positive development of the individual in the face of adversity (Fengjun et al., 2022). These factors are key to individual resistance to external disturbances and the level of self-confidence. According to exercise psychology, physical activity has a positive effect on attentional stability (De Greeff et al., 2018), negative emotion regulation (VanKim and Nelson, 2013), and cognitive abilities (Donnelly et al., 2016). From a constructivist perspective, resilience theory suggests that the development of resilience is closely related to an individual's mental health, physical functioning, and social adaptability (Yang, 2014). Existing research supports the idea that participation in physical activity enhances physical fitness and serves as a protective factor for increased mental toughness (Guo and Liang, 2023). Psychological resilience acts as a buffer against stress (Liang, 2019), and when faced with setbacks, this internal drive may generate positive feedback that promotes psychological fulfillment and a sense of belonging. Previous research has found that individuals with higher levels of psychological resilience have a greater sense of control over their lives and a greater belief in their ability to manage adversity, which in turn enhances their sense of security (Yang et al., 2021). Accordingly, the following hypotheses are proposed:

> H2a: Physical activity positively predicts the resilience of left-behind junior high school students; H2b: Resilience positively

predicts the sense of security of left-behind junior high school students.

In addition, there is a need to further explore the variability in physical activity, mental toughness, and sense of security with respect to lone-child status. Research suggests that only children who do not have to share or compete for parental attention and resources like other families with siblings benefit from the emotional warmth and support provided by parents through positive parenting (Morgan et al., 2020). Studies have found that children with siblings have higher levels of moderate to vigorous physical activity (MVPA) (Kracht and Sisson, 2018). As adolescents grow older, their participation in sports increases with the presence of siblings and other important family members (Santos et al., 2023). Furthermore, research shows that only children score higher in security measures than non-only children (Liao et al., 2014). According to attachment theory, only children, who often receive attention and protection from an early age, may develop a greater sense of security due to their parents' increased responsiveness and attention and responsiveness (Liu et al., 2010). A comparison of the areas where the one-child policy was implemented with those where the non-one-child policy was implemented revealed that non-one-child children had significantly higher levels of fear, anxiety and depression than one-child children (Yang et al., 1995). Accordingly, the following research hypothesis H3 is proposed:

H3: Under the influence of sole-child status, there is a difference in the mediating effect of resilience between physical activity and left-behind junior high school students' sense of security.

In summary, the sense of security among left-behind children has become a critical social concern, especially in remote areas of China. Exploring the relationship between physical activity and a sense of security, as well as the mediating role of individual human factors, can provide a basis for promoting the healthy growth of left-behind children.

2 Methods

2.1 Participants and procedures

China's provinces and regions are characterized by dichotomy, and Gansu Province is a relatively backward region in the western part of the country in terms of the level of economic development, with a large number of left-behind children, children from single-parent families, and other special groups in general (Robinson, 2016). Utilizing a convenience sampling method, this study targeted left-behind junior high school students from five schools in Gansu Province, China, all under 18 years of age. The second author led the survey process, which began with obtaining written informed consent from the participants and their class teachers. To ensure confidentiality and anonymity, students signed agreements in the classroom before the questionnaire distribution and collection, with all procedures designed to protect participant privacy. Out of 700 distributed questionnaires, 649 were deemed valid, yielding a response rate of 92.7%, the mean age was 12.82 ± 1.23. The demographic breakdown included 292 males (45%) and 357 females (55%), with 165 students in the first year (25.4%), 337 in the second year (51.9%), and 147 in the third year (22.7%).

Urban residents accounted for 392 students (60.4%), while rural residents made up 257 students (39.6%). Additionally, the sample comprised 330 children (50.8%) and 319 children with siblings (49.2%).

2.2 Measures

2.2.1 Physical activity rating scale

The physical exercise scale, originally developed by the Japanese scholar Kimitaka Hashimoto and subsequently revised by Chinese researcher Deqing Liang et al., assesses the overall level of physical activity (Liang, 1994). This instrument measures the intensity, frequency, and duration of physical exercise, calculating the total exercise amount as the product of these three factors. Intensity and frequency are each scored on a scale from 1 to 5, categorized into five levels, while duration is scored from 0 to 4. The exercise volume is classified as low (≤ 19 points), moderate (20–42 points), or high (≥ 43 points). The reliability of this scale was confirmed in the current study, with a Cronbach's α coefficient of 0.775.

2.2.2 Security questionnaire

The Sense of Security Scale, developed by Zhong Cong of the Beijing Institute of Mental Health and An Lijuan of Hebei Normal University, was utilized in this study (Zhong, 2004). This instrument comprises 16 items distributed across two dimensions: interpersonal sense of security and certainty of control, with the overall sense of security being the aggregate of these two dimensions. Responses were measured using a five-point Likert scale, ranging from "strongly agree" to "strongly disagree," where higher scores indicate a greater level of sense of security. The scale's reliability was confirmed in this study, evidenced by a Cronbach's alpha coefficient of 0.954, with internal consistency coefficients of 0.911 and 0.914 for the respective dimensions. Confirmatory factor analysis yielded satisfactory fit indices: x^2/df = 3.203, GFI = 0.931, RMSEA = 0.058, CFI = 0.967, and SRMR = 0.028.

2.2.3 Psychological resilience scale for adolescents

The study employed a psychological resilience scale developed by Hu and Gan (2008), consisting of 27 items across five dimensions. The initial three dimensions assess aspects of individual power, including goal focus, emotional control, and positive cognition, while the remaining two dimensions evaluate support factors, namely family support and interpersonal assistance. Given the scale's bifurcation into personal qualities and social influences, this research focused exclusively on the first three factors pertinent to individual power. A five-point Likert scale was used for responses, indicating that higher scores reflect greater levels of Psychological resilience. The internal consistency of the scale was robust in this study, with a Cronbach's alpha coefficient of 0.909 for the overall scale, and the coefficients for the individual power and support strength dimensions were 0.857 and 0.815, respectively.

2.3 Analytical strategy

Data analysis was conducted using SPSS version 23.0, beginning with Harman's single-factor test to address potential common method

bias, followed by descriptive statistics, independent samples t-tests, one-way ANOVA, and correlation analyses, with $p < 0.05$ indicating statistical significance. The PROCESS macro developed by Hayes was employed for statistical analysis, including mediation effect testing with bias-corrected bootstrap confidence intervals (5,000 resamples). Furthermore, AMOS version 26.0 was utilized to examine the mediation effect of psychological resilience (individual power) in the relationship between physical exercise and sense of security, along with conducting multi-group comparative analyses.

3 Results

3.1 Common method bias test

To assess the potential for common method bias, inherent in data derived from subjective questionnaire surveys, Harman's single-factor test was applied (Zhou and Long, 2004). This involved conducting an exploratory factor analysis on all items from the scales measuring physical exercise, sense of security, and mental resilience without rotation. The analysis identified six components with eigenvalues greater than 1, where the largest component accounted for 33.68% of the variance, falling below the critical threshold of 40%. This suggests that common method bias does not significantly affect the study's findings.

3.2 Tests for variability in different demographic characteristics of participants

Independent samples t-tests were conducted to examine gender and place of origin differences in physical exercise, mental resilience, and sense of security among left-behind junior high school students. The results, as outlined in Table 1, indicated no significant gender differences across the measures of physical exercise, mental resilience, or any dimensions of a sense of security. However, significant differences based on the place of origin were observed for psychological resilience (individual power) and the goal focus dimension ($p < 0.05$), with urban students scoring significantly higher than their rural counterparts. Further analysis using one-way ANOVA on the variable of grade level revealed significant differences in the sense of security and the dimension of certainty control across grades

($p < 0.05$), as detailed in Table 2. Specifically, students in the second year of junior high school exhibited significantly higher scores compared to those in the first and third years.

3.3 Correlation analysis

Pearson correlation analysis was employed to explore the relationships among physical exercise, psychological resilience (individual power), and sense of security, along with their respective dimensions. The results, detailed in Table 3, demonstrated significant positive correlations across all examined variables. Specifically, physical exercise showed a significant positive correlation with both the overall sense of security and its dimensions ($p < 0.01$), as well as with psychological resilience (individual power) ($p < 0.01$). Furthermore, psychological resilience (individual power) was significantly positively correlated with the overall sense of security and its dimensions ($p < 0.01$).

3.4 Partial mediating role of psychological resilience

According to the mediation effect testing method (Wen et al., 2004), the PROCESS macro (Model 4) in SPSS was used to assess the mediating role of psychological resilience (individual power) in the relationship between physical exercise and sense of security among left-behind junior high school students. Controlling for gender, place of origin, and grade level, physical exercise was initially tested as a predictor of a sense of security, revealing a significant positive effect ($\beta = 0.206$, $p < 0.01$). Subsequently, a regression analysis predicted psychological resilience (individual power) from physical exercise, showing a significant positive relationship ($\beta = 0.165$, $p < 0.01$). In the final step, with both physical exercise and psychological resilience (individual power) as predictors, the analysis confirmed their significant positive predictive effects on a sense of security ($\beta = 0.136$, $p < 0.01$ for physical exercise; $\beta = 0.424$, $p < 0.01$ for psychological resilience), as detailed in Table 4.

The mediation effect of psychological resilience (individual power) in the relationship between physical exercise and a sense of security among left-behind junior high school students was evaluated using a bias-corrected bootstrap method with 5,000 samples, setting a 95% confidence interval. Results, as shown in Table 5, indicated that

TABLE 1 Difference test for each variable on gender, birthplace.

Variables	Gender		p	Birthplace		p
	Boys	Girls		Rural	Urban	
Physical exercise	41.91 ± 30.75	39.86 ± 28.43	0.377	40.03 ± 29.58	41.93 ± 29.37	0.421
Sense of security	56.43 ± 14.79	55.20 ± 13.98	0.277	54.93 ± 14.55	57.01 ± 13.99	0.071
Sense of certainty	28.30 ± 7.53	27.65 ± 7.07	0.257	27.55 ± 7.31	28.54 ± 7.21	0.088
Sense of control	28. 13 ± 7.59	27.55 ± 7.24	0.320	27.38 ± 7.58	28.46 ± 7.08	0.067
Individual power	50.76 ± 9.83	51.46 ± 10.30	0.378	50.51 ± 10.18	52. 11 ± 9.88	0.048*
Goal focus	17.45 ± 3.89	17.70 ± 3.99	0.419	17.28 ± 3.98	18.05 ± 3.84	0.015*
Emotional control	19.55 ± 5.03	20.05 ± 5. 12	0.211	19.60 ± 4.95	20. 16 ± 5.27	0.174
Active cognition	13.76 ± 3.38	13.71 ± 3.26	0.842	13.63 ± 3.38	13.90 ± 3.21	0.297

TABLE 2 Tests of difference in variables at grade levels.

Variables	Grade			p
	Grade 1	Grade 2	Grade 3	
Physical exercise	44.08 ± 29.52	38.95 ± 30.16	41.28 ± 27.73	0.183
Sense of security	56.07 ± 15.03	56.76 ± 14.88	53.08 ± 11.90	0.033*
sense of certainty	28. 12 ± 7.67	28.39 ± 7.53	26.71 ± 6.07	0.062
sense of control	27.95 ± 7.64	28.37 ± 7.68	26.37 ± 6.23	0.023*
Individual power	50.35 ± 11.39	51.25 ± 10.57	51.82 ± 6.89	0.423
Goal focus	17.08 ± 4.18	17.65 ± 4. 11	18.01 ± 3.15	0.103
Emotional control	19.95 ± 5.82	19.79 ± 5.26	19.77 ± 3.61	0.933
Active cognition	13.32 ± 3.55	13.81 ± 3.49	14.03 ± 2.50	0.134

TABLE 3 Correlation test between variables.

Variables	1	2	3	4	5	6	7	8
Physical exercise	1.000							
Sense of security	0.210**	1.000						
sense of certainty	0.212**	0.978**	1.000					
sense of control	0.198**	0.978**	0.913**	1.000				
Individual power	0.164**	0.443**	0.425**	0.442**	1.000			
Goal focus	0.117**	0.497**	0.483**	0.489**	0.863**	1.000		
Emotional control	0.176**	0.256**	0.241**	0.260**	0.807**	0.480**	1.000	
Active cognition	0.088*	0.364**	0.348**	0.364**	0.779**	0.701**	0.351**	1.000

TABLE 4 Mediation model tests for physical activity, psychological resilience (individual power), and perceived safety.

Outcome variable	Predictor variable	R	R^2	F	B	β	t
Sense of security	Physical exercise	0.057	0.049	7.717	0.100	0.206	5.357**
Individual power	Physical exercise	0.036	0.028	4.780	0.056	0.165	4.239**
Sense of security	Individual power	0.230	0.223	31.924	0.603	0.424	12.015**
	Physical exercise				0.066	0.136	3.862**

TABLE 5 Results of the mediation effect test for psychological resilience (individual power).

681 effect	Effect value	Boot standard error	Boot 95% CI lower	Boot 95% CI upper	Percentage
Total effect	0.100	0.019	0.064	0.137	
Direct effect	0.066	0.013	0.033	0.100	66. 1%
Indirect effect	0.034	0.020	0.031	0.110	33.9%

the indirect path from physical exercise through psychological resilience (individual power) to a sense of security was significant, with an estimated indirect effect of 0.034 and a 95% confidence interval [CI: 0.031–0.110], which does not include zero. The mediation effect accounted for 33.9% of the total effect, suggesting that psychological resilience (individual power) plays a significant partial mediating role between physical exercise and a sense of security.

To further substantiate the mediating role of psychological resilience (individual power) between physical exercise and a sense of security among left-behind students, a fit analysis of the hypothesized model was conducted using AMOS version 26.0. The model demonstrated excellent fit, with the following indices: degrees of freedom (DF) = 17, chi-square to degrees of freedom ratio (x^2/df) = 1.518, Comparative Fit Index (CFI) = 0.997, Normed Fit Index (NFI) = 0.990, Relative Fit Index (RFI) = 0.997, Incremental Fit Index (IFI) = 0.997, and Root Mean Square Error of Approximation (RMSEA) = 0.028, all indicating acceptable fit levels. Specifically, physical exercise significantly predicted psychological resilience (individual power) ($\beta = 0.199$, $p < 0.001$) and a sense of security ($\beta = 0.202$, $p < 0.001$). Furthermore, psychological resilience (individual power) significantly predicted a sense of security ($\beta = 0.483$, $p < 0.001$), with a 95% confidence interval [CI: 0.043–0.160] excluding zero. These results validate the mediation effect of

psychological resilience (individual power) in the relationship between physical exercise and a sense of security (see Figure 1).

