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Anxiety, burnout, and stress among healthcare professionals

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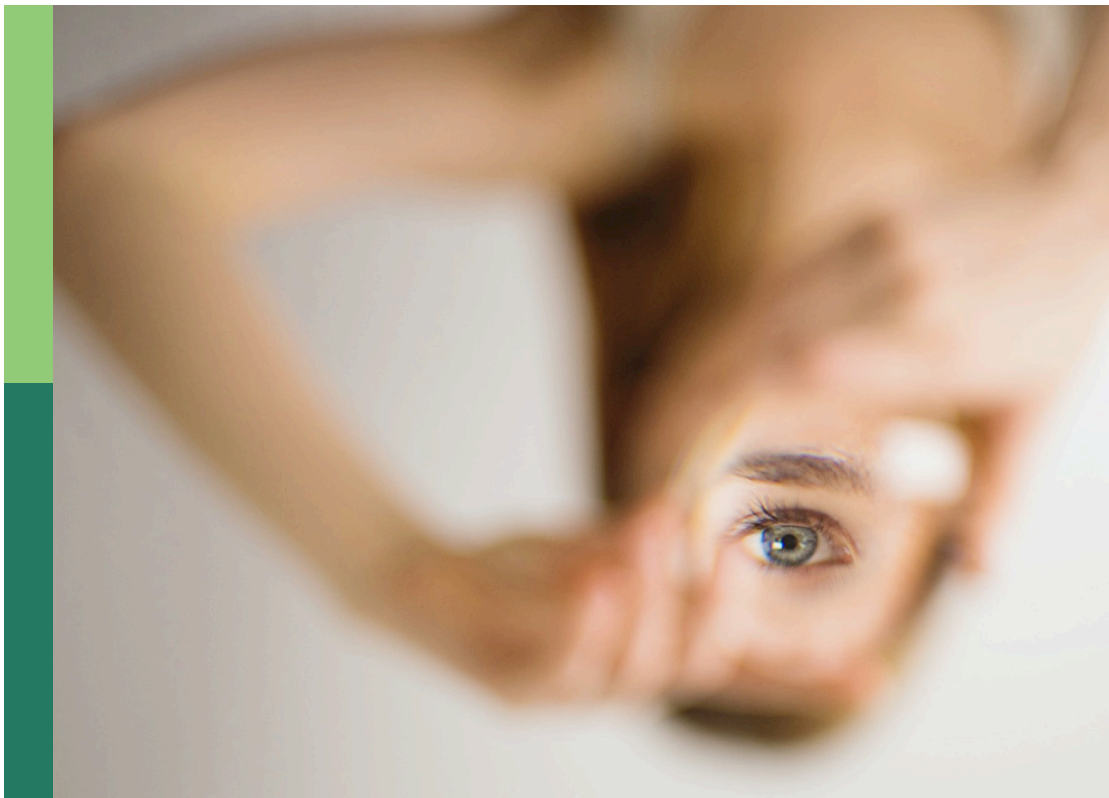

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Anxiety, burnout, and stress among healthcare professionals

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Editorial: Anxiety, burnout, and stress among healthcare professionals

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Editorial on the Research Topic
Anxiety, burnout, and stress among healthcare professionals

The technology, informatics and social fields are experiencing continuous changes and developments day by day. Such changes and developments influence human life and expand the fields of research. One of these fields is the world of work life. Work life is an area where people spend a significant part of their lives by spending time and effort. The willingness of employees to make quality use of their time and labor significantly affects the efficiency obtained as a result of their work (Burton, 2010). The nature of the work requirements and the quantity of communication with other people in the workplace create challenging situations for employees. In this context, when it comes to health in work life, health workers are seen as an important sample group in terms of researching variables in work life, since their field requires qualified labor force, is vital and is a profession that constantly involves face-to-face interaction with people. The health sector is one of the sectors where employees have the most difficulties due to various factors. The health sector differs from other working environments due to the difficulty of serving patients with severe stress and the fact that employees in this sector often face stressful situations in their daily working environment.

Stress, anxiety and burnout experienced by physicians, nurses and allied health personnel who are in direct contact with patients affect both their work performance and health status thus decreasing their quality of life. Anxiety that arises in healthcare professionals during or as a result of crisis intervention can impair their mental reasoning and abstract thinking skills, leading to a lack of attention and coordination. Various emotions such as fear and anxiety can affect problem-solving performances. Decreased problem solving ability may lead to a decrease in the effectiveness of services provided to protect the health of individuals and society and to facilitate living conditions (Çelmece and Menekay, 2020).

Anxiety in health care workers can lead to occupational injuries and illnesses; it particularly affects physical, social and psychological health negatively. Burnout is the psychological response of health workers. A significant relationship exists between anxiety and burnout syndrome and anxiety may predispose to burnout syndrome. Healthcare workers are exposed to burnout as a result of psychological and behavioral actions due to stress and pressure caused by intense communication and the nature of the work area. The state of anxiety and burnout undoubtedly carries the risk of bringing about a decrease in the functionality of healthcare workers.