3.5 Multi-cluster test analysis

This study also explored the differential mediating role of psychological resilience (individual power) between physical exercise and a sense of security among left-behind junior high school students based on their only-child status. Initial model fit indices for only children and children with siblings indicated both models were suitable for further multi-group comparative analysis. The fit indices were favorable: for only children, DF = 17, x^2/df = 2.561, CFI = 0.982, NFI = 0.971, RFI = 0.953, IFI = 0.982, RMSEA = 0.069; for children with siblings, DF = 17, x^2/df = 1.552, CFI = 0.991, NFI = 0.976,

RFI = 0.961, IFI = 0.991, RMSEA = 0.042 (see Figures 2, 3). Subsequent multi-group analysis using structural equation modeling to compare models across groups revealed no significant differences in model fit for most comparisons (Δx^2/df between models M1 and M2, M3 and M4, and M5 and M6, all $p > 0.05$). However, significant differences emerged between models M2 and M3 (Δx^2/df = 2.03, $p < 0.05$) and between M4 and M5 (Δx^2/df = 9.461, $p < 0.001$), with changes in TLI and CFI indicating significant structural weight and residual model differences across only-child status groups. Further analysis showed that while physical exercise significantly predicted psychological resilience (individual power) in both groups, the path coefficient's difference was not significant (CR = 0.685, $p > 0.05$). Similarly, no significant difference was found in the impact of physical exercise on a sense of security across only-child status (CR = −1.845, $p > 0.05$). However, the path from psychological resilience (individual power) to a sense of security

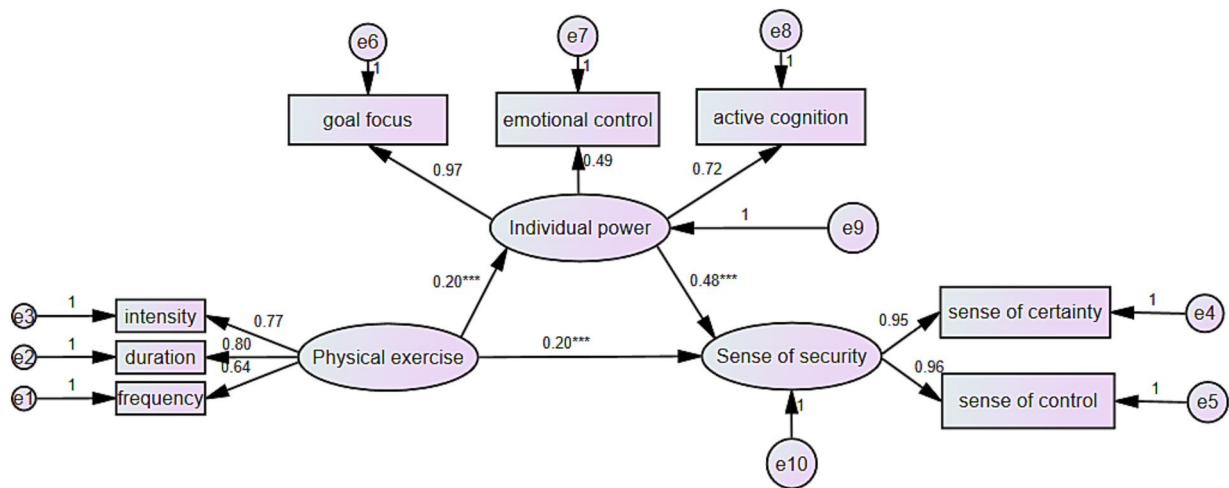**FIGURE 1**
The mediating effect of psychological resilience between physical exercise and left-behind middle school students' sense of security. ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.
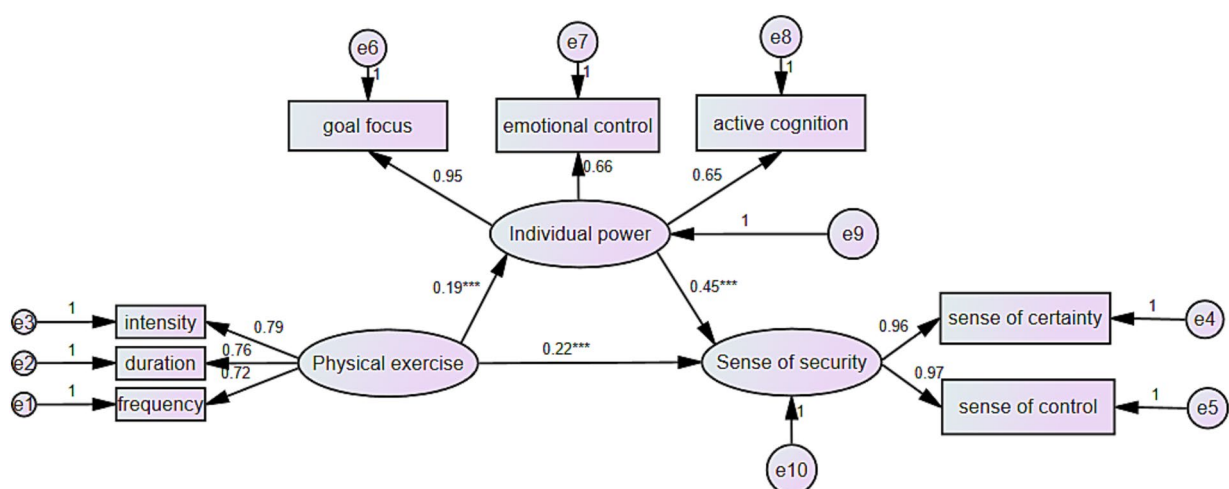

FIGURE 2
Mediating effect of psychological resilience between physical exercise and sense of security of left-behind junior high school students (lone students). ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.
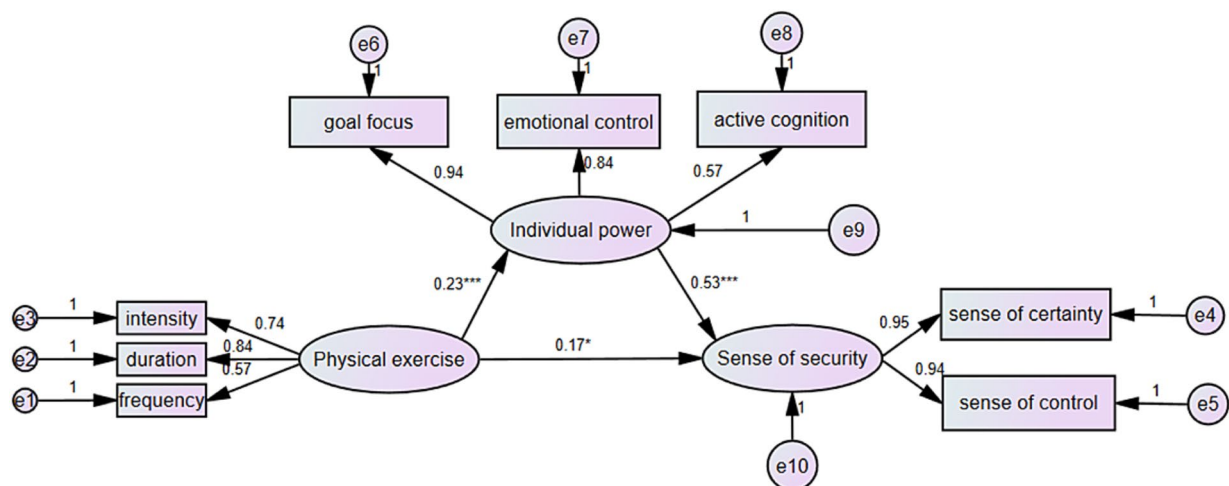
FIGURE 3
The mediating effect of psychological resilience on the relationship between physical activity and left-behind junior high school students' sense of security (non-alone students). ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.

TABLE 6 Adaptation table for multi-cluster analysis.

Model	x^2	DF	x^2/DF	NFI	IFI	TCL	CFI	RMSEA	Δ(x^2Δdf)
M1	68.246	32	2.133	0.974	0.986	0.975	0.986	0.042	
M2	77.761	37	2.102	0.971	0.984	0.976	0.984	0.041	9.515(5)
M3	100.100	48	2.085	0.962	0.980	0.977	0.980	0.041	22.339(11)
M4	100.257	49	2.046	0.962	0.980	0.977	0.980	0.040	0. 158(1)
M5	119.179	51	2.337	0.955	0.974	0.971	0.974	0.045	18.922(2)
M6	134.363	59	2.277	0.949	0.971	0.972	0.971	0.044	15. 184(8)

M1 is the unrestricted model, M2 is the measurement weight model, M3 is the structural weight model, M4 is the structural covariance model, M5 is the structural residual model, and M6 is the measurement residual model.

showed significant variation (CR = 2.518, $p < 0.05$), with children with siblings demonstrating a stronger relationship ($\beta = 0.533$, $p < 0.001$) compared to only children ($\beta = 0.453$, $p < 0.001$), indicating a stronger predictive power of psychological resilience on a sense of security among children with siblings (Table 6).

4 Discussion

4.1 Differences in different demographic characteristics of middle school students left behind

The present study found no gender differences in physical activity among left-behind junior high school students, but boys' scores were higher than girls' scores, which is basically the same as the results of previous studies (Fu and Zhao, 2020). This may be due to the fact that boys are more inclined to experience exciting and challenging sports, while girls often show a gentle, quiet and stable character and are willing to participate in less intense, relaxing and enjoyable social sports activities (Lever, 2020). Furthermore, the study identifies significant disparities in mental resilience and goal-focused attention among these students based on their geographical backgrounds, with urban students outperforming their rural counterparts. According to Ecological Systems Theory (Bronfenbrenner and Evans, 2000),

individuals are embedded within various environmental systems that foster positive interactions, influencing the acquisition of knowledge and experience. The psychological environment and resource conditions of urban left-behind students are significantly better than those of rural left-behind students, they can obtain more education and family material resources, make full use of the existing conditions to formulate a clear study plan, take their learning attitude seriously, and concentrate more on their concentration, while rural left-behind junior high school students have a difficult life since childhood and lack corresponding protective resources, especially after entering the junior high school stage, the comparison of classmates and friends becomes more and more serious, and problems such as poor learning interest and deviation in learning goal positioning will occur (Sun et al., 2015).

The study also notes significant differences in the sense of security and perceived control among different grades. Second-year students, having spent more time in school, exhibit higher independence, and adaptability to the school's environment, and have established positive interpersonal relationships, showcasing a preference for self-expression. First-year students, still in early adolescence with lower self-awareness, struggle with new and unfamiliar environments. Third-year students score the lowest, likely due to the increased academic pressure of preparing for entrance exams, leading to frequent encounters with the uncertainties of present and future academic performance and stability (Du et al., 2019).

4.2 The relationship between physical exercise, psychological resilience, and sense of security among left-behind middle school students

This study reveals a significant positive correlation between physical exercise and the sense of security among left-behind middle school students, corroborating previous findings (Piestrzyński et al., 2021). Psychoanalyst Horney (2013) suggested that familial discord leads to psychological anxiety, contributing to a diminished sense of security, a notion paralleled in Freud's psychoanalytic theory (Freud, 1936), which identifies insecurity as an intrinsic motivator for anxiety symptoms. Anxiety, a key predictor of security levels, often prompts avoidance behaviors or perceived rejection risks in socially anxious individuals (Calfas and Taylor, 1994). Physical exercise has been shown to mitigate anxiety, enhance self-esteem, and foster positive cognition in left-behind middle school students, thereby improving psychological well-being (Ren and Li, 2020). Humanistic psychologist Erich Fromm argued that the process of growing up involves detachment from family bonds, increasing feelings of loneliness and helplessness, thereby exacerbating security deficits (Ryckman, 1989). Studies indicate that engagement in physical activities can enhance social and interpersonal relationships among adolescents, potentially preventing or reducing loneliness and fostering a sense of control and security (Pinto et al., 2021). For left-behind middle school students undergoing puberty, physical exercise can bolster social skills, counteract isolation, and enhance their sense of security (Bernardon et al., 2011). Moreover, feelings of interpersonal alienation and loneliness in social contexts are significant factors affecting these students' sense of security. This research enriches the body of knowledge on the impact of physical exercise on the sense of security, offering theoretical and practical insights for enhancing the well-being of left-behind middle school students through physical activities.

Research further indicates a significant positive correlation between physical exercise and psychological resilience, suggesting that active engagement in physical exercise enhances concentration, emotional control, and cognitive capabilities, aligning with findings by Dunston et al. (2022). Engaging in sports activities of varied intensity, frequency, and duration during adolescence, such as aerobic fitness, can elevate resilience by fostering the neuroregulatory mechanisms of self-regulation, thereby mitigating the risk of psychological health issues (Belcher et al., 2021). This corroborates the perspective of physical exercise as a beneficial intervention, where higher levels of individual exercise correlate with increased capacity to manage setbacks, optimistically navigate life's challenges, and transform adverse conditions into favorable outcomes, thus cultivating positive personal qualities. The significant positive relationship between psychological resilience and a sense of security indicates that higher levels of "individual power" within psychological resilience are associated with enhanced feelings of security, highlighting psychological resilience as a critical factor influencing interpersonal security and a sense of control. Left-behind middle school students, often raised by grandparents or other guardians, develop independence and self-reliance from an early age, predisposing them to analytical problem-solving (Xu et al., 2013). Research reveals that children with higher levels of psychological resilience (Glantz and Johnson, 1999) possess superior emotional regulation and positive cognition, tending not to blame themselves for their circumstances but rather actively seeking solutions, thereby

experiencing a greater sense of freedom and control over their lives. The Kumpfer psychological resilience theoretical model suggests that resilience levels rise upon facing and overcoming significant stressors and challenges, aiding individuals in using protective factors to regulate psychological stress and positively predict outcomes under high-risk conditions (Shi et al., 2016). Rew et al. found that individuals with higher mental resilience are more likely to rely on themselves, considering resilience as an adaptive strategy or a defense against loneliness and despair (Rew et al., 2001). It is noteworthy that some left-behind middle school students may experience psychological trauma in childhood, lacking adequate self-protection. Rutter identified mental resilience as a crucial protective factor in the effective treatment and prevention of psychiatric disorders, indicating that individuals with high levels of mental resilience can effectively alleviate and improve adverse psychological symptoms (Rutter, 1985). Therefore, it is imperative to focus on nurturing the personal qualities of left-behind middle school students, leveraging their inherent strengths and talents to proactively manage stress and crises, thereby maintaining optimal mental health and enhancing their sense of security.

4.3 The mediating role of psychological resilience in the relationship between physical exercise and feelings of safety in remaining middle school students

Mediation analysis reveals that psychological resilience (individual power) plays a partial mediating role between physical exercise and the sense of security among left-behind middle school students. This finding confirms Hypothesis H2, illustrating that physical exercise influences these students' sense of security through enhancing levels of psychological resilience (encompassing goal focus, emotional control, and positive cognition). Garmezy (1993) categorizes psychological resilience models into compensatory, challenge, and vulnerability models. Particularly, the challenge model suggests that when the difficulty of life's tasks is moderate, individuals often judge based on their capabilities, thereby enhancing self-efficacy in addressing and resolving uncompleted tasks, potentially benefiting psychological health growth. Setting appropriate exercise goals can ignite intrinsic motivation for physical activity, enabling individuals to overcome multiple barriers, improve physical capabilities, and develop resilience and determination, thus achieving the benefits of physical fitness. From the perspective of positive psychology in sports, physical exercise offers a platform for self-expression, cultivating positive psychological constructs such as psychological resilience, perseverance, and flexibility to mitigate the negative effects of emotional dysregulation (Mann and Narula, 2017). Consequently, society should intensify psychological support for left-behind students, fostering resilience and perseverance through diverse sports activities, encouraging positive self-assessment, and nurturing an optimistic and confident outlook toward complex social changes and the future.

4.4 Multi-group comparative analysis of the mediating effect of psychological resilience

The multi-group analysis indicates variability in the mediation model based on the only-child status, with psychological resilience (individual

power) exerting a stronger predictive effect on the sense of security among children with siblings (Xiao et al., 2019). This variation likely stems from differences in family environments and parental upbringing styles. Research has shown that sibling relationships among left-behind children positively correlate with psychological resilience. The interaction among non-only children fosters mutual understanding of emotions, thoughts, and intentions, and experiences of competition and cooperation from a young age enhance resilience through adversity (McHale et al., 2012). In contrast, only children, lacking sibling interactions, tend to be more self-centered in problem-solving and exhibit lower levels of social support, often relying excessively on parents or relatives for problem analysis and resolution (Gutgesell and Payne, 2004). For middle school-aged left-behind students, adolescence entails the maturation of body image, abstract thinking, and cognitive functions. However, due to parents working away, the parent–child relationship fails to improve and maintain adequately, leading to deficiencies in coping abilities and social skills, which may indirectly cause a psychological sense of security imbalance. Non-only children, on the other hand, can compensate for this with sibling relationships. Psychological resilience encompasses three factors: individual, environmental, and community aspects. From an individual trait perspective, facing significant stress or danger with good adaptability allows for setting firmer goals and calmly tackling academic tasks in future learning, satisfying the need for a sense of security. Compared to only children, left-behind students with siblings are better at pooling ideas, mutually honing each other, setting reasonable learning plans, having a clear understanding of difficulties, potentially experiencing less helplessness or emotional dysregulation, and valuing competition and sharing for experience exchange to enhance their sense of security. Family size and educational approaches lead to distinctive traits in only children, such as dominance, anxiety, quarrelsomeness, or overprotectiveness, exhibiting emotional instability during conflicts (Blake, 1981). Many left-behind only children may live in single-parent families or under grandparent care for extended periods, bearing more household or caregiving responsibilities than their non-left-behind peers, often accumulating disappointment and dissatisfaction with their families. Consequently, they might exhibit resistance and rejection in unfamiliar environments or social interactions, requiring a longer period to adapt in terms of emotional control and positive cognition.

This study also acknowledges certain limitations and areas for improvement: (1) It is based on a cross-sectional survey conducted among junior high school students left behind during the pandemic, primarily using self-reported data, which has its constraints. Future research should include longitudinal studies to address these limitations. (2) The survey's geographic scope was restricted to specific regions, potentially limited by time and space, and the sample size was insufficient. Future empirical studies should consider a comprehensive comparison of data across different regions and stages, including urban students left behind, to enhance the persuasiveness of the findings. (3) The use of a physical exercise scale for measuring may not allow for regular tracking of the students' exercise levels. Future research should incorporate periodic physical intervention experiments to make the research design more scientific and standardized.

5 Conclusion

Our study demonstrates that physical exercise significantly enhances the sense of security among junior high students in Gansu Province, offering an effective intervention strategy for bolstering the psychological well-being of children in China's impoverished regions. Furthermore, we identified that individual power, a component of psychological resilience, mediates the relationship between physical exercise and the student's sense of security. Diverse exercise activities notably improve focus, emotional control, and positive cognition, serving as a critical link in enhancing the sense of security. Notably, this mediating effect varies with sibling status, where the predictive power of individual power on sense of security is stronger among students with siblings. These findings underscore the necessity for further exploration into scientifically based adolescent exercise programs to optimize mental health benefits.

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

Ethical approval was not required for the study involving human samples in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

QX: Conceptualization, Data curation, Investigation, Resources, Supervision, Validation, Writing – original draft. QL: Investigation, Methodology, Supervision, Writing – review & editing. GQ: Conceptualization, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing.

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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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Hwa-byung (anger syndrome) as a risk factor for suicidal ideation in MZ generation: a survey study in South Korea

Chan-Young Kwon*

Department of Oriental Neuropsychiatry, College of Korean Medicine, Dong-Eui University, Busan,
Republic of Korea

Introduction: Suicide is a critical global public health issue, with South Korea exhibiting the highest suicide rate among OECD countries at 24.1 per 100,000 people in 2020. This study focuses on suicidal ideation (SI) within South Korea's Millennials and Generation Z (Generation MZ) by examining the impact of anger and hwa-byung (HB), a culture-bound anger syndrome.

Methods: The online survey was conducted between June 7 and 12, 2024. The inclusion criteria for this study were the following: (1) generation MZ (i.e., those born between 1980 and 2005); (2) those without a history of mood disorders (i.e., depressive disorders or bipolar disorder); (3) those of Korean nationality and residing in South Korea. Demographic variables and clinical variables including SI, HB, and depression were investigated. The chi-square test or t-test was used to compare the differences between the SI and non-SI groups. Additionally, binary logistic regression analysis was performed to analyze factors associated with the presence of SI. Finally, Pearson's correlation coefficients were calculated to explore HB symptoms that were highly associated with SI.

Results: Total 457 participants were included. The survey revealed an overall prevalence of SI of 38.07%, with 18.82% reporting "much" or more SI and 4.81% reporting "very much" SI. Significant differences were found between the SI and non-SI groups in HB symptoms, depression, anxiety, perceived stress, trait anger, state anger, anger-in, and anger-out (all $p < 0.001$). Logistic regression analysis identified HB symptoms (odds ratio [OR], 1.05; 95% CI, 1.00−1.11; $p = 0.050$), depression (OR, 1.41; 95% CI, 1.23−1.62; $p < 0.001$), and state anger (OR, 1.14; 95% CI, 1.05−1.24; $p = 0.002$) as significant factors for SI. The mediating factors confirmed the direct and indirect effects of HB symptoms on the presence of SI. Pearson's correlation coefficients between HB symptoms and SI severity ranged from 0.241 to 0.536, with physical symptoms, such as heat sensation and chest pressure, showing high correlations (0.426 to 0.476).

Conclusion: These findings highlight the need for mental health policies that integrate Korean medical approaches into suicide prevention. Future research should confirm these results using larger, nationally representative samples to improve generalizability and further explore HB and suicidality in diverse populations.

KEYWORDS

suicidal ideation, generation MZ, hwa-byung, depression, anger

1 Introduction

Suicide is an urgent public mental health concern worldwide (Henry, 2021). Among them, South Korea, in particular, has a high suicide rate worldwide and the highest suicide rate among the Organization for Economic Cooperation and Development (OECD) countries, with a suicide rate of 24.1 per 100,000 people in 2020 (OECD, 2024). Suicidal ideation (SI), one of the suicidal behaviors, is a major target for suicide prevention (Mann et al., 2021). SI exists on a spectrum ranging from a general desire for death to a firm's intention to act on that thought actively (Harmer et al., 2024). Factors known to be significantly associated with the presence of SI in Koreans differed depending on age group, but depression and perceived stress were both significant risk factors in all age groups (Hwang and Park, 2021).

Generation MZ, which stands for "Millennials" and "Generation Z," has become Korea's main working-age group. This generation values the agreement between individual and organizational values and wants the meaning of what individuals pursue to be respected (Moon and Kim, 2023). This generation shows distinct characteristics, particularly their heightened sensitivity to fairness and justice (Moon et al., 2024). In this generation, unfairness and injustice play an important role in turnover intention (Moon et al., 2024) and mental health outcomes (Kim, 2020). Considering that higher perceived overall injustice is associated with higher levels of anger (Qin and Zhang, 2022), the emotion of anger among generation MZ in South Korea is likely to have a significant impact on their life (Hong and Hong, 2023). This generation's unique characteristic of sensitivity to injustice makes them particularly vulnerable to hwa-byung (HB), a Korean culture-bound anger syndrome specifically associated with perceived unfairness and suppressed anger (Lee et al., 2014; Kwon et al., 2020). It is characterized by the suppression of anger caused by perceiving unfair or unjust social experiences, leading to both psychological and physical symptoms (Min, 2008; Kwon et al., 2020). Min validated the diagnostic criteria of HB through factor analysis, identifying core symptoms including feelings of unfairness, subjective anger, expression of anger, heat sensation, and respiratory discomfort (Min et al., 2009). The prevalence of HB in the Korean general population has been reported to be approximately 4.2 to 13.3%, and it is more commonly diagnosed in individuals experiencing chronic stress and perceived injustice (The Korean Society Of Oriental Neuropsychiatry, 2021).

Korean medicine, a traditional medical system that has been officially recognized alongside Western medicine in South Korea's healthcare system (Park et al., 2021), plays a primary role in diagnosing and treating HB (Kwon and Lee, 2024). Korean medicine conceptualizes HB within its unique theoretical framework that emphasizes the mind–body connection and the pathogenic role of emotional disturbance (Lee et al., 2014). In the Korean medical system, patients with HB are primarily diagnosed and treated in Korean medicine clinics, where practitioners employ diagnostic methods including pattern identification and traditional symptom assessment (Kwon and Lee, 2024). This cultural and medical context is particularly important as Korean medicine doctors are often the first healthcare providers to identify and manage HB symptoms, though they are currently not included in South Korea's national suicide prevention policies (Kwon and Lee, 2024).

Emotional labor, defined as a means for employees to manage their emotions and to express only those requested by their organizations (Hochschild, 2019), encompasses surface acting (modifying external expressions) and deep acting (modifying both feelings and expressions) (Ashforth and Humphrey, 1993). This concept is particularly relevant to the MZ generation in South Korea, who predominantly work in service-oriented industries requiring high levels of emotional regulation (Kim S. S. et al., 2023; Lee et al., 2023). Given that emotional labor often involves suppressing negative emotions, especially anger, to maintain appropriate workplace behavior (Kim et al., 2019), it may share psychological mechanisms with HB, where anger is typically suppressed due to social and cultural constraints (Lee et al., 2014; Kwon et al., 2020). Additionally, in this context, high emotional demands associated with emotional labor were found to be related to the presence of SI in service and sales workers in South Korea (Yoon et al., 2016).

While anger has been studied in the context of suicide risk and was found to be significantly related to SI and/or suicidal behavior in studies with Koreans (Lee et al., 2009; Bagalkot et al., 2014), the impact of culturally specific anger expression, particularly HB, on SI among generation MZ remains understudied. This gap is particularly concerning given that this generation's characteristic sensitivity to injustice may manifest differently in terms of anger expression and related mental health outcomes compared to other generations (Kim, 2020; Moon et al., 2024). In South Korea, which has the highest suicide rate among OECD countries (OECD, 2024), identifying SI-related risk factors across generations will contribute to improving suicide prevention strategies.

Therefore, this study sought to analyze the contribution of HB, a unique cultural manifestation of anger related to perceived injustice, to SI in generation MZ, aiming to inform culturally appropriate suicide prevention strategies for this population.

2 Methods

2.1 Study design

This study was carried out using an anonymous online survey. The online survey was conducted between June 7 and 12, 2024 by Macromill Embrain (Embrain Co., Ltd., Seoul, Korea).

2.2 Participants

According to the Korean government, as of 2020, the number of generation MZ was 16.299 million, accounting for 32.5% of the total population (KOCIS, 2024). A total of 54.9% of Generation M and 50.2% of Generation Z lived in metropolitan areas (i.e., Seoul, Gyeonggi-do, and Incheon). Considering the population size of the subjects and a 5% error margin with a 95% confidence level, the target number of subjects for this survey was calculated to be 384 (Serdar et al., 2021). Therefore, we aimed to recruit at least 400 participants to account for potential incomplete responses. The inclusion criteria for this study were the following: (1) generation MZ (i.e., those born between 1980 and 2005); (2) those without a history of mood disorders (i.e., depressive disorders or bipolar disorder); (3) those of Korean nationality and residing in South Korea. The survey link was sent to the company panel.

2.3 Variables

2.3.1 Demographic variables

Demographic variables, including sex, age, area of residence, and marital status, were investigated.

2.3.2 Clinical variables

2.3.2.1 SI

The presence of SI was assessed with the question "Within the past week I had thoughts about taking my own life." Participants responded to this question with "not at all," "a little," "much," and "very much." All participants who did not respond "not at all" were considered to have SI.

2.3.2.2 HB

The HB scale was used to evaluate HB traits and HB symptoms. This scale consisted of 16 questions evaluating HB traits and 15 questions evaluating HB symptoms (Kwon et al., 2008). Respondents responded to each question on a 0-4-point Likert scale. The items that evaluated the symptoms of HB included psychological and physical symptoms. In particular, the 15th question on HB symptoms is "I think the world is unfair," which assesses the perceived injustice of the respondents. In this study, the Cronbach's alpha coefficient calculated in the current study were 0.88 for HB traits and 0.94 for HB symptoms, respectively (0.85 and 0.83, respectively, in the original study).

2.3.2.3 Emotional labor

Emotional labor was assessed using Lee's emotional labor scale (Lee, 2007), which was developed based on Grandey (2000) conceptual model of emotional labor. The scale consists of 14 items evaluating two dimensions: employee-focused emotional labor (6 items assessing surface acting and deep acting) and job-focused emotional labor (8 items assessing frequency, duration, and variety of emotional expressions). Each item is rated on a 5-point Likert scale, with higher scores indicating higher levels of emotional labor. High emotional demand was included in this survey because it could potentially be a risk factor for SI among Koreans (Yoon et al., 2016). In this study, the Cronbach's alpha coefficient calculated in the current study were 0.81 for employee-focused emotional labor and 0.86 for job-focused emotional labor, respectively (0.78 to 0.80 in the original study).

2.3.2.4 Depression, anxiety, and perceived stress

The Depression, Anxiety, and Stress Scale-21 (DASS-21), which consists of 21 questions, was used. Depression, anxiety, and stress were each assessed using seven questions and all questions were answered on a 0–3 point Likert scale (Ng et al., 2007). In this study, the Cronbach's alpha coefficient calculated in the current study were 0.92 for depression, 0.90 for anxiety, and 0.89 for stress, respectively [0.93 in a recent Korean study (Hwang et al., 2024)].

2.3.2.5 Anger

The State–Trait Anger Expression Inventory was used to assess trait anger, state anger, anger-in, anger-out, and anger-control (Spielberger et al., 2013). Respondents answered 44 questions on a 1–4 point Likert scale. In this study, the Cronbach's alpha coefficient calculated in the current study were 0.91 for trait anger, 0.95 for state anger, 0.87 for anger-in, 0.88 for anger-out, and 0.83 for anger-control, respectively [0.71 to 0.96 in a recent Korean study (Lee et al., 2024)].

2.3.2.6 Subjective health status

Respondents responded with their subjective perception of their health status as "very bad," "bad," "average," "good," and "very good."

2.3.2.7 Chronic diseases

The presence of chronic diseases was determined using the form surveyed by the Korea Health Panel Survey, a nationally representative panel in South Korea (Park and Kim, 2022). The participants responded "yes" or "no" to the presence of the following chronic diseases: hypertension, diabetes, liver disease (hepatitis, cirrhosis, etc.), kidney disease (renal failure, etc.), digestive disease (functional dyspepsia, etc.), cardiovascular disease (angina, myocardial infarction, etc.), cerebrovascular disease (cerebral hemorrhage, cerebral infarction, etc.), chronic lower respiratory tract diseases (asthma, emphysema, chronic obstructive pulmonary disease, bronchiectasis, etc.), joint diseases (knee arthrosis, intervertebral disc disorders, other spinal diseases, etc.), hypothyroidism, hyperthyroidism, cancer (stomach cancer, colon cancer, lung cancer, etc.), depressive disorder, bipolar disorder, and dementia. As described, participants with mood disorders including depressive disorder and bipolar disorder were excluded from the analysis.

2.4 Data analysis

The demographic information of the participants was analyzed using descriptive statistics. The normality of each variable was assessed using the Kolmogorov–Smirnov test. While the Kolmogorov–Smirnov test suggested deviations from normality ($p < 0.05$), we conducted additional assessments of distribution characteristics. The skewness (< 2) and kurtosis (< 7) values fell within acceptable ranges recommended by Kim (2013). Kim (2013), indicating that the violations of normality were not severe enough to preclude the use of parametric tests. Therefore, parametric tests such as t-tests and Pearson's correlation coefficients were deemed appropriate for this analysis.

Additionally, multivariable logistic regression analysis was performed to analyze factors associated with the presence of SI. All variables were simultaneously entered into the model to adjust for potential confounding effects. The calculated values were expressed as adjusted odds ratios (aORs) and their 95% confidence intervals (CIs). Three separate multivariable models were constructed for different SI severity thresholds ("a little" or more, "much" or more, and "very much"). Each model included demographic variables (sex, age, marriage status, residence area), clinical variables (subjective health status, chronic disease presence), and psychological variables (HB symptoms, HB traits, emotional labor, depression, anxiety, stress, and anger-related variables) as independent variables, with all variables mutually adjusted for each other.

To examine potential mediating effects of psychosocial factors on the relationship between HB symptoms and SI, a mediation analysis was conducted with the PROCESS macro (Hayes and Rockwood, 2017). Clinical variables that showed significant associations with SI in regression analysis were tested as potential mediators. Demographic variables and clinical variables that were not significantly related were

considered covariates. Bootstrap sampling (5,000 samples) was used to estimate the 95% CIs for the indirect effects. Finally, Pearson's correlation coefficients were calculated to explore HB symptoms that were highly associated with SI.

The analysis of SI was approached in two ways to serve different research objectives. For the logistic regression analysis, SI was dichotomized (presence/absence) at different thresholds to identify clinically relevant risk factors for varying severity levels of SI. This approach aligns with clinical practice where the presence of SI, regardless of severity, warrants attention. For the correlation analysis with HB symptoms, we utilized SI as an ordinal variable to capture the full range of severity and its relationship with specific symptoms, allowing for more nuanced understanding of symptom-level associations.

All statistical analyses were performed with PASW Statistics for Windows (version 18.0; SPSS Inc., Chicago, IL, USA), and p-values < 0.05 were considered statistically significant.

2.5 Ethical considerations

All participants voluntarily agreed to participate in the survey and consented to the use of their personal information. This study was approved by the Institutional Review Board of Dong-eui University Korean Medicine Hospital (DH-2024-05, approved on May 28, 2024).