In addition, inadequacies in health services and unbalanced distribution of health workers also create a sense of stress on workers. Factors such as improper working conditions, insufficient personnel, lack of medical equipment and supply problems can negatively affect the mental health of healthcare workers. Stress and exhaustion based on this working environment can lead to mental symptoms such as depression, anxiety and feelings of helplessness. In addition, physiological symptoms such as headaches, muscle tension and insomnia may also occur. Healthcare workers may experience sleep disturbances due to working in shifts and work stress, which can negatively affect their work performance. Healthcare workers are often witness to the harsh realities of life. This is especially true for those who have to witness traumatic events. Healthcare workers working in emergency departments and intensive care units are often confronted with death, suffering and emergencies. This can lead to a higher incidence of illnesses such as acute stress disorder, post-traumatic stress disorder, depression, psychosomatic disorders and substance use disorders in healthcare workers.

The health system is one of the institutions operating under the most challenging conditions, especially in epidemics or extraordinary situations such as the pandemic we have recently experienced, which affected the whole world and caused deaths. The mental health of healthcare teams, who undertake an intense social and work burden, especially during periods of extraordinary situations that affect the society socioeconomically and psychologically, is also affected by this situation. There are a large number of studies in the literature on the subject, and there are many studies that focus on the psychological risks of healthcare workers, especially in relation to epidemics, identifying high levels of anxiety, depression, stress and burnout (Cocco et al., 2002; Wong et al., 2005; Zhang et al., 2018). Moreover, there were even disparities among health workers, with health workers who were on the front lines of diagnosing, treating and caring for their patients during the COVID-19 pandemic reporting more severe symptoms of anxiety, depression and stress than those who were not on the front lines (Kang et al., 2020; Lai et al., 2020). In the early stages of an epidemiological crisis, symptoms such as anxiety and fear increase immediately, but decrease rapidly in the later stages, while depression and post-traumatic stress symptoms persist over time (Wu et al., 2009). Cai et al. (2020) surveyed 534 doctors, nurses and primary care providers in Hubei province and concluded that the stress levels of healthcare workers were extremely high during the COVID-19 pandemic. Another study conducted in Turkey found that 38% of nurses working in emergency services experienced stress. According to the same study, it was revealed that nurses who experienced stress regretted their choice of profession and considered quitting or leaving their jobs (Yasal and Partlak, 2019).

In light of this information, some precautions should be taken for healthier health workers and thus better health care services, where the risk of error is minimized and care is better. More healthcare workers can be employed in institutions to reduce the pressure and workload. During the pandemic, one of the most challenging issue was access to appropriate protective equipment. Personal protective equipment can be provided for health professionals. Working hours can be rescheduled by planning the rest needs of healthcare professionals and creating working and resting environments that will ensure that the risk of infection as well as other risk factors arising from lack of sleep and fatigue are controlled.

In conclusion, some steps that may be taken to resolve this issue are likely to have a positive impact on public health. Healthcare institutions should prioritize the psychological health of their employees and create a supportive working environment. Institutional policies should include measures such as a less stressful working environment, supportive services for managing employees' workloads and flexibility for work balance, and they can provide regular mental health trainings for health workers. These trainings can provide the necessary tools to overcome work stress, prevent burnout and maintain psychological health. Establishing support groups for health workers can empower workers to interact with each other, share work stress and receive support.

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References

Burton, S. (2010). *WHO Healthy Workplace Framework and Model: Background and Supporting Literature and Practice*. Geneva: Word Health Organizations.

Cai, B., Tu, J., Ma, L., Chen, L., Fu, Y., Jiang, Q., et al. (2020). Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID19) in Hubei. *Med. Sci. Monit.* 26, e924171. doi: 10.12659/MSM.924171

Çelmece, N., and Menekay, M. (2020). The effect of stress, anxiety and burnout levels of healthcare professionals caring for COVID-19 patients on their quality of life. *Front Psychol.* 23, 597624. doi: 10.3389/fpsyg.2020.597624

Cocco, E., Gatti, M., Lima, C. A. D. M., and Camus, V. A. (2002). Comparative study of stress and burnout among staff caregivers in nursing homes and acute geriatric wards. *Int. J. Geriatr. Psychiat.* 18, 78–85. doi: 10.1002/gps.800

Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., et al. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. *Brain Behav. Immun.* 87, 11–17. doi: 10.1016/j.bbi.2020.03.028

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., et al. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw. Open* 3, e203976. doi: 10.1001/jamanetworkopen.2020.3976

Wong, T. W., Yau, J. K., Chan, C. L., Kwong, R. S., Ho, S. M., Lau, C., et al. (2005). The psychological impact of severe acute respiratory syndrome outbreak on healthcare workers in emergency departments and how they cope. *Eur. J. Emerg. Med.* 12, 13–18. doi: 10.1097/00063110-200502000-00005

Wu, P., Fang, Y., and Guan, Z. (2009). The psychological impact of the SARS epidemic on hospital employees in china: exposure, risk perception, and altruistic acceptance of risk. *Can. J. Psychiatry.* 54, 302–311. doi: 10.1177/070674370905400504

Yasal, D., and Partlak, N. G. (2019). *Trauma stress of nurses working in emergency department investigation of factors affecting symptoms and coping ways of nurses*. Nine September University Faculty Nurse Electronic Journal 12, 74–81.