3 Results

3.1 Baseline characteristics of the participants

A total of 457 participants met the inclusion criteria (Figure 1). Among the participants, 214 were women (46.83%), and the average age was 34.75 ± 7.45 years. Among the participants, the number of participants who responded "a little," "much," and "very much" to SI was 174, 86, and 22, respectively, and the overall prevalence of SI among these participants was 38.07%. Furthermore, the prevalence rates of "much" or more SI and "very much" SI were 18.82 and 4.81%, respectively. No statistically significant differences were found in sex, age, area of residence, presence of chronic disease, or marital status between the non-SI and SI groups (all p > 0.05). However, significant differences between the two groups were observed in almost all clinical variables. Specifically, the SI group had significantly higher HB traits (p < 0.001), HB symptoms (p < 0.001), employee-focused emotional labor (p < 0.001), job-focused emotional labor (p = 0.001), depression (p < 0.001), anxiety (p < 0.001), perceived stress (p < 0.001), trait anger (p < 0.001), state anger (p < 0.001), anger-in (p < 0.001), and anger-out (p < 0.001). Furthermore, the SI group had significantly more subjective health status responses of "bad" or "very bad" (p = 0.004). However, no significant differences were observed between the anger-control groups (p = 0.064) (Table 1).

3.2 Factors associated with the presence of SI

Multivariable logistic regression analysis was conducted with all variables simultaneously entered into the model. After mutual adjustment for all variables, factors significantly associated with the presence of "a little" or more SI were HB symptoms (aOR, 1.05; 95% CI, 1.00–1.11; p = 0.050), depression (aOR, 1.41; 95% CI, 1.23–1.62; p < 0.001), and state anger (aOR, 1.14; 95% CI, 1.05–1.24; p = 0.002). Factors significantly associated with the presence of "much" or more SI were age (aOR, 1.11; 95% CI, 1.02 to 1.21; p = 0.013), HB symptoms (aOR, 1.08; 95% CI, 1.01–1.16; p = 0.031), depression (aOR, 1.70; 95% CI, 1.40–2.06; p < 0.001), and state anger (aOR, 1.14; 95% CI, 1.02–1.27; p = 0.021). Finally, the only factor significantly associated with the presence of "very much" SI was depression (aOR, 1.65; 95% CI, 1.15–2.37; p = 0.006) (Table 2).

3.3 Mediation analysis

A mediation analysis was conducted to examine the potential mediating roles of depression and state anger in the relationship between HB symptoms and the presence of "a little" or more SI. The results indicated that HB symptoms had a significant direct effect on SI (β = 0.054; 95% CI, 0.001–0.107; p = 0.045). Significant indirect effects were also observed through depression (β = 0.032, 95% CI, 0.015–0.063) and state anger (β = 0.015, 95% CI, 0.003–0.037). The total indirect effect was also significant (β = 0.046, 95% CI, 0.027–0.087) (Figure 2A; Table 3). Similar mediating effect of depression (β = 0.049, 95% CI, 0.028–0.109) and state anger (β = 0.016, 95% CI, 0.001–0.048) was observed in the relationship between HB symptoms and the presence of "much" or more SI. In this case as well, HB symptoms were significantly and directly related to the presence of SI (β = 0.081; 95% CI, 0.009–0.153; p = 0.028). These results suggest that the relationship between HB symptoms and SI is partially mediated by both depression and state anger (Figure 2B; Table 3).

3.4 Correlation between HB symptoms and the severity of SI

Pearson's correlation coefficient between each question assessing HB symptoms and SI severity was calculated. The correlation coefficients ranged from 0.241 to 0.536. The questions with the highest correlations were in the following order: Q7 (coefficient = 0.536), Q1 (coefficient = 0.504), Q3 (coefficient = 0.489), Q5 (coefficient = 0.480), and Q10 (coefficient = 0.476) (Table 4).

4 Discussion

South Korea's high suicide rate presents an urgent mental health crisis for the country (OECD, 2024). Suicide prevention policies in this country have continued to improve, but attention has been mainly paid to depression (Park, 2023), with relatively little consideration of the impact of anger. However, given the sensitivity of generation MZ to unfairness (Hong and Hong, 2023; Moon et al., 2024) and the presence of HB associated with Korean culture (Lee et al., 2014), the association between anger and the presence of HB and SI in this generation should be investigated.

In this study, the prevalence of SI was 38.07%. This high prevalence appears to be due to the fact that the existence of weak SI is included, and if limited to the prevalence of "very much" SI, it is 4.81%, which
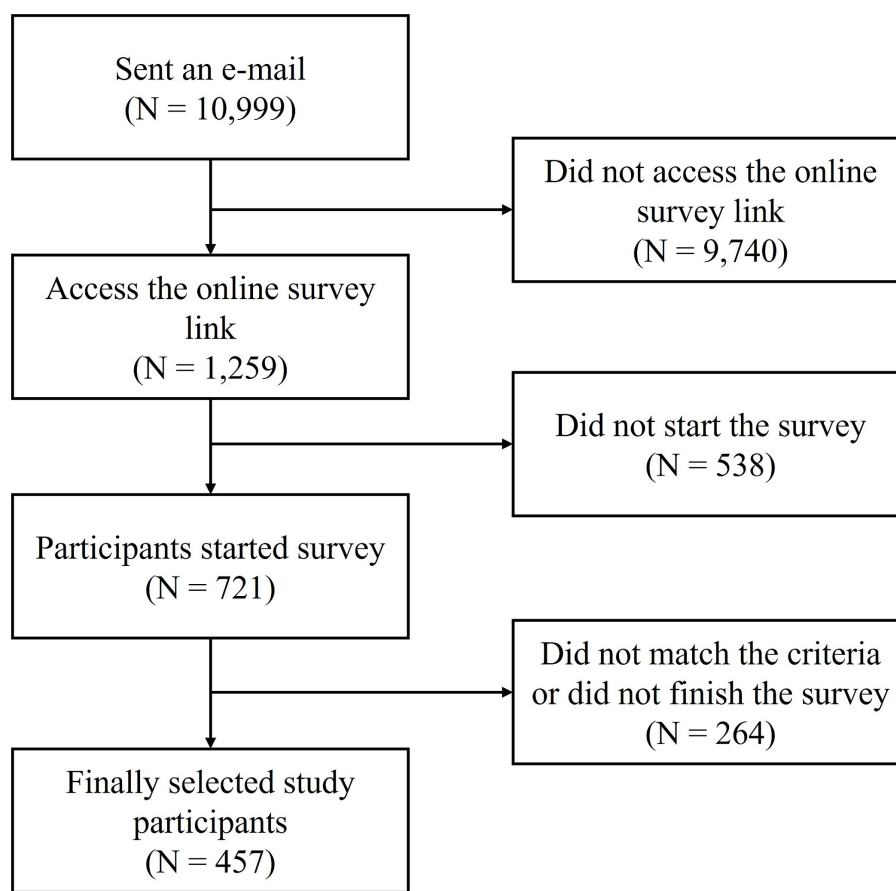
FIGURE 1
Flow diagram of selection of the study participants.

is similar to the prevalence of SI in the general population, found in other studies (i.e., 3.7 to 5.4%) (Hwang and Park, 2021; The Korean Society Of Oriental Neuropsychiatry, 2021; Kim E. Y. et al., 2023). However, passive or weak SI, which constitutes the SI spectrum, is also closely related to suicide attempts and is important from a mental health perspective (Liu et al., 2020; Harmer et al., 2024). Despite excluding individuals diagnosed with mood disorders, the high prevalence of SI in this study suggests that the Korean population with MZ may be exposed to high rates of mental health problems. While the coronavirus disease 2019 pandemic has had a more negative impact on mental health, including suicide risk, among younger generations in South Korea (Park et al., 2022), several other factors may contribute to this high prevalence. The MZ generation in South Korea faces unique socioeconomic challenges including severe housing affordability issues, high youth unemployment rates, gender inequalities and extreme competition in education and employment (Hwang and Shin, 2023; Kang et al., 2023). Additionally, this generation experiences significant economic inequality and limited social mobility compared to previous generations, often described as the "N-po generation" (N-giving-up generation) who have given up on various life goals such as marriage, home ownership, and having children due to economic constraints (Seo, 2019). The perceived generational inequity and social pressure to succeed despite limited opportunities may contribute to psychological distress in this population (Moon and Kim, 2023). Furthermore, Korea's intensive

work culture, characterized by long working hours and hierarchical relationships, may particularly affect the MZ generation who value work-life balance and fair treatment (Hong and Hong, 2023).

In the comparison between the SI and non-SI groups, the SI group showed poor overall mental health; however, it showed low scores on deep acting, a type of emotional labor that modifies inner feelings (Grandey, 2003). This result is consistent with existing studies showing that deep acting is associated with better mental outcomes in workers exposed to emotional labor (Grandey, 2003; Zhao et al., 2020). However, there is still a lack of research that divides emotional labor into surface acting and deep acting and investigates their relationship with suicidality. Considering that emotional labor has a serious impact on workers' physical and mental health (Hwang et al., 2020), it appears that more in-depth research is needed in the context of suicidality. The relatively weak relationship between emotional labor and SI in our sample might reflect the heterogeneous occupational composition of participants, as emotional labor demands vary significantly across different job sectors. Additionally, recent workplace policy changes in South Korea regarding emotional labor protection might have helped mitigate its negative mental health impacts. Furthermore, for the MZ generation, other psychosocial stressors might play more prominent roles in SI risk than work-related emotional demands.

The relatively low mean scores on the emotional labor scale, despite high levels of unexpressed anger and perceived injustice, suggest that the sources of anger in this population may extend

TABLE 1 Baseline characteristics of the participants.

Variables		Total (n = 457)	Non_SI (n = 283)	SI (n = 174)	X² or t	P-value
Sex	Men	243	140	103	4.093	0.053
	Women	214	143	71		
Age	19–29	126	80	76	0.918	0.632
	30–39	152	97	55		
	40–44	179	106	73		
	Raw (year)	34.75 ± 7.45	34.35 ± 7.58	35.40 ± 7.20	−1.460	0.145
Generation	M generation	267	157	110	2.658	0.118
	Z generation	190	126	64		
Marriage	Unmarried or divorced	281	174	107	0.000	1.000
	Married	176	109	67		
Residence area	Metropolitan	271	165	106	0.305	0.624
	Other	186	118	68		
Subjective health status	Good or very good	157	109	48	11.155	0.004**
	Normal	225	139	86		
	Bad or very bad	75	35	40		
Chronic disease	Presence	333	210	123	0.673	0.449
	Absence	124	73	51		
HB scale	HB traits	33.12 ± 9.16	31.01 ± 8.62	36.55 ± 8.99	−6.554	0.000***
	HB symptoms	25.85 ± 11.65	20.90 ± 9.76	33.91 ± 9.84	−13.799	0.000***
Employee-focused EL	Subtotal	3.27 ± 0.65	3.17 ± 0.66	3.54 ± 0.71	−3.586	0.000***
	Superficial acting	3.38 ± 0.76	3.27 ± 0.78	3.54 ± 0.71	−3.244	0.001**
	Deep acting	3.16 ± 0.75	3.07 ± 0.78	3.03 ± 0.69	−2.873	0.004**
Job-focused EL	Subtotal	3.09 ± 0.69	3.00 ± 0.71	3.24 ± 0.64	−3.203	0.001**
	Frequency of interactions	3.22 ± 0.90	3.16 ± 0.97	3.29 ± 0.79	−1.293	0.197
	Duration of interactions	3.20 ± 0.85	3.13 ± 0.88	3.31 ± 0.78	−1.927	0.055
	Variety of expressions	2.90 ± 0.91	2.74 ± 0.93	3.14 ± 0.82	−4.048	0.000***
Total EL		3.17 ± 0.61	3.07 ± 0.62	3.32 ± 0.56	−3.763	0.000***
DASS-21	Depression	7.09 ± 5.32	4.34 ± 3.94	11.56 ± 4.09	−18.729	0.000***
	Anxiety	5.70 ± 4.95	3.28 ± 3.48	9.64 ± 4.42	−17.065	0.000***
	Stress	8.26 ± 4.87	6.15 ± 4.14	11.68 ± 3.93	−14.119	0.000***
STAXI	State anger	16.71 ± 6.86	13.53 ± 4.61	21.90 ± 6.76	−15.720	0.000***
	Trait anger	19.74 ± 6.48	17.61 ± 5.46	23.19 ± 6.54	−9.815	0.000***
	Anger-control	19.36 ± 4.18	19.08 ± 4.34	19.82 ± 3.86	−1.854	0.064
	Anger-out	14.79 ± 4.68	13.05 ± 3.63	17.61 ± 4.82	−11.496	0.000***
	Anger-in	17.52 ± 5.00	15.98 ± 4.58	20.02 ± 4.64	−9.123	0.000***

DASS-21, the Depression, Anxiety, and Stress Scale-21; EL, emotional labor; HB, hwa-byung; SI, suicidal ideation; STAXI, The State–Trait Anger Expression Inventory. *, p < 0.05; **, p < 0.01; ***, p < 0.001.

beyond workplace emotional demands. The MZ generation's experience of anger and injustice appears to stem from broader societal issues, including significant economic disparities between generations, limited social mobility, systemic barriers to achieving traditional life goals such as home ownership and marriage, and gender inequalities (Hwang and Shin, 2023; Kang et al., 2023).
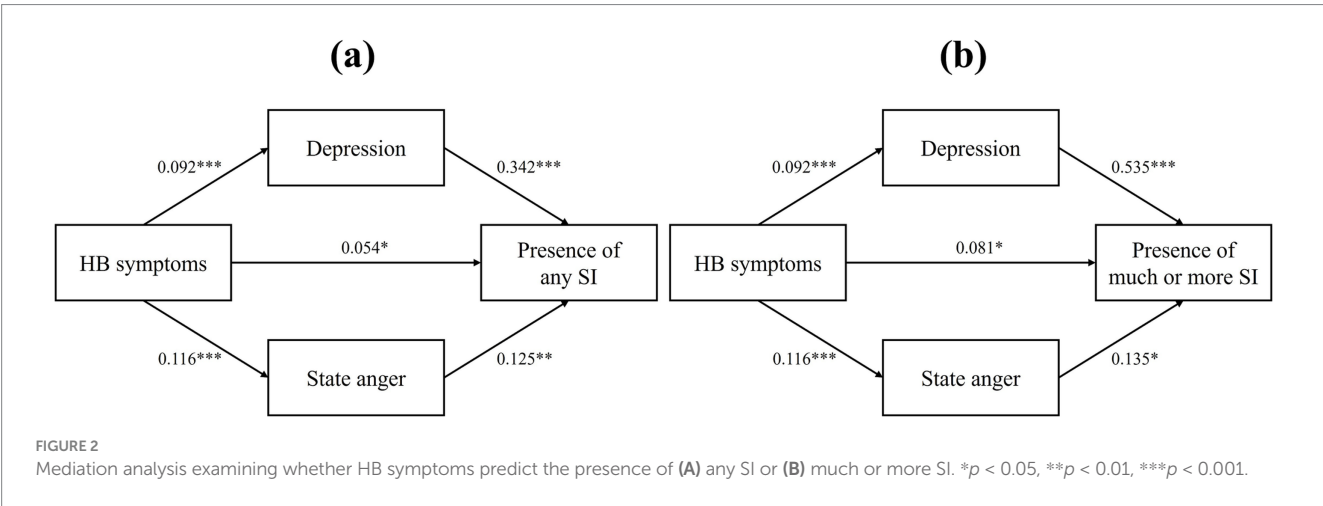
This generation has been particularly affected by rapidly increasing housing prices, stagnant wages, and intense competition for stable employment, leading to a sense of relative deprivation compared to previous generations (Seo, 2019). Furthermore, their heightened sensitivity to fairness and justice (Moon and Kim, 2023) may make them more susceptible to

TABLE 2 Factors associated with the presence of suicidal ideation from multivariable logistic regression analysis.