Zhang, Y. Y., Han, W. L., Qin, W., Yin, H. X., Zhang, C. F., Kong, C., et al. (2018). Extent of compassion satisfaction, compassion fatigue and burnout in nursing: a meta-analysis. *J. Nurs. Manag.* 26, 810–819. doi: 10.1111/jonm.12589

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Job security among healthcare workers in Guangdong, China

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Objective: The objective of this study was to explore the sense of job security and its influencing factors among healthcare workers in Guangdong, China.

Methods: This cross-sectional study used stratified random sampling to enroll healthcare workers employed by hospitals across Guangdong province between September 2020 and October 2020.

Results: A total of 4,173 questionnaires were distributed, and 4,076 were returned for an effective recovery rate of 97.68%. The overall score for the sense of security was 64.85 ± 20.09, and the item means score was 2.95 ± 0.91. Multiple-linear regression analysis showed that work experience (years), education level, job position, specialty unit, employment type, marital status, job satisfaction, WPV frequency, daily sleep duration, weekly overtime hours, average monthly earnings (RMB), hospital level, and region were significantly associated with senses of poor security among healthcare workers (all $P < 0.05$).

Conclusions: Hospital workers in Guangdong reported relatively low levels of job security. Levels of job security were significantly associated with multiple factors which could be addressed by hospital practices to improve the sense of job security among healthcare workers.

KEYWORDS

healthcare workers, job security, current situation, influencing factors, a cross-sectional study

1. Introduction

Safety is the most basic physiological need of human beings (1), and lack of job security not only affects job satisfaction, but also leads to the lack of job safety and quality (2). Poor doctor-patient relationships are a significant concern for healthcare workers in China (3, 4). Approximately two-thirds of physicians have reported disputes or doctor-patient conflicts which threatened their physical safety (5). A recent article published in the Lancet examining the safety of healthcare workers in China concluded that medical workers in China have a very low sense of security (6).

The recent coronavirus pandemic only made safety concerns among hospital workers in China more apparent (7). A Chinese report on workplace violence in hospitals showed that 100% of nurses expressed lack of job security (8). An American study reports that 34.4% of medical workers experienced physical violence within 12 months, and 13.5% suffered physical attacks (9). Among those who suffered verbal or physical violence, 9.4% did not want to continue working in the medical industry.

As the above data indicate, job security is an important factor which influences the retention of nurses (10). Yan et al. (11) found that there is a relationship between job

insecurity, quality of life and turnover intention whereby reduced job insecurity was associated with a lower quality of life and higher turnover intention. A cross-sectional survey which included 403 medical staff members as research objects found that job insecurity was an important predictor of job burnout (12). Similarly, a Chinese study that included 453 nurses found that occupational stress was inversely correlated with psychological security (13). Moreover, over two-thirds of doctors in China report symptoms of burnout in a recent systematic review (14).

Workplace Violence (WPV) is defined by the International Labor Organization (ILO) as the assault of threat of assault to a staff member in a work-related environment that threatens their safety, wellbeing or health (15, 16). The domestic incidence rate of WPV among medical workers in China is 61.9% (17, 18). Further, 68.6% of the healthcare workers in pediatrics in China have experienced WPV at least once over the course of a year (19). Related studies have shown that WPV harms individual mental health and job performance (20) and that anxiety among healthcare workers increased significantly after experiencing WPV (21, 22).

Pienaar's Job Insecurity Scale (JIS-8) is commonly used abroad, and includes two dimensions: emotional job insecurity and cognitive job insecurity (23). However, the reliability and validity of Pienaar's job insecurity scale (JIS-8) has not been verified among workers in China or among healthcare workers. Cong et al. (24) compiled a job security scale for workers in China that includes the dimensions of sense of control and interpersonal security. However, this scale does not take into consideration the professional characteristics of medical staff.

In order to better study job security among healthcare workers in China, a scale was adopted in this study, which was compiled through qualitative and quantitative research on the experience of safety by medical staff (25). This scale better reflects the professional characteristics of the medical staff as compared to currently available surveys. Using this scale, this study examined perceptions of job security among healthcare workers in hospitals of Guangdong province and used these data to identify factors which may influence job security in this population.

2. Methods

2.1. Study design and populations

This cross-sectional study used stratified random sampling to enroll healthcare workers from hospitals in Guangdong Province between September 2020 and October 2020. This study was conducted stratified random sampling on three groups of hospitals, primary, secondary and tertiary, as classified by the Chinese government. The June 2018 list of general hospitals published by the Commission of Health and Family Planning was used to obtain the names and contact information for 204 primary, 224 secondary, and 76 tertiary hospitals in Guangdong. Hospitals from each of the four regions were included and the sampling ratio of primary hospitals: secondary hospitals: tertiary hospitals was determined to be about 2:1:1. According to health statistics published by the Guangdong Health Commission in 2019, there were 292,128 licensed physicians, 356,784 registered nurses, 43,374 pharmacists and 37,175 technicians working in hospitals in Guangdong in 2019. The sampling ratio of doctors: nurses: pharmacists: technicians, was about 4:8:1:1.

The inclusion criteria were as follows: (1) Age over 18 years; (2) Medical personnel working in clinical posts (doctors, nurses, pharmacists and technicians); (3) Without cognitive dysfunction; (4) Voluntary participation in the survey. Interns, trainees, and employees studying abroad or who were otherwise absent during the study period were excluded. This study was approved by the Guangdong Provincial People's Hospital Ethic Committee (2019236H).

2.2. Instruments and procedure

Staff were administered a questionnaire that included items on gender, age (years), work experience (years), education level, job position, specialty unit, professional title, employment type, marital status, job satisfaction, WPV frequency, daily sleep duration, weekly overtime hour, average monthly earnings (RMB), hospital level and region within the province.

The sense of job security scale (25) included 22 items across five dimensions: patients, self, organizational management, social support and environment. A Likert 5-level scoring method was used, and each item was given a score on a discrete scale from 1 to 5. A score of 1 was given if the participant very strongly agreed with that item and a score of 5 was given if the participant very strongly disagreed with that item. The total score ranged from 22 to 110, with score $\geq$ 44 indicating a high level of job security, while score $<$ 44 indicating a low level of job security. The total Cronbach's alpha coefficient was 0.939, the split-half reliability was 0.96, and the test-retest reliability was 0.967, indicating good internal consistency.

The questionnaire service (https://www.wenjuan.com) was used to administer each survey. Before beginning the survey, each participant was introduced to the software interface and the purpose of this survey and gave written informed consent. In order to avoid repeat submissions, a single account, device and IP address can only be used once to take the questionnaire. The questionnaire service was used to export the data, and the data was manually screened and reviewed by two independent evaluators.

2.3. Statistical analysis

According to Kendall's empirical estimation method, the sample size N should be 5–10 times of the number of independent variables (26). The number of independent variables in the subject was 22, indicating that the maximum required sample size according to this method is 220. Reasonably, up to 20% of the questionnaires could be invalid, so a sample size of at least 275 was used.

SPSS version 23.0 (IBM, Armonk, NY, USA) was used for statistical analysis. Continuous variables were described as mean $\pm$ SD or median values with interquartile range depending on normality of the variables. Categorical variables were presented

as percentages. Comparisons for continuous data were performed using Student t-test or Mann-Whitney U test. Categorical variables were compared using the chi-square test or Fisher exact test. A Multiple linear regression model was used to analyze the factors influencing healthcare workers security. All analyses were two-sided, and P-values < 0.05 were considered statistically significant.

3. Results

A total of 29 hospitals participated in this study, including 14 tertiary hospitals, 8 secondary hospitals, and 7 primary hospitals. A total of 4,173 questionnaires were distributed, among which 97 were invalid and excluded (55 working for <1 year, 35 administrative and logistics staff, and 7 refused to participate), and 4,076 were finally recovered for an effective recovery rate of 97.68%. Among the 4,076 doctors, nurses, pharmacists and technicians that completed the survey, 231 (5.7%) worked in primary hospitals, 1,462 (35.9%) in secondary hospitals and 2,383 (58.5%) in tertiary hospitals (Table 1). A total of 2,426 (59.5%) staff worked in the Pearl River Delta, 377 (9.2%) in eastern Guangdong, 703 (17.2%) in western Guangdong and 570 (14.0%) in northern Guangdong. There were 1,484 males (36.4%) and 2,592 females (63.6%), with a mean age of 32.46 ± 9.06 years old. The average duration of employment was 10.75 ± 8.4 years. There were 2,238 (54.9%) nurses, 1,019 (25.0%) doctors, 438 (10.7%) pharmacists, and 381 (9.3%) technicians.

The scores from each different dimension, self, organizational management, patient, social support, and environment, are shown in Table 2. Gender, work experience (years), education level, job position, specialty unit, employment type, marital status, job satisfaction, WPV frequency, daily sleep duration, weekly overtime hour, average monthly earnings (RMB), hospital level and region were all significantly correlated to job security (all $P < 0.05$) (Table 1). Between these variables, the tolerance limit was 0.1 or higher, ranging from 0.53 to 0.96. The variance inflation factor (VIF) ranged from 1.04 to 1.89, which was below the reference value of 3. Therefore, there was no multicollinearity among the independent variables. Multiple linear regression analysis showed that work experience (years), education level, job position, specialty unit, employment type, marital status, job satisfaction, WPV frequency, daily sleep duration, weekly overtime hours, average monthly earnings (RMB), hospital level, and region are significantly and independently associated with job security among healthcare workers (all $P < 0.05$) (Table 3).

4. Discussion

This study showed that these hospital workers perceived their workplace as relatively unsafe. Multiple-linear regression analysis showed that work experience (years), education level, job position, specialty unit, employment type, marital status, job satisfaction, WPV frequency, daily sleep duration, weekly overtime hours, average monthly earnings (RMB), hospital level, and region were significantly associated with feelings of poor safety and security among healthcare workers. This data may provide a reference for hospital managers to formulate policies that improve workplace safety.