Variables		Any SI		Much or more SI		Very much SI	
		OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Sex (ref. Women)	Men	1.26 (0.61, 2.62)	0.527	0.96 (0.39, 2.37)	0.934	0.80 (0.19, 3.43)	0.766
Age		1.02 (0.95, 1.09)	0.601	1.11 (1.02, 1.21)	0.013*	1.01 (0.88, 1.14)	0.933
Marriage (ref. married)	Unmarried or divorced	1.42 (0.63, 3.19)	0.395	1.71 (0.62, 4.73)	0.300	1.99 (0.36, 10.92)	0.431
Residence area (ref. Metropolitan)	Other	0.91 (0.46, 1.82)	0.795	0.93 (0.37, 2.32)	0.871	1.84 (0.49, 6.92)	0.368
Subjective health status (ref. bad)	Good or very good	3.30 (0.97, 11.24)	0.056	1.88 (0.48, 7.44)	0.369	1.12 (0.13, 9.71)	0.917
	Normal	0.93 (0.34, 2.57)	0.895	1.04 (0.33, 3.29)	0.941	0.80 (0.12, 5.30)	0.816
Chronic disease (ref. absence)	Presence	1.15 (0.53, 2.50)	0.732	0.46 (0.16, 1.28)	0.138	0.78 (0.17, 3.63)	0.748
HB scale	HB traits	0.99 (0.93, 1.05)	0.711	0.95 (0.87, 1.03)	0.202	0.95 (0.84, 1.07)	0.412
	HB symptoms	1.05 (1.00, 1.11)	0.050*	1.08 (1.01, 1.16)	0.031*	1.12 (0.98, 1.28)	0.097
EL	Employee-focused EL	0.57 (0.25, 1.30)	0.179	1.65 (0.49, 5.59)	0.423	0.79 (0.13, 5.03)	0.806
	Job-focused EL	1.06 (0.54, 2.08)	0.867	0.93 (0.39, 2.25)	0.880	1.35 (0.39, 4.59)	0.636
DASS-21	Depression	1.41 (1.23, 1.62)	0.000***	1.70 (1.40, 2.06)	0.000***	1.65 (1.15, 2.37)	0.006**
	Anxiety	1.09 (0.96, 1.24)	0.176	0.98 (0.84, 1.14)	0.755	0.89 (0.71, 1.11)	0.296
	Stress	0.90 (0.77, 1.06)	0.219	0.82 (0.65, 1.03)	0.093	0.89 (0.63, 1.26)	0.517
STAXI	State anger	1.14 (1.05, 1.24)	0.002**	1.14 (1.02, 1.27)	0.021*	0.93 (0.79, 1.09)	0.384
	Trait anger	0.99 (0.91, 1.07)	0.801	0.97 (0.88, 1.09)	0.644	1.03 (0.87, 1.23)	0.733
	Anger-control	1.03 (0.93, 1.14)	0.543	0.99 (0.87, 1.13)	0.883	0.97 (0.80, 1.18)	0.777
	Anger-out	1.04 (0.93, 1.17)	0.486	1.09 (0.95, 1.25)	0.236	1.23 (0.95, 1.59)	0.119
	Anger-in	0.94 (0.85, 1.05)	0.259	0.98 (0.87, 1.11)	0.787	0.98 (0.80, 1.20)	0.842

CI, confidence interval; DASS-21, the Depression, Anxiety, and Stress Scale-21; EL, emotional labor; HB, hwa-byung; OR, odds ratio; SI, suicidal ideation; STAXI, The State–Trait Anger Expression Inventory. All odds ratios are mutually adjusted for all other variables in the model. *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

FIGURE 2
Mediation analysis examining whether HB symptoms predict the presence of (A) any SI or (B) much or more SI. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

perceiving and responding to various forms of social inequity beyond the workplace context. These findings suggest that interventions aimed at addressing anger and suicide risk in this population should consider not only workplace factors but also broader societal and generational issues contributing to perceived injustice.

Depression and state anger were significantly related to the presence of SI in the study group of interest (Masood et al., 2018;

Orsolini et al., 2020). An important finding of this study was the confirmation of a significant association between SI and HB symptoms. The mediation analysis provided further insight into the relationship between HB symptoms and SI. While HB symptoms showed a direct effect on SI, they also exhibited indirect effects through depression and state anger. This suggests that HB symptoms may increase the risk of SI not only directly but also by exacerbating depression and state anger. These findings highlight the complex

TABLE 3 Mediation analysis of depression and state anger on hwa-byung symptoms-suicidal ideation relationship.

Variables		Any SI				Much or more SI			
		β (95% CI)	SE	Z or t-value	P-value	β (95% CI)	SE	Z or t-value	P-value
Direct	HB symptoms → SI	0.054 (0.001, 0.107)	0.027	2.007	0.045*	0.081 (0.009, 0.153)	0.037	2.198	0.028*
Indirect	Total	0.046 (0.027, 0.088)	0.015	–	–	0.065 (0.040, 0.139)	0.026	–	–
	via Depression	0.032 (0.015, 0.064)	0.012	–	–	0.049 (0.027, 0.109)	0.021	–	–
	via State anger	0.015 (0.003, 0.038)	0.009	–	–	0.016 (0.001, 0.049)	0.012	–	–
Paths	HB symptoms → depression	0.092 (0.051, 0.134)	0.021	4.363	0.000***	0.092 (0.051, 0.134)	0.021	4.363	0.000***
	HB symptoms → state anger	0.116 (0.049, 0.184)	0.034	3.412	0.000***	0.116 (0.049, 0.184)	0.034	3.412	0.000***
	Depression → SI	0.342 (0.204, 0.480)	0.070	4.854	0.000***	0.055 (0.341, 0.729)	0.099	5.402	0.000***
	State anger → SI	0.125 (0.044, 0.206)	0.041	3.034	0.002**	0.135 (0.024, 0.245)	0.057	2.384	0.017*

CI, confidence interval; HB, hwa-byung; SI, suicidal ideation; SE, standard error. *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$. Sex, age, marriage, residence area, subjective health status, presence of chronic disease, HB traits, employee-focused emotional labor, job-focused emotional labor, anxiety, stress, trait anger, anger-control, anger-out, and anger-in were included in the analysis as covariates variables. This analysis was based on 5,000 bootstrap samples.

TABLE 4 Correlation between hwa-byung symptoms and the severity of suicidal ideation.

SI Correlation with SI severity		HB symptoms in the HB scale (Q1 to Q15)	Dimensions of each symptom (physical, emotional, or cognitive)
Pearson correlation	P-value		
0.536	0.000	Q7. My hands and feet tremble, and I feel restless.	Physical and Emotional
0.504	0.000	Q1. My life is rather unhappy.	Cognitive
0.489	0.000	Q3. I feel that my life is sorrowful.	Emotional
0.480	0.000	Q5. I feel wronged.	Emotional
0.476	0.000	Q10. I often feel a heat buildup in my chest.	Physical
0.464	0.000	Q4. I feel sorrowful.	Emotional
0.458	0.000	Q6. My nerves are so fragile that I cannot control my emotions.	Emotional
0.430	0.000	Q11. I often feel something rising from below (legs or abdomen) to above (chest).	Physical
0.426	0.000	Q9. My face often flushes with heat.	Physical
0.373	0.000	Q8. I often feel disappointed in myself.	Cognitive
0.372	0.000	Q13. I have indigestion and often feel bloated.	Physical
0.360	0.000	Q12. When I get angry, my hands feel numb or tremble.	Physical
0.347	0.000	Q15. I feel that the world is unfair.	Cognitive
0.337	0.000	Q2. There are times when I feel deep regret or resentment.	Emotional and Cognitive
0.241	0.000	Q14. I am extremely tired.	Physical

HB, hwa-byung; SI, suicidal ideation.

interplay between culture-bound syndromes, emotions, and SI. They also underscore the importance of addressing both HB symptoms and associated psychological factors in suicide prevention strategies for the Korean MZ generation.

HB is not a mental disorder that simply displays feelings of anger, but is also accompanied by characteristic physical symptoms caused by the accumulation of anger caused by injustice that cannot be expressed (Lee et al., 2014; Kwon et al., 2020). In Korean medicine,

HB is caused by suppressed anger, which is likened to fire; therefore, its characteristic physical symptoms include heat sensation (Q9 and 10) or pushing-up in the chest (Q11) (Kwon et al., 2020). According to the results of the correlation analysis conducted in this study, these characteristic physical symptoms are highly correlated with the severity of SI (coefficient = 0.426 to 0.476). These were identified as unique symptoms of HB that were not significantly related to depressed mood (Min et al., 2009).

Importantly, in some cases, physical symptoms mask the presence of SI. SI and depression are highly prevalent among patients visiting primary care facilities in South Korea; however, they are likely to be underdiagnosed (Choi and Lee, 2017). Clinicians should identify risks early through appropriate interviews, even if patients do not spontaneously complain of SI (Choi and Lee, 2017). To achieve this, it is important to identify the various mental and physical signs and symptoms associated with the presence of SI. The significant association of HB symptoms with the presence of SI in Korea's generation MZ found in this study can be considered helpful in identifying unidentified patients with SI in the future. In particular, Korean medicine doctors have not been included in South Korea's mental health policy (Kwon and Lee, 2024). Considering that HB is a mental disorder that originated in Korean medicine and is generally treated by Korean medicine doctors in this country (Kwon et al., 2020), the role of Korean medicine doctors in preventing and managing suicide in patients with HB should be emphasized.

A significant association between physical and mental multimorbidities and suicidality has been reported (Renemane et al., 2021). HB includes unique somatic and behavioral symptoms related to the release and suppression of anger (Min, 2008; Kavalidou et al., 2019). It is also considered a functional somatic syndrome (Kwon et al., 2020). Therefore, HB can be considered a mental disorder with the characteristics of physical-mental multimorbidity. However, HB is a culture-related syndrome (Kwon et al., 2020) and is mainly diagnosed in South Korea; therefore, it can be considered a physical-mental multimorbidity in other countries. In the future, investigating the prevalence of HB as a type of physical-mental multimorbidity and its relationship with suicidality in populations in other countries may be proposed as a meaningful research topic.

The limitations of this study were as follows. First, the survey was distributed to a panel of survey companies; therefore, it is difficult to view it as a nationally representative sample. Therefore, the results of this study are challenged by their generalizability and may be influenced by surveys with larger or nationally representative samples. Furthermore, because HB is considered a syndrome related to Korean culture (Lee et al., 2014), there are limitations in applying these results to populations outside of Korea. Second, although web-based surveys are convenient, they may have methodological weaknesses, such as selective participation (Heiervang and Goodman, 2011). This means that the survey may have selectively attracted participants who were interested or had problems related to mental health, which may be related to the high prevalence of SI found in this study. Third, suicidality is a phenomenon accompanied by complex pathophysiological factors (Orsolini et al., 2020) and qualitative information, such as interpersonal experiences and perceptions may be involved (McClelland et al., 2022), but due to the limitations of the online survey, they were not investigated in this study. However, in the clinical setting, individual narratives

should be considered when assessing suicidality. Fourth, while we focused on emotional labor as a work-related factor, we acknowledge that other important risk factors for SI, such as substance use, family history of suicide, and impulsivity, were not assessed in this study. Future research should consider incorporating these variables to provide a more comprehensive understanding of suicide risk in this population. Fifth, another important limitation is that we only assessed emotional labor among various work-related variables. Other occupational factors such as job position, working hours, work-life balance, financial compensation, and general working conditions could significantly influence both emotional labor demands and mental health outcomes (Kim, 2023). Furthermore, the impact of emotional labor likely varies across different occupations and job sectors. For instance, workers in customer service (Totterdell and Holman, 2003), healthcare (Chen et al., 2022), or education (Zheng et al., 2024) might experience higher emotional labor demands compared to those in other sectors. Future studies should consider a more comprehensive assessment of work-related variables and potentially conduct occupation-specific analyses to better understand the relationship between work conditions, HB symptoms, and SI in the MZ generation. Sixth, a major limitation of this study is the use of a single item to assess SI, rather than validated multi-item scales such as the Modified Scale for Suicidal Ideation, the Suicidal Ideation Attributes Scale, or the Beck Scale for Suicide Ideation. These validated scales would have provided more nuanced assessment of SI severity and characteristics, potentially revealing more detailed relationships between HB symptoms and specific aspects of SI. Future studies should employ comprehensive suicide risk assessment tools to better understand the relationship between HB and SI. Finally, we note that our analytical approach to SI - using it as both a dichotomous and ordinal variable - while serving different analytical purposes, may have some limitations. Future studies might benefit from consistent treatment of SI as an ordinal variable using methods such as ordinal logistic regression, which could provide additional insights while maintaining the ordered nature of the variable.

5 Conclusion

This study is the first to find results suggesting that the severity of HB symptoms is a risk factor for SI in the MZ population in South Korea, both directly and indirectly through its effects on depression and state anger. Given the high suicide rate in the country and the need to improve related mental health policies, the findings of this study can be used to improve future suicide prevention policies. Furthermore, this study highlights the role of medical personnel in KM clinics, where HB is diagnosed primarily, in the context of suicide prevention. However, because this study has limitations in generalizability, the results need to be confirmed using a larger or nationally representative sample in the future.

Data availability statement

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

Ethics statement

Author contributions

Funding

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Conflict of interest

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

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The effects of student bullying on non-suicidal self-injurious behavior in rural adolescents: the chain-mediated effects of alexithymia and ruminate thinking

Jing Wen[1,2,3], Qinghong Xu[2,4], Yongzhi Jiang[1,2,3] and Min Li[1,2,3]*

[1]School of Education, Inner Mongolia Minzu University, Tongliao, China, [2]Inner Mongolia Student Bullying Prevention Research Center, Tongliao, China, [3]Inner Mongolia Ethnic Education and Psychological Development Research Base, Tongliao, China, [4]School of Foreign Languages, Yulin University, Yulin, China

Bullying among students is a significant risk factor for non-suicidal self-injury (NSSI), which can adversely impact the physical and mental health development of individuals. To explore the mechanisms by which student bullying affects adolescent non-suicidal self-injury, 701 adolescents were selected as participants. The assessment tools included the Bullying Questionnaire, Toronto Alexithymia Scale, Ruminative Responses Scale, and Adolescents Non-suicidal Self-injury Assessment Questionnaire, which were used to measure the experiences of bullying, levels of alexithymia, rumination tendencies, and the severity of non-suicidal self-injury, respectively. This study aimed to examine whether there is a chain mediation effect of alexithymia and rumination in the relationship between student bullying and non-suicidal self-injury. The results indicated that: (1) Student bullying has a significant positive impact on adolescent non-suicidal self-injury (63.62%) and indirectly influences it through alexithymia and rumination (12.69%); (2) There are gender differences in the chain mediation effect between student bullying and non-suicidal self-injury, with the chain mediation effect of rumination and alexithymia being significantly greater in females (0.12) compared to males (0.06). This study not only provides a cognitive-emotional perspective and a gender difference perspective on the effects of bullying on adolescent non-suicidal self-injury but also focuses on rural adolescents, who often face more physical and mental health issues. Therefore, the conclusions enrich the understanding of the complex mechanisms between student bullying and non-suicidal self-injury, offering new theoretical guidance for preventing bullying and intervening with victims of bullying.

KEYWORDS

student bullying, non-suicidal self-injury, alexithymia, rumination, goal progression theory, gender differences

1 Introduction

Non-suicidal self-injury (NSSI) refers to the intentional harm inflicted on one's own body without the intent to die (Ahn et al., 2021). Adolescents are a high-risk group for NSSI, with the behavior peaking between the ages of 15 and 17, and there is a noticeable upward trend in NSSI rates (Plener et al., 2015). Previous studies indicate that the one-year prevalence of NSSI among Chinese adolescents is 15.5% (Tang et al., 2011). NSSI is an important risk factor for predicting suicidal behavior (Tang et al., 2011; Wilkinson et al., 2011; Asarnow et al., 2011),

meaning that individuals with a broader history of self-injurious behavior are more likely to attempt suicide. Joiner posits that once adolescents view self-injury as a coping mechanism for stress, they may be more inclined to engage in such behavior more frequently. This attribution can reinforce self-injurious behaviors and exacerbate the relationship between NSSI and suicidal behavior (Joiner, 2005). The escalating suicide rates severely impact the maintenance of social harmony and stable development; thus, understanding the mechanisms underlying NSSI is crucial for reducing suicide rates.

In recent years, there has been a significant increase in research examining the relationship between NSSI among adolescents and bullying experiences, clearly identifying that experiences of bullying are an important risk factor triggering non-suicidal self-injurious behavior (Ayano et al., 2021). Bullying is characterized by an attack from a stronger party on a weaker one and involves repetition, power imbalances, and intentional harm. It primarily includes four forms: physical bullying, relational bullying, verbal bullying, and cyberbullying. Survey data indicate that bullying is a widespread phenomenon globally, with approximately one-third of children having experienced bullying. In China, the incidence of bullying victimization in primary and secondary schools reaches as high as 25.8% (Olweus, 2013; Tan, 2023). The impacts of bullying on individual mental health are profound; it not only causes immediate psychological trauma to victims but can also lead to serious negative effects on their long-term development. Studies have shown that the rate of NSSI among bullying victims is higher than that among non-victims (Li et al., 2020; Lee et al., 2021). Furthermore, numerous scholars have confirmed a significant positive correlation between bullying and NSSI, indicating that adolescents who experience higher levels of bullying are more likely to exhibit self-injurious tendencies (Yang et al., 2023; Wen et al., 2023; Van Geel et al., 2015; Huang et al., 2022). General strain theory suggests that when one is unable to resolve or adapt to the negative emotions caused by violent events, such feelings may lead an individual to take a series of deviant behaviors in order to relieve or eliminate such feelings (Agnew, 1992). Based on these findings, this study proposes Hypothesis H1: Adolescent experiences of bullying significantly positively predict their engagement in non-suicidal self-injury.

Existing research has indicated that one of the significant predictive variables for non-suicidal self-injury (NSSI) among adolescents is alexithymia, with its importance increasingly recognized (Ruan et al., 2024). Alexithymia refers to an individual's insufficient ability to recognize, process, and regulate emotions, specifically manifested as difficulty in identifying and describing feelings, distinguishing emotions from bodily sensations, and a lack of fantasy and extraverted thinking traits (Taylor, 2000). Studies have shown that alexithymia has a direct impact on adolescents' non-suicidal self-injurious behavior (Zhang et al., 2023). For example, one study found that individuals with high levels of alexithymia are more likely to engage in NSSI, suggesting that such behavior may serve as an externalizing coping mechanism (Paivio and McCulloch, 2004).

Moreover, it is noteworthy that alexithymia is highly correlated with experiences of bullying. Specifically, Levantini et al. found that victims of bullying scored higher on measures of alexithymia compared to non-victims (Levantini et al., 2023). Overall, several studies have consistently identified a relationship between alexithymia and various severe outcomes, including trauma-related stress in adolescents and preadolescents, deliberate self-injury, as well as

internalizing and externalizing problems (Guzzo et al., 2014; Garisch and Wilson, 2010; Prino et al., 2019). These findings provide compelling arguments for the role of alexithymia as a mediator between bullying and non-suicidal self-injury.

These arguments are rooted in a fundamental theoretical framework, particularly from the perspective of social mechanisms of alexithymia. This theory posits that certain adverse social factors encountered during child development can diminish socialization levels and impair emotional regulation abilities, leading to maladaptive behaviors (Honkalampi et al., 2004). This implies that Honkalampi and colleagues emphasize the role of external social factors in the development of alexithymia, where bullying, as a typical social trauma event, can significantly affect an individual's ability to express and identify emotions. In the context of bullying, victims often face difficulties in emotional suppression and expression, which results in ineffective regulation of their negative emotions and internal evaluations. This emotional dysregulation further exacerbates the psychological distress experienced by the victims and may prompt them to engage in NSSI as a coping strategy.

Based on the aforementioned theoretical perspectives and analyses, this study proposes that to fully understand the impact of bullying on non-suicidal self-injury, it is essential to explore the direct and indirect relationships between bullying experiences, alexithymia, and NSSI, thereby establishing a path relationship model among the three factors. Accordingly, this research posits the following hypothesis H2: Alexithymia mediates the relationship between bullying victimization and non-suicidal self-injury among adolescents. This hypothesis not only unveils the underlying connections between bullying and NSSI but also emphasizes the crucial role of alexithymia in this process.

Furthermore, we note that rumination is an important mediating variable influencing the relationship between bullying and non-suicidal self-injury (NSSI) among students (Wang, 2021). Rumination refers to the tendency of individuals to continually focus on negative experiences following adverse life events, persistently thinking about the causes and consequences of these events, along with the accompanying negative emotions, while failing to actively seek solutions. It represents an excessive preoccupation with problems rather than a proactive coping approach (Nolen-Hoeksema, 1991). Individuals who experience bullying often struggle with unresolved stress, making them more likely to become immersed in negative emotions, negative thoughts, and memories related to the adverse events, thereby intensifying their rumination (Chu et al., 2019).

Additionally, studies have shown a significant positive correlation between bullying and rumination, indicating that individuals who experience bullying more frequently tend to have stronger ruminative responses (Chu et al., 2019; Wang et al., 2023). According to the stress response model, if the outcome of a stressful event is negative, individuals are likely to ruminate over that negative outcome (Robinson and Alloy, 2003). Therefore, when victims of bullying struggle to resolve or adapt to the situation, they may continuously reflect on the negative consequences of being bullied.

Moreover, investigations have revealed a close relationship between rumination and non-suicidal self-injury (Voon et al., 2014). Persistent rumination can exacerbate an individual's negative experiences, heighten their focus on distress, and ultimately lead to NSSI as a means of temporarily alleviating that pain. Consequently, individuals with high levels of rumination are

more likely to engage in non-suicidal self-injurious behavior (Fu et al., 2024). Previous research has also identified rumination as a significant predictor of NSSI (Bjärehed and Lundh, 2008). Selby et al. further argued that NSSI serves as a painful yet non-lethal method for diverting attention away from ruminative thoughts (Selby and Joiner, 2010).

In summary, these findings highlight the critical role of rumination as a mediating factor between bullying experiences and non-suicidal self-injury, suggesting that individuals who are bullied may resort to self-injury as a maladaptive coping mechanism fueled by their ruminative tendencies.

Given the significant role of rumination in the relationship between experiences of bullying and non-suicidal self-injury (NSSI), we can understand bullying as a negative stressor that, when individuals are unable to cope with it effectively, leads to persistent contemplation of its negative consequences. This can create a vicious cycle of rumination and negative emotions, further exacerbating negative thoughts and deepening emotional distress. Individuals who are bullied often exhibit elevated levels of rumination (Monti et al., 2017), and mild stimuli are insufficient to divert their attention from negative outcomes. As a result, they may resort to more intense strategies, such as engaging in NSSI, to shift their focus towards bodily pain and the stimulation of blood, using it as a method to distract themselves. This approach can rapidly alleviate the negative effects of bullying on mental health and may even lead to NSSI becoming a habitual coping mechanism for individuals (Selby and Joiner, 2010). Given the adverse impacts of bullying on mental health, this study posits that bullying is not only directly associated with NSSI but may also indirectly promote NSSI behaviors through the mediation of rumination. Hence, based on this analysis, we propose Hypothesis H3: Rumination mediates the relationship between bullying and non-suicidal self-injury among adolescents.

In thorough investigations of previous research, both rumination and alexithymia have been identified as influential predictors of non-suicidal self-injury (Borrill et al., 2009). This finding provides support for constructing a chain mediation model between bullying and NSSI. Individuals with alexithymia typically exhibit difficulties in recognizing and expressing emotions, as well as social withdrawal, which limits their information-processing capabilities. This limitation is particularly pronounced among adolescents who have experienced bullying, as they often struggle to effectively cope with or adapt to the various consequences of bullying events. This not only exacerbates their psychological burden but also leads to further difficulties in information recognition. From the perspective of goal progression theory, rumination is viewed as a form of self-regulated thinking that arises when individuals perceive significant goals being obstructed, resulting in persistent thoughts about the situation (Martin et al., 2003). Such individuals tend to continuously focus on negative situations and outcomes (Di Schiena et al., 2011).

Some scholars have found a significant positive correlation between alexithymia and rumination, implying that the severity of alexithymia is associated with higher levels of rumination (Liu et al., 2022). Additionally, in a study specifically targeting patients with depression, it was confirmed that depressed individuals with alexithymia exhibited higher levels of rumination compared to those without alexithymia (Du and Dong, 2019). This finding further validates the close relationship between alexithymia and rumination. Furthermore, some research has indicated that alexithymia and

anger rumination play a chain-mediation role in the relationship between social trauma and suicidal ideation (Wang and Zhang, 2023).

Based on these significant findings, while consistent outcomes have been observed in the direct relationship between bullying and NSSI, it raises the question of whether this consistency extends to the chain mediation of alexithymia and rumination. Therefore, this study proposes Hypothesis H4: Alexithymia and rumination serve as chain mediators in the impact of bullying on NSSI among adolescents. The introduction of this hypothesis not only helps to deepen our understanding of the complex mechanisms linking bullying and adolescent NSSI but also provides important theoretical support for developing effective prevention and intervention measures.

During adolescence, students develop a greater sense of independence, and their emotions often become unstable. Social gender theory posits that females, characterized by their sensitivity, emotionality, and nurturing traits, often display deeper empathy and a propensity to help others. In contrast, males typically exhibit boldness, competitiveness, aggression, and rationality. Individuals internalize and conform to socially prescribed gender role expectations, which subsequently govern their behaviors (Espelage and Swearer, 2004). When confronted with bullying, females are more likely to demonstrate emotional internalization and have lower self-esteem, exhibiting higher levels of negative thinking when compared to males (Butler and Nolen-Hoeksema, 1994). Males, due to their competitive nature, are more likely to get involved in bullying scenarios, and they tend to adopt proactive aggressive coping strategies when facing bullying (Xia et al., 2023). Furthermore, the positive traits attributed to males, such as strength and independence, can somewhat mitigate the harm caused by bullying. Therefore, there may be significant gender differences in the chain mediation effect observed between bullying and non-suicidal self-injury (NSSI). This leads to the formulation of Hypothesis H5: There exists a gender difference in the chain mediation model of the impact of bullying on non-suicidal self-injury.

In summary, this research focuses on adolescents as the study population, utilizing emotional cascade theory, the social mechanisms of alexithymia, and goal progression theory to substantiate and explore the empirical findings. It aims to investigate the mediating roles of alexithymia and rumination in the relationship between bullying experiences and non-suicidal self-injury among rural adolescents. The study seeks to further examine the explanatory capacities of these theories and prior findings regarding the mechanisms involved in the relationships among bullying, non-suicidal self-injury, and rural adolescents, thereby providing valuable insights for reducing the incidence of NSSI in this demographic.

Integrating the hypotheses H1, H2, and H3, we have constructed a chain mediation model, as illustrated in Model 1. Although a considerable amount of research has been conducted on adolescent non-suicidal self-injury, most studies focus on urban youth. Rural adolescents, affected by more complex environments, are likely to face a greater array of psychological issues. This study not only provides a unique cognitive-emotional perspective and an in-depth exploration of gender differences regarding bullying's impact on adolescent NSSI but also specifically targets the rural adolescent group, which faces more pronounced physical and mental health challenges, conducting a specialized investigation into their experiences.

By exploring the complex mechanisms surrounding bullying and non-suicidal self-injury, we gain a deeper understanding of the causes and mechanisms underlying these behaviors, as well as the emotional and cognitive processes at play for students. Moreover, adolescents experiencing bullying are at risk for individual and societal developmental issues; thus, this research will aid in identifying high-risk individuals and inform future comprehensive interventions and therapeutic strategies from the emotional-cognitive and gender difference perspectives. This approach aims to alleviate the suffering of bullying victims and prevent the occurrence of non-suicidal self-injury behaviors, which is vital for safeguarding adolescent mental health, maintaining campus harmony, and promoting healthy societal development.

2 Research methodology

2.1 Participants

Adolescent students from six high schools in Tongliao City, Inner Mongolia, participated in a questionnaire survey. A total of 826 questionnaires were distributed, and after careful screening, 125 were excluded for clearly insufficient responses, resulting in 701 valid participants, yielding an effective response rate of 84.7%. Details of the valid participants are presented in Table 1. Participants were from several schools in Naihanqi of Tongliao City, with 550 participants (78.5%) from rural areas and 133 participants (19.0%) from urban areas. Among the participants, 187 (26.7%) held class leadership positions, while 493 (70.3%) did not. Regarding the only-child designation, 225 participants (32.1%) were only children, while 464 (66.2%) were not. In terms of family structure, 563 participants (80.3%) came from intact families, 67 (9.6%) from single-parent families, and 56 (8.0%) from blended families. The gender distribution was roughly balanced, with a slight majority of females (51.16%), while males comprised 338 individuals (48.84%). As for grade levels, there were 63 participants (9.0%) in the first year of junior high school, with an average age of about 13 years; 118 participants (16.8%) in the second year, with an average age of 14 years; 144 participants (20.5%) in the third year, with an average age of 15 years; 150 participants (21.4%) in the first year of senior high school, with an average age of approximately 16 years; 143 participants (20.4%) in the second year, with an average age of around 17 years; and 74 participants (10.6%) in the third year, with an average age of about 18 years.

Data collection and entry for this study occurred from November 2023 to January 2024.

TABLE 1 Statistics on the number of boys and girls in each grade.

Grade	Male	Female	Total
First grade	27	36	63
Second grade	69	49	118
Third grade	72	72	144
Freshman year	80	70	150
Sophomore year 6	66	77	143
Senior year	24	50	74
Total	338	354	692

2.2 Inclusion and exclusion criteria

2.2.1 Inclusion criteria

1. Ages between 12 and 18 years;
2. Ability to properly understand the contents of the questionnaire and willingness to cooperate with the survey;
3. Consent from the participants and their guardians.

2.2.2 Exclusion criteria

1. Presence of neurological or other mental disorders;
2. Substance or alcohol dependency;
3. Conditions such as epilepsy, brain injury, or intellectual disabilities;
4. Recent exposure to significant stressful events;
5. Hearing, speech, or other communication impairments that affect normal interaction;
6. Inability to cooperate with the surveyors.

2.3 Research tools

Item Packing Note: The following four scales were modeled with latent variables in the analysis of the fitted model in question items packaged three or four adjacent to each other when using AMOS.

2.3.1 Bullying questionnaire

This study adopted the bullying scale from the Olweus Bullying Questionnaire revised by Zhang Wenxin and other scholars (1999) (Zhang and Wu, 1999). The questionnaire asked the subjects about the frequency of school bullying from their classmates in the past 3 months, and the questionnaire consisted of 6 questions. It was divided into three dimensions: verbal bullying (2 questions about some classmates calling me unpleasant nicknames or making fun of and being sarcastic to me), physical bullying (2 questions about some classmates hitting, kicking, pushing, bumping into me, or threatening me), and relational bullying (2 questions about some classmates spreading some rumors about me through cell phones or computers, and trying to make other people dislike me). Likert's 5-point scale was used, with one meaning "it did not happen," 2 meaning "it only happened once or twice," 3 meaning "two or three times a month," 4 meaning "about once a week," and 5 for "several times a week." The higher the total score, the higher the individual's level of bullying. In this study, the bullying questionnaire factor fit model was good: χ / df = 3.18, RMSEA = 0.06, SRMR = 0.02, CFI = 0.99, TLI = 0.97, and Cronbach's alpha coefficient was 0.81.

2.3.2 Adolescents' non-suicidal self-injury assessment questionnaire

Developed by Yuhui Wan et al. to obtain information on the occurrence of 12 self-injurious behaviors in the study population in the last year. The total questionnaire was divided into functional and behavioral questionnaires (Wan et al., 2018). The behavioral questionnaire consisted of 12 entries and was divided into two dimensions using Likert's 5-point scale: the group with no apparent tissue damage and the group with apparent tissue damage. The no obvious tissue damage included seven questions, such as intentionally scratching hair, pinching, and biting oneself. The no apparent tissue

damage included five questions, such as intentionally cutting oneself and intentionally rubbing the skin with something to make it bleed or bruise. [2]In this study, the non-suicidal self-injury questionnaire factor fit model was good: χ/df = 5.99, RMSEA = 0.08, SRMR = 0.05, CFI = 0.92, TLI = 0.90, and Cronbach's α was 0.87.