Prior research demonstrates that effective team leadership is an essential factors for the team atmosphere (27). Therefore, the department directors and the head nurses can play a critical role in building feelings of job security among staff members.

Surprisingly, inexperience, as demonstrated by fewer years on the job, was associated with relatively high feelings of job security, a finding which was inconsistent with some reports (28). This discrepancy may be due to the relationship between age and career development. Older workers are more likely to have greater work experience and higher levels of education which can increase job security, but they are also more likely to experience sleep disturbances which negatively impact performance and job satisfaction. This is supported by the finding that sleep duration was inversely related to job security in this study.

In Guangdong, the State Council's regulation states the working week is 8 h a day for 40 h a week and any work exceeding these house is overtime work. In this study, over half of those surveyed worked 5 h of overtime a week. Previous studies showed that 61.2% of healthcare workers worked 5 h of overtime per week (29), while survey results of healthcare workers in Lanzhou show a rate more comparable to this study's 50% rate (30). According to the White Paper on the Occupational Status of Chinese doctors published in 2018, doctors in tertiary hospitals in China work an average of 51.5 h per week (5). Moreover, almost 60% of the healthcare workers in Ningbo Grade A hospitals work more than 8 h a day, 12.4% more than 10 h a day, and 4.8% more than 12 h a day (31). Overwork is more likely to cause errors or medical disputes, and thus weaken the sense of job security of healthcare workers (32).

Furthermore, this study found that employment at primary hospitals was associated with worse job security as compared with secondary and tertiary hospitals. In China, primary hospital are local community hospitals with fewer resources than the larger more specialized secondary and tertiary hospitals (33). The public and government officials generally equate patient volumes with the quality of care and as such large patient volumes have become a prerequisite to aquiring funding for high-quality training and research (34). Career development opportunities such as those offered by tertirary hospitals have been shown to be associated with greater levels of job security among hospital workers (35).

More than half of the healthcare workers in this survey experienced WPV during the yearlong study period. This suggests that medical departments need WPV training, and the hospital should strengthen personal safety protection measures among healthcare workers (36), especially in the department of surgery. Furthermore, the department in which a healthcare worker was employed was significantly associated with job security. This indicates that healthcare workers in high-risk departments, such as the emergency and critical care and obstetrics and gynecology departments, need more supports than other lower risk departments such as dermatology.

Additionally, home and environmental factors were shown to have a significant association with job security in this study. Married healthcare workers and those with higher incomes had greater levels job security on average than

TABLE 1 General information on medical personnel ($n = 4076$).

Item		Subjects (n, %)	Scores (mean ± SD)	P
Gender	Male	1,484 (36.4)	63.99 ± 19.89	0.039
	Female	2,592 (63.6)	65.34 ± 20.19	
Age (years)	≤25	984 (24.1)	64.48 ± 20.62	0.180
	26-	1,831 (44.9)	64.61 ± 20.08	
	36-	871 (21.4)	64.84 ± 19.92	
	≥46	390 (9.6)	66.96 ± 19.07	
Work experience (years)	≤5	1,376 (33.8)	64.58 ± 20.05	0.004
	6-	1,172 (28.8)	64.21 ± 19.92	
	11-	882 (21.6)	64.21 ± 20.71	
	≥21	646 (15.8)	67.48 ± 19.45	
Education level	Junior college or below	1781 (43.7)	63.86 ± 20.34	<0.001
	Bachelor's degree	1,363 (33.4)	64.65 ± 19.57	
	Master's degree or above	943 (22.9)	67.04 ± 20.21	
Job position	Doctor	1,019 (25.0)	64.87 ± 19.45	<0.001
	Nurse	2,238 (54.9)	62.83 ± 21.18	
	Pharmacist	438 (10.7)	70.45 ± 16.28	
	Technologist	381 (9.3)	70.23 ± 16.68	
Specialty unit	Intensive Care Unit	228 (5.6)	61.22 ± 18.15	<0.001
	Medical	1,087 (26.7)	63.52 ± 20.61	
	Surgical	698 (17.1)	63.53 ± 20.91	
	Maternity	221 (5.4)	61.16 ± 19.98	
	Pediatric	136 (3.3)	61.15 ± 18.58	
	Outpatient/emergency department	448 (11.0)	65.13 ± 21.95	
	Assistant department	1,098 (26.9)	69.14 ± 17.71	
	Other	160 (3.9)	62.89 ± 22.15	
Professional title	Primary	2,465 (60.5)	64.46 ± 19.82	0.060
	Middle	1,214 (29.8)	64.94 ± 20.83	
	Advanced	397 (9.7)	67.03 ± 19.37	
Employment type	Contract employee	2,369 (58.1)	62.81 ± 19.94	<0.001
	Permanent employee	1,632 (40.0)	67.81 ± 19.83	
	Personnel agency employee	75 (1.8)	64.95 ± 22.60	
Marital status	Married	2,655 (65.1)	67.63 ± 18.40	<0.001
	Single	1,339 (32.9)	59.78 ± 21.67	
	Divorced/separated	82 (2.0)	57.74 ± 27.04	
Job satisfaction	Yes	1,198 (29.4)	73.35 ± 20.97	<0.001
	No	2,878 (70.6)	61.31 ± 18.60	
WPV frequency	No	1,865 (45.8)	69.62 ± 21.20	<0.001
	≤3 times	1,710 (42.0)	61.45 ± 18.52	
	3 times<F≤6 times	256 (6.3)	58.93 ± 17.08	
	>6 times	245 (6.0)	58.55 ± 16.40	
Daily sleep duration	≤6 h	963 (23.6)	58.50 ± 18.61	<0.001
	6 h<T≤7 h	2,205 (54.1)	65.02 ± 19.12	