2.3.3 Toronto alexithymia scale

The Toronto Alexithymia Scale (TAS) was developed by Bagby et al. and revised by Jin-Yao Ant et al. (Yi et al., 2003). The scale consists of 20 questions divided into three dimensions: difficulty in identifying emotions (e.g., I am often confused about what kind of feelings I have. 7 questions), difficulty in expressing emotions (e.g., I can easily describe my feelings. 5 questions), and extroverted thinking (e.g., I prefer to talk to others about their daily activities rather than their feelings. 8 questions). A 5-point Likert scale was used, with higher scores indicating higher levels of dysfunction in describing feelings. In this study, the Toronto Alexithymia Scale factor fit model was good: χ/df = 5.50, RMSEA = 0.08, SRMR = 0.08, CFI = 0.85, TLI = 0.83, and Cronbach's alpha coefficient was 0.75.

2.3.4 Ruminative responses scale (RRS)

Prepared by Nolen-Hoeksema, revised into Chinese by Han and Yang (2009), it consists of 22 questions divided into three dimensions: symptomatic rumination (e.g., I often think about how lonely I am. 12 questions), obsessive-compulsive thinking (e.g., I often think about what I did to cause this. 5 questions), and introspective thinking (e.g., I often think alone about why this is the case. 5 questions). A 4-point Likert scale was used, with higher scores indicating a greater tendency to ruminate. The ruminative thinking questionnaire factor fit model was good: χ/df = 3.96, RMSEA = 0.07, SRMR = 0.04, CFI = 0.91, TLI = 0.90, and the internal consistency alpha coefficient of this scale in this study was 0.93.

2.4 Procedures

This study was approved by the Research Ethics Committee of Inner Mongolia University for Nationalities. After establishing contact with teachers from two middle schools in Naiman Banner, Tongliao City, the researcher introduced the purpose and content of the study. After acquiring their consent, the teachers in the local school used the paper version of the questionnaire to conduct the whole class test in their spare time, and the students completed the questionnaire anonymously. Written informed consent and assent forms were acquired from the participants and their legal guardians/ relatives. Participation was voluntary, and confidentiality was guaranteed. The data collectors consisted of trained researchers who

ensured the standardization of the data collection process. Completing the self-report questionnaire took approximately 30 min.

2.5 Data analysis

Descriptive analysis of the data was conducted using SPSS 25.0 software. The correlations between variables were assessed using Pearson product–moment correlation analysis. Structural equation modeling (SEM) was constructed using AMOS 28.0 software, and the mediation effects along with gender difference tests were examined using the bias-corrected nonparametric percentile Bootstrap method. A 95% confidence interval that does not include zero indicates a significant mediation effect. Statistical significance was defined at $p < 0.05$.

3 Results

3.1 Common method bias test

Using only the questionnaire method in this study may create the problem of common method bias, which was controlled by emphasizing confidentiality and positive and negative scoring during the test administration. A common method bias test was also conducted. Validated factor analysis was used, and the results showed that the one-way model fit was poor: χ/df = 22.46, RMSEA = 0.18, SRMR = 0.13, CFI = 0.64, and TLI = 0.57, which suggests that common method bias is not a severe problem and that the effect of common method bias can be ruled out.

3.2 Descriptive statistics and correlation analysis

Table 2 presents the means, standard deviations, and correlation coefficients for the various variables. The analysis revealed significant positive correlations among bullying experiences, alexithymia, rumination, and non-suicidal self-injury (NSSI) in pairs. This indicates that the more frequently students experience bullying, the more difficult it is for adolescents to recognize, express, and regulate their emotions. Additionally, the severity of bullying correlates with the severity of adolescents' NSSI behaviors; those who find it more challenging to identify and express emotions, as well as exhibit more severe alexithymia, demonstrate higher levels of rumination. Furthermore, students who engage in rumination more frequently tend to have a higher occurrence of NSSI. The relationships among

TABLE 2 Descriptive statistics and correlation of main variables.

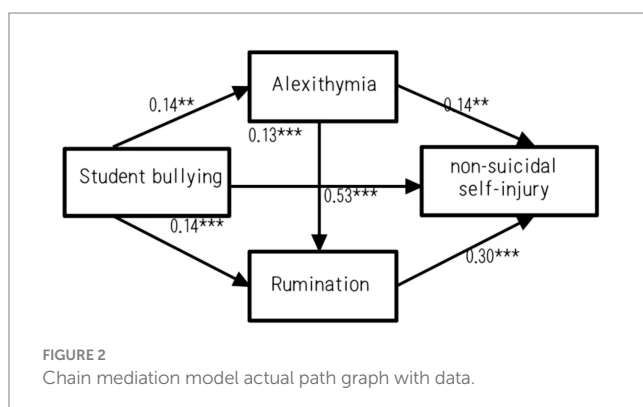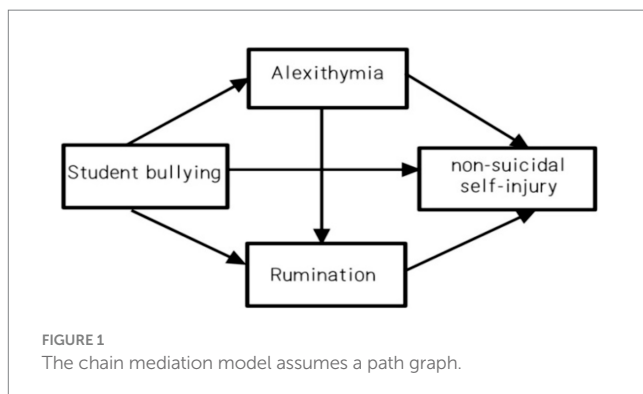| Variable	M ± SD	Student bullying	Alexithymia	Rumination	Non-suicidal self-injury
Student bullying	1.14 ± 0.31	1.00			
Alexithymia	55.55 ± 9.58	0.13**	1.00		
Rumination	42.45 ± 12.01	0.20***	0.55***	1.00	
Non-suicidal self-injury	13.56 ± 3.78	0.22***	0.31***	0.39***	1.00

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

these variables support the further testing of the proposed hypotheses Figure 1.

3.3 Tests for mediating effects

This study used structural equation modeling to test for the chain mediation effect to control measurement error. Variables were analyzed, and it was found that all predictor variables had variance inflation factors below 5, so there was no problem with multicollinearity. The total effect of student bullying on non-suicidal self-injury was significant (β = 0.21, SE = 0.46, t = 5.70, p = 0.000), controlling for gender and school year; secondly, two mediating variables - alexithymia and ruminative thinking - were added to the model to obtain the path model shown in Figure 2. It was found that the fitted model was good: χ/df = 3.11, RMSEA = 0.06, SRMR = 0.04, CFI = 0.97, TLI = 0.96.

Student bullying can all successively affect non-suicidal self-injury through alexithymia and rumination, but there are some differences in their internal mechanisms.

In conclusion, Table 3 shows that the total effect of mediation is significant (b = 0.54, SE = 0.35, 95%CI = [0.14, 1.49]), and the direct effect of bullying on NSSI is significant (β = 0.34, SE = 0.27, 95%CI = [0.03,1.06]). The indirect effect of alexithymia (β = 0.05, SE = 0.04, 95%CI = [0.001,0.18]) and rumination (β = 0.08, SE = 0.05, 95%CI = [0.02,0.23]) was significant. And the indirect effects of alexithymia and rumination as chain mediators were significant (β = 0.07, SE = 0.06, 95%CI = [0.02,0.21]) Figure 3.

FIGURE 1
The chain mediation model assumes a path graph.

FIGURE 2
Chain mediation model actual path graph with data.

3.4 Tests for gender differences in mediation models

The present study examined whether there was cross-sex consistency in the mediating effects of alexithymia and rumination. First, the chained mediation effect models of bullying on non-suicidal self-injury among adolescent students were tested separately for boys and girls. [22]The results showed that the fit indices for the boys' model were: χ/df = 2.60, RMSEA = 0.07, SRMR = 0.06, CFI = 0.95, TLI = 0.94; and for the girls' model were: χ/df = 1.92, RMSEA = 0.05, SRMR = 0.05, CFI = 0.97, TLI = 0.96. Overall, all the fit indices were consistent across genders. The fit indices were in the acceptable range for equal group comparisons. Subsequently, the method of multi-group comparison in structural equation modeling was used to set up the equivalent model, Model 1 (baseline model), defining that the boys' and girls' groups have the same model structure and the path coefficients are estimated freely; Model 2: restricting the corresponding path coefficients of the boys' and girls' groups to be equal based on Model 1. It was found that the fitting results of the two models were acceptable (χ/df = 2.18, RMSEA = 0.04, SRMR = 0.06, CFI = 0.96, TLI = 0.95; χ/df = 4.10, RMSEA = 0.07, SRMR = 0.07, CFI = 0.88, TLI = 0.88); moreover, the difference in fitting indices between the two models ΔCFI and ΔTLI were both greater than 0.01, which indicated significant gender differences (Jiang et al., 2023; Cheung and Rensvold, 2002; Kuo et al., 2024). With both male and female students significantly predicted by their respective chain mediators, the mediation effect value for female students (0.12) was twice as high as that for male students (0.06), suggesting that the chain mediators of rumination thinking and Alexithymia were more predictive for female students than for male students in the relationship between student bullying and non-suicidal self-injurious behaviors.

On this basis, the mediating roles and gender differences of alexithymia and rumination thinking between bullying and non-suicidal self-injury among students were examined. As shown in Table 4, both boys' and girls' chain mediation for both alexithymia and rumination thinking were significant as well (Boys:β = 0.06, SE = 0.07, 95%CI = [0.01,0.27]; Female: β = 0.12, SE = 0.21, 95%CI = [0.001,0.71]), and the paths mediated by alexithymia were non-significant; boys' rumination thinking mediated the relationship between bullying and non-suicidal self-injury as compared to girls' (β = 0.08, SE = 0.07, 95%CI = [0.01, 0.27]). Separate paths for girls' alexithymia and rumination were found to be non-significant from the data, and only the overlap of both alexithymia and rumination played a role.

4 Discussion

The present study found a two-by-two significant correlation between adolescent student bullying, alexithymia, rumination thinking, and nonsuicidal self-injury, suggesting that adolescents who students frequently bully are more likely to have alexithymia and rumination thinking and thus are more likely to engage in nonsuicidal self-injurious behaviors. Therefore, the internal mechanism of action between the variables was further examined based on the correlation analysis.
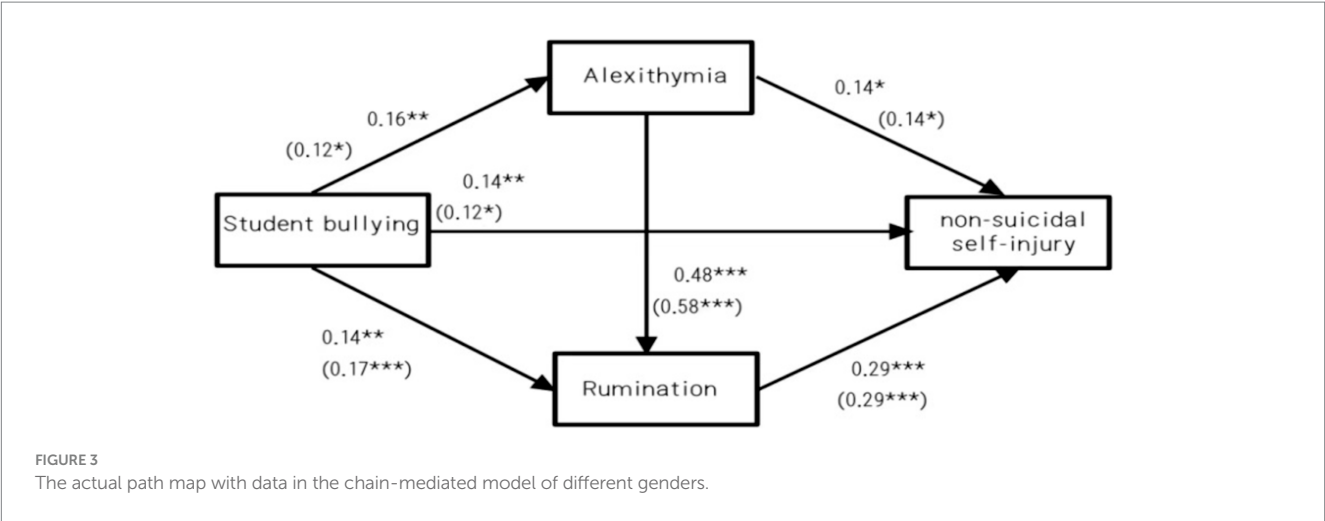
FIGURE 3
The actual path map with data in the chain-mediated model of different genders.

TABLE 3 Direct and indirect effects between latent variables.

Independent variable	Effect type	Path	SE	efficiency value	relative effect value	95% CI
Student bullying	Direct effect (β)	Student bullying→Non-suicidal self-injury	00.27	0.34	63.62%	[0.03,1.06]
	Indirect effect (β)	Student bullying→Alexithymia→Non-suicidal self-injury	00.04	0.05	80.40%	[0.001,0.18]
		Student bullying→Rumination→Non-suicidal self-injury	00.05	0.08	15.30%	[0.02,0.23]
		Student bullying→Alexithymia→Rumination→Non-suicidal self-injury	00.06	0.07	12.69%	[0.02,0.21]
	Total effect(β)		00.35	0.54	100%	[0.14, 1.49]

TABLE 4 Testing the mediating effect of male and female students.

Path	Male				Female			
	SE	efficiency value	relative effect value	95% CI	SE	efficiency value	relative effect value	95% CI
Student bullying→Alexithymia→Non-suicidal self-injury	0.07	0.04	8.49%	[−0.02,0.27]	0.21	0.05	7.75%	[−0.05,0.74]
Student bullying→Rumination→Non-suicidal self-injury	0.07	0.08	15.64%	[0.01,0.27]	0.34	0.15	21.76%	[−0.01,1.04]
Student bullying→Alexithymia→Rumination→Non-suicidal self-injury	0.07	0.06	11.58%	[0.01,0.27]	0.21	0.12	17.88%	[0.001,0.71]

4.1 Bullying and non-suicidal self-injury

The results of the data indicated that adolescent student bullying significantly and positively predicted their non-suicidal self-injurious behaviors and Hypothesis H1 was confirmed, which is also consistent with previous studies. Several scholars have found a positive correlation between student bullying and non-suicidal behavioral self-injury (Baiden et al., 2017; Jiang et al., 2016; Claes et al., 2015). Some foreign scholars conducted a 1-year observational study on middle school students and found that being bullied by peers significantly predicted individuals' non-suicidal self-injurious behavior (Jutengren et al., 2011). In addition, Moore et al. concluded that there is sufficient evidence to suggest a causal relationship between bullying and self-injury in childhood and adolescence (Moore et al., 2017). All of these studies provide a favorable basis.

In addition, the findings of this study also fit with the general stress theory and the interpersonal model. On the one hand, the general stress theory suggests that when an individual encounters

environmental stimuli or stressful events (stressors), such as being bullied, and is unable to resolve or change their behavior to adapt to the demands of the environment, a subjective feeling of being oppressed is generated in their physiological psychology under such stressful stimuli. Thus, they are likely to alleviate or relieve the feeling of being oppressed through behaviors such as non-suicidal self-injury avoidance (Van Geel et al., 2015). On the other hand, Hilt suggests that non-suicidal self-injurious behaviors are ways of negatively coping with negative interpersonal relationships or events and that individuals experience changes in their interpersonal relationships with peers around them after experiencing a negative event of bullying (Hilt et al., 2008). The last tendency is to escape from difficult situations or to attract others for help through non-suicidal self-injurious behaviors (Muehlenkamp et al., 2013).

This outcome may be due to the rapid physical development of adolescents and their relative psychological immaturity, which makes it difficult for middle school students to adopt effective coping strategies when they are confronted with student bullying as a socially stressful event that cannot be resolved over a long period (Vacca et al., 2023) When the negative emotions are not released for an extended period, students will seek extreme ways to relieve their emotions or seek help, which will gradually strengthen the behavior and form a vicious circle in the long run, thus increasing the frequency of non-suicidal self-injurious behaviors. Therefore, teachers should pay more attention to the emotional and thinking problems of adolescents whom students have bullied, find out in time, and provide effective guidance to prevent bullying from causing more severe consequences.