(Continued)

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TABLE 1 (Continued)

Item		Subjects (*n*, %)	Scores (mean ± SD)	*P*
	7 h<T≤8 h	745 (18.3)	70.82 ± 21.01	
	>8 h	163 (4.0)	72.77 ± 25.06	
Weekly overtime hours	≤5 h	2,175 (53.4)	67.25 ± 20.64	<0.001
	5 h<T≤10 h	1,332 (32.7)	63.38 ± 18.89	
	10 h<T≤15 h	317 (7.8)	60.80 ± 19.42	
	T>15 h	252 (6.2)	57.03 ± 18.78	
Average monthly earnings (RMB)	≤5000	1,182 (29.0)	62.79 ± 21.45	<0.001
	5001-	1,927 (47.3)	65.01 ± 19.80	
	10001-	847 (20.8)	66.40 ± 18.82	
	≥20001	120 (2.9)	71.80 ± 16.73	
Hospital level	Primary hospital	231 (5.7)	58.37 ± 19.98	<0.001
	Secondary hospital	1,462 (35.9)	64.16 ± 19.96	
	Tertiary hospital	2,383 (58.5)	65.91 ± 20.05	
Region	Pearl River Delta	2,426 (59.5)	63.72 ± 19.57	<0.001
	Eastern	377 (9.2)	60.83 ± 19.98	
	Western	703 (17.2)	68.19 ± 22.28	
	Northern	570 (14.0)	68.19 ± 18.45	

TABLE 2 Job security scores across each dimension ($n = 4076$).

Dimension	Score ranges	Total points	Points Normalized by Entries	Rank	Average Score, %
Self	3–15	9.30 ± 3.13	3.10 ± 1.04	1	62.00
Organizational management	7–35	21.37 ± 7.41	3.05 ± 1.06	2	61.06
Patients	4–20	11.80 ± 4.45	2.95 ± 1.11	3	59.00
Social support	4–20	11.55 ± 5.60	2.75 ± 0.89	4	57.75
Environment	4–20	10.83 ± 4.02	2.71 ± 1.00	5	54.15
Total score	22–110	64.85 ± 20.09	2.95 ± 0.91		58.95

workers who were divorced or who had lower incomes. This confirms that marriage and family life can have a strong stabilizing influence on healthcare workers' lives and outlook (37). Since higher incomes are needed to support families, it follows that higher incomes were also associated with greater job security.

The survey results show that contract workers account for almost 6 in 10 workers, indicating that most of the healthcare workers in this survey belong to the contract system. Although the public hospitals claim to follow a policy of equal pay for equal work, contract staff have reduced benefits, fewer sick days, and higher stress (38). Hospitals in eastern Guangdong were ranked the lowest in this study, while those in northern Guangdong were ranked highest. These differences may be related to the economic development of each region, suggesting that hospital managers should adopt localized strategies.

This study had some limitations. This was a survey-based research study that captured the attitudes of medical workers toward their sense of job security in the workplace at a single point in time. As such, it is unknown if the trends observed in this study persist throughout the year or over time. Guangdong has a rapidly growing economy, and as such conditions may change rapidly that can improve the sense of job security among workers. Additional research should be carried out to understand the dynamic factors that influence the sense of job security among hospital workers and identify which strategies most improve the job security of healthcare workers.

5. Practice implication

Department managers should focus on the department construction. Efforts to build department unity and enhance collaboration may improve the mental health of healthcare workers and foster a sense of job security. Hosptials should equip key departments with one-button alarm devices and increase the intensity of security in high risk areas (39). Additionally, social support is key to mental health and worker wellbeing and should be a focus of hospital remediation efforts to mitigate the effects of unavoidable WPV (40).

TABLE 3 Multiple linear regression analysis of influencing factors of healthcare workers security ($n = 4076$).

Variables	Regression coefficient	95% *CI*	Standard error	Standardized regression coefficient	*P*
(Constant)	83.264	(78.781, 87.746)	2.286	–	<0.001
Gender					
Male (ref)	–	–	–	–	–
Female	−0.382	(−1.666, 0.902)	0.655	−0.009	0.056
Work experience (years)					
≤5 (ref)	–	–	–	–	–
6–	−3.383	(−4.871, −4.871)	0.759	−0.976	<0.001
11–	−6.121	(−7.875, −4.367)	0.895	−0.125	<0.001
≥21	−7.762	(−9.827, −5.696)	1.954	−0.141	<0.001
Education level					
Junior college or below (ref)	–	–	–	–	–
Bachelor's degree	−0.794	(−2.266, 0.678)	0.751	−0.019	0.029
Master's degree or above	4.779	(0.678, 7.876)	1.580	0.100	3.026
Job position					
Nurse (ref)	–	–	–	–	–
Doctor	−3.691	(−6.6, −0.783)	1.484	−0.080	0.013
Pharmacist	5.552	(2.665, 8.438)	1.472	0.086	<0.001
Technologist	6.814	(8.438, 9.74)	1.493	0.099	<0.001
Specialty unit					
Outpatient/emergency (ref)					
ICU	−5.180	(−8.111, −2.248)	1.495	−0.059	0.001
Medical	−0.974	(−3.027, −3.027)	1.047	−0.021	0.352
Surgical	−0.974	(−3.171, 1.222)	1.121	−0.018	0.385
Maternity	−1.828	(−4.789, 1.133)	1.510	−0.021	0.226
Pediatric	−3.510	(−7.011, −−0.008)	1.786	−0.031	0.049
Assistant department	−1.729	(−0.008, 1.010)	1.397	−0.038	0.216
Other	−3.270	(−6.546, 0.006)	1.671	−0.032	0.050
Employment type					
Permanent employee	–	–	–	–	–
Contract employee	−4.703	(−6.049, −3.357)	0.687	−0.116	<0.001
Personnel agency employee	−4.189	(−8.415, 0.037)	2.156	−0.028	0.052
Marital status					
Married (ref)	–	–	–	–	–
Single	6.975	(5.717, 8.233)	0.642	0.165	<0.001
Divorced/separated	−3.189	(−7.183, 0.805)	2.037	−0.022	0.118
Job satisfaction					
Yes (ref)	–	–	–	–	–
No	−9.322	(−10.648, −7.997)	0.676	−0.211	<0.001
WPV frequency					
No (ref)	–	–	–	–	–
≤ 3 times	−6.120	(−7.33, −4.91)	0.617	−0.150	<0.001

(Continued)

TABLE 3 (Continued)

Variables	Regression coefficient	95% *CI*	Standard error	Standardized regression coefficient	*P*
3 times < F≤ 6 times	−7.497	(−9.884, −5.11)	1.218	−0.091	<0.001
> 6 times	−8.550	(−11.005, −6.094)	1.252	−0.101	<0.001
Daily sleep duration					
≤ 6 h (ref)	–	–	–	–	–
6 h < T ≤ 7 h	−13.388	(−16.371, −10.405)	1.522	−0.283	<0.001
7 h < T ≤ 8 h	−9.187	(−12.054, −6.321)	1.462	−0.228	<0.001
> 8 h	−5.375	(−8.429, −2.322)	1.557	−0.103	<0.001
Weekly overtime hour					
≤ 5 h (ref)	–	–	–	–	–
5 h < T≤ 10 h	−2.394	(−3.64, −3.64)	0.635	−0.056	<0.001
10 h < T ≤ 15 h	−4.487	(−6.643, −2.330)	1.100	−0.060	<0.001
T > 15 h	−7.429	(−9.851, −5.007)	1.235	−0.089	<0.001
Average monthly earnings (RMB)					
≤ 5000 (ref)	–	–	–	–	–
5001–	0.141	(−1.316, 1.598)	0.743	0.004	0.849
10001–	0.185	(−1.829, 2.199)	1.027	0.004	0.857
≥ 20001	4.748	(0.955, 8.541)	1.935	0.040	0.014
Hospital level					
Primary hospital (ref)	–	–	–	–	–
Secondary hospital	4.908	(2.284, 7.532)	1.338	0.117	<0.001
Tertiary hospital	5.074	(2.299, 7.849)	1.415	0.124	<0.001
Region					
Pearl River Delta (ref)	–	–	–	–	–
Eastern	−2.888	(−4.968, −0.808)	1.061	−0.042	0.007
Western	0.615	(−1.099, 2.329)	0.874	0.012	0.482
Northern	0.779	(−0.973, 2.53)	0.893	0.013	0.384

6. Conclusions

In conclusion, the total job security score for healthcare workers in this study was relatively low. Education level, employment duration, job satisfaction, the frequency of WPV, daily sleep duration, overtime hours, professional category, departments, employment type, marital status, and locality of employment were significantly associated with feelings of poor safety and security among healthcare workers. A multi-center study with larger sample size is needed in future to make further conclusions about these results.

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.

Ethics statement

The studies involving human participants were reviewed and approved by the Guangdong Provincial People's Hospital Ethics Committee. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

LM and HH conceived and designed the study. SW, QZ, ZB, and XY collected the data. WL did the statistical analysis and produced the tables and figures. QH wrote the initial draft. All authors subsequently

critically edited the report, read, and approved the final edition.