4.2 The mediating role of alexithymia in bullying and non-suicidal relationships

Findings suggesting that student bullying can indirectly influence adolescents' non-suicidal self-injurious behaviors through alexithymia are similar to those of Thomassin, who found that emotional expression mediates the relationship between emotional abuse and self-injurious behaviors in childhood (Thomassin et al., 2016). On the one hand, a small number of studies have investigated a positive correlation between alexithymia and bullying victimization (Önal Sönmez et al., 2020). Due to memory fragmentation and attentional lopsidedness in post-victimization individuals (Van der Kolk and Fisler, 1995), they have difficulty effectively utilizing their cognitive abilities. They have difficulty effectively utilizing their cognitive resources to process these emotional states and physiological arousal (Lischke et al., 2022). This may further exacerbate an individual's difficulty in expressing emotions by causing bullying victims to have difficulty recognizing their own emotions and thus expressing and regulating traumatic emotions (Cowie and Berdondini, 2002). The more severe the student bullying, the higher the level of alexithymia. On the other hand, the traumatic experience serves as an external unpleasant stimulus because of prolonged exposure to the bullying event. Emotions may avoid unpleasant stimuli through non-suicidal self-injurious behaviors, creating negative reinforcement associations (Liu et al., 2022). Meanwhile, empirical studies have demonstrated that alexithymia directly predicts non-suicidal self-injurious behavior (Zhang et al., 2023).

The findings also fit with the social mechanism of alexithymia, which suggests that children's exposure to certain undesirable social factors during their development, such as socially traumatic events like bullying, may cause severe damage to the individual's psyche, which in turn reduces their level of socialization. As a result, the emotional regulation ability and self-evaluation system of those who experience bullying may be impaired and exhibit non-adaptive behaviors (Wang and Zhang, 2023).

4.3 The mediating role of rumination thinking in bullying and non-suicidal relationships

This study also found that ruminative thinking indirectly influences the relationship between student bullying and adolescent non-suicidal self-injurious behaviors, allowing hypothesis H3 to be confirmed, which is similar to the findings of Qin et al. (2024). Qian Qin concluded that rumination mediates the relationship between major life events and non-suicidal self-injury. On the one hand, the results are consistent with the expectations of the Stress Response Model, which posits that rumination is a subsequent response to a stressful event. When stressful events lead to negative outcomes, individuals tend to keep thinking about these negative outcomes (Robinson and Alloy, 2003). Bullying serves as an ongoing stressor (Kampoli et al., 2017). When individuals are unable to resolve and adapt, it can lead adolescents to become trapped in the negative effects of the bullying incident that are difficult to extricate themselves from, immersing themselves in distressing emotions, i.e., falling into rumination thinking. In the absence of effective adjustment strategies for the individual, compensatory behaviors such as non-suicidal self-injury may be adopted to restore personal and environmental balance in this way (Yusin, 1974; Agnew, 1992). Meanwhile, Malamut confirmed that bullying has a positive predictive effect on rumination thinking (Malamut and Salmivalli, 2021), supporting the present study's findings.

On the other hand, the findings are consistent with the emotional cascade model, which suggests that ruminating on even small negative stimuli can exacerbate the experience of negative emotions (Selby et al., 2013). Rumination thinking manifests as a sustained focus on the negative stimulus and a repeated experience of the causes and consequences of the negative event. This persistent rumination further exacerbates negative emotions, and strong negative emotions may trigger more rumination, resulting in an emotional cascade (Selby et al., 2008). When rumination reaches a certain level where the individual is unable to cope with the psychological pain, the individual will use non-suicidal self-injury to alleviate their psychological pain (Qin et al., 2024). The following are some examples of non-suicidal self-injury. People report an increase in positive emotions in non-suicidal self-injury, which predicts more severe self-injury tendencies (Hasking et al., 2018), suggesting that non-suicidal self-injury is reinforced, making it a habitual way of coping. Meanwhile, several studies have confirmed that rumination directly predicts non-suicidal self-injury (Selby et al., 2010; Coleman et al., 2022), providing a basis for this study's findings. Thus, rumination plays a partial mediating role in student bullying and non-suicidal self-injury.

4.4 Chain mediating role of alexithymia and ruminate thinking

The present study further found that alexithymia and rumination thought chain mediated the effects of student bullying on non-suicidal self-injury, and hypothesis H4 was supported. This finding illustrates that adolescents' bullying experiences lead to individuals who are prone to difficulties in recognizing and expressing emotions and that individuals with high levels of alexithymia tend to have higher levels of rumination thinking and are ultimately more prone to non-suicidal self-injury. Specifically analyzed, student bullying leads individuals to develop high levels of alexithymia, and according to previous research, alexithymia, and rumination are two typical characteristics of depression (Taylor, 2000). The two are intrinsically congruent, and individuals with alexithymia tend to exhibit higher levels of rumination, which further diminishes their problem-solving and adaptive skills. To alleviate the resulting distress, individuals may engage in non-suicidal self-injurious behaviors.

On the one hand, goal progression theory suggests that when individuals are sensitive to unfulfilled goals, they tend to think about the emotional goals of the negative event repeatedly (Martin et al., 2003). On the one hand, Individuals with alexithymia have relatively little information to guide their behavior in emotional situations due to difficulties in identifying and expressing their own and others' emotions. As a result, they may tend to think repetitively and analytically about the emotional goals triggered by bullying incidents (Wang and Zhang, 2023), i.e., to fall into rumination thinking, accumulate negative emotions, and ultimately release pain through non-suicidal self-injury. On the other hand, emotion recognition and expression can directly affect interpersonal situations (Kornreich, 2002). Difficulty in identifying and expressing emotions is a distinctive feature of people with alexithymia, which often leads to interpersonal tension, which in turn causes them to reduce their interactions with the outside world passively. In such situations, their thoughts and attention are more focused on internal emotions, and they repeatedly think about less unpleasant targets, i.e., ruminative thinking, which increases the risk of nonsuicidal self-injurious behavior. In addition, adolescents are in a sensitive period of physical and mental development, facing their changes, schooling, and various pressures in life, when they have insufficient ability to deal with problems and frequently experience negative emotions (Stephenson, 1985; Arnett, 1999). Therefore, when faced with bullying, they have difficulty adapting, accepting, or resolving the situation, as well as expressing their emotions. They can only think about the negative results repeatedly, which leads to negative emotions, and then non-suicidal self-injurious behaviors may occur. Moreover, Liu Yuxing and other scholars pointed out that alexithymia positively predicts rumination, and showed that alexithymia and rumination mediated the chain between childhood trauma and suicidal ideation in medical students (Liu et al., 2022). Which is similar to the hypothesis of the present study. Accordingly, affective alexithymia and rumination play a chain-mediating role in the relationship between bullying and self-injurious behaviors among students.

4.5 Gender differences in the mediation model

The data results indicate that there are significant gender differences in the chain mediation model regarding the impact of bullying on non-suicidal self-injury (NSSI), thus supporting Hypothesis H5. Specifically, the predictive power of the chain mediation model for females is significantly higher than that for males. Previous studies have shown that females exhibit significantly higher levels of rumination compared to males (Nolen-Hoeksema, 1987; Bugay, 2011). In particular, in response to negative events, females are more likely than males to cope by repeatedly thinking about and focusing on the potential causes of the events. Additionally, because females generally possess higher levels of empathy and emotional understanding (Espelage and Swearer, 2004), they may struggle to escape and effectively regulate these emotions.

However, existing research has indicated that the prevalence of alexithymia is higher among males or shows no significant gender difference (Carpenter and Addis, 2001; Viinikangas et al., 2009). This finding slightly contrasts with the results of the current study. There may be several reasons for this discrepancy:

First, the variations in the selection of variables between previous studies and this research may contribute to the differing findings, as this study included the variable of rumination. Given that different variables can influence gender effects in varying ways and directions, this may lead to conclusions that diverge from those of prior research.

Second, this study examines alexithymia and rumination only in a generalized manner, without delving deeper into the individual dimensions of alexithymia and rumination.

Lastly, this study is limited by its focus on a specific population, as it only surveyed rural adolescents, and the sample size was relatively small, which may weaken its representativeness. Additionally, the research method is confined to a cross-sectional design, lacking in-depth longitudinal analysis, which could explain the discrepancies between these results and those of earlier studies.

4.6 Significance of the present study

In summary, adolescents who experience student bullying are at risk for potential individual physical, mental, and social developmental problems. Bullied individuals may be more inclined to resort to non-suicidal self-injurious behaviors due to chronic psychological stress and unreleased negative emotions. This behavior affects an individual's physical and mental health and may also negatively affect their social relationships, academic performance, and future development (Ttofi and Farrington, 2011). Student bullying is a significant impediment to an individual's normal development, as previous research has found that adolescents who are frequently bullied are more likely than those who are not to experience a range of physical, psychological, and behavioral symptoms, including headaches, stomachaches, depression, non-suicidal self-injurious behaviors, and even suicidal behaviors (Rigby, 1998; John Calvin, 2023; Claes et al., 2015; Litwiller and Brausch, 2013). Therefore, it is necessary to deepen the research on the breadth and depth of student bullying to provide theoretical guidance for preventing and intervening in the phenomenon.

Through systematic analysis and evidence-based argumentation, this paper delves into the relationship between bullying experiences and non-suicidal self-injury (NSSI), proposing a new chained mediation model featuring alexithymia and rumination. This model enhances and expands empirical research in general strain theory (GST). According to GST, when individuals encounter stressful

stimuli that they are unable to resolve or adapt to, they may experience forced subjective perceptions—such as difficulty recognizing, expressing, or regulating emotions, as well as persistent rumination on negative emotions triggered by stressful events. This intensifies the negative impact of bullying, ultimately leading individuals to maladaptive behaviors as a means to relieve the oppressive experience. By exploring the mediating roles of psychological factors such as alexithymia and rumination, this study enriches the conceptual understanding of the subjective experience of oppression, refines and extends general strain theory, and provides a new cognitive-emotional theoretical perspective and explanatory framework in this domain.

The practical significance of this study is particularly notable within the educational context. It not only aids schools and educators in gaining deeper insights into the roots, manifestations, and impacts of bullying and non-suicidal self-injury (NSSI) behaviors but also provides a scientific basis for developing and implementing effective school intervention or support programs. Through comprehensive research, schools can design more targeted prevention strategies, such as establishing anti-bullying mechanisms, conducting mental health education, and providing psychological counseling and support, thereby fostering a safe, respectful, and inclusive school environment.

4.7 Research implications

First, the study found that bullying successively affects non-suicidal self-injury through alexithymia and rumination, suggesting that socially traumatic experiences can lead to non-adaptive behaviors in bullied students, posing a threat to an individual's physical and mental health. This effect is both severe and far-reaching, so parents and schools should pay more attention to the physical and mental health of the bullied. Secondly, more mental health education courses should be introduced in schools to popularize anti-bullying knowledge and make students aware of the seriousness of bullying. At the same time, students should be guided to look at themselves correctly, cope with negative events positively, and promote the positive development of emotion regulation and cognitive attribution to enhance adaptive ability. In addition, as different genders and individuals show different ways of coping with bullying among students, we should pay attention to each individual without discrimination and provide personalized counseling according to different situations.

Furthermore, given that bullying is a negative interpersonal event, teachers should always pay attention to interpersonal interactions within the classroom and properly manage interpersonal relationships among students. Instant education should be provided to the bullies, immediate guidance should be given to the bullied, and correct guidance should be given to the bystanders. Adolescent students face multiple pressures and rapid physical and mental development. Schools can organize outdoor activities to help students relax and promote the harmonious development of interpersonal relationships. Finally, previous studies have mostly focused on common emotional problems such as depression, anxiety, and insomnia in bullied students but less on aspects such as alexithymia and rumination. Therefore, by delving into other aspects of cognitive emotions, we can gain a more comprehensive understanding of the process of bullying's impact on adolescents and provide solid theoretical support for bullying intervention.

4.8 Limitations and prospects

Although this study has yielded a series of valuable findings and has made contributions to advancing knowledge in related fields, it also recognizes several significant limitations that need to be addressed in future research endeavors.

Firstly, the study focused exclusively on rural middle school students as the research subjects, which somewhat restricts the generalizability and applicability of the findings. To provide a more comprehensive understanding of the issue, future research could consider including urban middle school students as a comparative control group. This would enrich the content and results of the study, making the conclusions more representative and persuasive.

Secondly, the study employed a cross-sectional design, which, while effective in revealing associations between variables at a single point in time, limits the exploration of the dynamic relationships among variables over time. To gain deeper insights into the intrinsic connections between variables and to confirm the reliability of the findings, future studies should adopt longitudinal tracking methods. This would involve prolonged observation and recording to uncover the changes and interrelations among variables across time.

Thirdly, the evaluation in this study was conducted by teachers, which introduces the possibility of bias, such as social desirability effects. Despite ensuring anonymity and providing training for the teachers to follow standardized procedures, the presence of teachers during the assessment may have influenced students' responses. This limitation should be considered when interpreting the findings. Future research should aim to minimize this type of bias by employing external assessors or online survey methods to enhance the accuracy and objectivity of the data.

Fourthly, this study did not include an evaluation of clinical diagnoses such as eating disorders, borderline personality disorder, or other psychiatric conditions that are known to significantly increase the risk of non-suicidal self-injury (NSSI). While efforts were made to control for certain psychological variables, the absence of detailed diagnostic data limits the ability to comprehensively interpret the findings. Future research should incorporate structured diagnostic interviews or validated clinical screening tools to better account for the influence of these psychiatric factors and provide a more nuanced understanding of the predictors of NSSI.

Lastly, while this research primarily focused on exploring chain mediation effects, which provides new insights into the relationship between bullying and self-injurious behaviors, the content of the study still requires further expansion. Future investigations could consider including moderation effects to examine how other factors influence the chain mediation process, providing more comprehensive and in-depth theoretical support for interventions targeting bullying. This would in turn help to more effectively prevent and reduce occurrences of adolescent self-injurious behaviors.

Furthermore, future research should not only deepen theoretical exploration but also actively incorporate practical intervention studies as an essential component to further enrich and enhance the research content. By designing and implementing a range of scientifically sound practical intervention measures, it could create a more positive, healthy, and uplifting learning atmosphere for adolescents, effectively promoting their physical and mental well-being. Such practical intervention research would not only validate the effectiveness and feasibility of theoretical hypotheses but also provide valuable practical

experience and reference for educators, parents, and policymakers, thus collectively contributing to the healthy growth of adolescents.

5 Conclusion

1. Bullying experiences significantly predict non-suicidal self-injurious behaviors among rural adolescents.
2. Alexithymia and rumination play a chain mediating role in the relationship between bullying and non-suicidal self-injury, forming three paths: (i) Alexithymia mediates the relationship between bullying and non-suicidal self-injury among rural adolescents; (ii) Rumination mediates the relationship between bullying and non-suicidal self-injury among rural adolescents; (iii) There is a chain effect of alexithymia and rumination in the relationship between bullying and non-suicidal self-injury.
3. There are significant gender differences in the chain mediation model between bullying and non-suicidal self-injury, with the predictive power of rumination and alexithymia as mediators being significantly greater for females than for males.

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: https://pan.baidu.com/s/1XoskIOZ-w0ZV8UpeBfiaZA?pwd=vvr9, Code: vvr9.

Ethics statement

The studies involving humans were approved by academic committee of the School of Education Sciences at Inner Mongolia Minzu University. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin. Written informed consent was obtained from the individual(s), and minor(s)' legal guardian/next of kin, for the publication of any potentially identifiable images or data included in this article.

Author contributions

JW: Data curation, Investigation, Methodology, Writing – original draft. QX: Formal analysis, Supervision, Writing – review & editing. YJ: Conceptualization, Supervision, Validation, Writing – review & editing. ML: Formal analysis, Funding acquisition, Project administration, Supervision, Validation, Writing – review & editing.

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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