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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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References

1. Maslow AH. A theory of human motivation. *Psychol Rev.* (1943) 1:370–96. doi: 10.1037/h0054346

2. Bakr RH, Jarrar MK, Abumadini MS, Al SA, Larbi EB. Effect of leadership support, work conditions and job security on job satisfaction in a medical college. *Saudi J Med Med Sci.* (2019) 7:100–5. doi: 10.4103/sjmms.sjmms_105_17

3. Deng J, Guo Y, Ma T, Yang T, Tian X. How job stress influences job performance among Chinese healthcare workers: a cross-sectional study. *Environ Health Prev Med.* (2019) 24:2. doi: 10.1186/s12199-018-0758-4

4. Zhang X, Li Y, Yang C, Jiang G. Trends in workplace violence involving health care professionals in china from 2000 to 2020: a review. *Med Sci Monit.* (2021) 27:e928393. doi: 10.12659/MSM.928393

5. Chinese Medical Doctor Association. *White Paper on Physician Practice in China.* (2018). Available online at: http://www.cmda.net/rdxw2/11526.jhtml (accessed March 15, 2021).

6. Sun S, Wang W. Violence against Chinese health-care workers. *Lancet.* (2011) 9742:657. doi: 10.1016/S0140-6736(11)60733-2

7. Cheung JC, Ho LT, Cheng JV, Cham E, Lam KN. Staff safety during emergency airway management for COVID-19 in Hong Kong. *Lancet Respir Med.* (2020) 8:e19. doi: 10.1016/S2213-2600(20)30084-9

8. Jing X. Analysis of the status quo of violence in the hospital outpatient workplace and its impact on the mental health of nurses. *Manage Health Serv China.* (2018) 3535:504–6.

9. Rosenthal LJ, Byerly A, Taylor AD, Martinovich Z. Impact and prevalence of physical and verbal violence toward healthcare workers. *Psychosomatics.* (2018) 59:584–90. doi: 10.1016/j.psym.2018.04.007

10. Wu LT, Low MM, Tan KK, Lopez V, Liaw SY. Why not nursing? A systematic review of factors influencing career choice among healthcare students. *Int Nurs Rev.* (2015) 62:547–62. doi: 10.1111/inr.12220

11. Xu Yan Y, Yang L, Zhang Y, Yang X. Study on the relationship between job insecurity, work life quality and turnover intention of nurses. *PLA Nursing J.* (2017) 34:23–6.

12. Biksegn A, Kenfe T, Matiwos S, Eshetu G. Burnout status at work among health care professionals in a tertiary hospital. *Ethiop J Health Sci.* (2016) 26:101–8. doi: 10.4314/ejhs.v26i2.3

13. Wang Jiao L, Zhang Y, Zeng L, Wang Q, Wang Y, et al. Occupational stress and psychological security of clinical nurses in Changsha City and its correlation. *Occupation and Health.* (2016) 32:1623–8.

14. Lo D, Wu F, Chan M, Chu R, Li D. A systematic review of burnout among doctors in China: a cultural perspective. *Asia Pac Fam Med.* (2018) 17:3. doi: 10.1186/s12930-018-0040-3

15. ISBN. *Framework Guidelines for Addressing Workplace Violence in the Health Sector*. Geneva, Switzerland Ilo. (2002).

16. Ramzi ZS, Fatah PW, Dalvandi A. Prevalence of workplace violence against healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Front Psychol.* (2022) 13:896156. doi: 10.3389/fpsyg.2022.896156

17. Liu J, Gan Y, Jiang H, et al. Prevalence of workplace violence against healthcare workers: a systematic review and meta-analysis. *Occup Environ Med.* (2019) 76:927–37. doi: 10.1136/oemed-2019-105849

18. Li Z, Yan CM, Shi L, Mu HT Li X, Li AQ, et al. Workplace violence against medical staff of Chinese children's hospitals: a cross-sectional study. *PLoS ONE.* (2017) 12:e179373. doi: 10.1371/journal.pone.0179373

19. Zhao S, Xie F, Wang J, Shi Y, Zhang S, Han X, et al. Prevalence of workplace violence against chinese nurses and its association with mental health: a cross-sectional survey. *Arch Psychiat Nurs.* (2018) 32:242–7. doi: 10.1016/j.apnu.2017.11.009

20. Nyberg A, Kecklund G, Hanson LM, Rajaleid K. Workplace violence and health in human service industries: a systematic review of prospective and longitudinal studies. *Occup Environ Med.* (2021) 78:69–81. doi: 10.1136/oemed-2020-106450

21. Zhang L, Wang A, Xie X, Zhou Y, Li J, Yang L, et al. Workplace violence against nurses: a cross-sectional study. *Int J Nurs Stud.* (2017) 72:8–14. doi: 10.1016/j.ijnurstu.2017.04.002

22. Cheung T, Yip PS. Workplace violence towards nurses in Hong Kong: prevalence and correlates. *BMC Public Health.* (2017) 17:196. doi: 10.1186/s12889-017-4112-3

23. Pienaar J, De Witte H, Hellgren J, Sverke M. The cognitive/affective distinction of job insecurity: validation and differential relations. *Southern Afr Bus Rev.* (2013) 17:1–22.

24. Cong Zhong, An Lijuan. Preliminary preparation and reliability and validity test of security scale. *Chinese J Mental Health*. (2004) 18: 97–9.

25. Ba Zhiqiong H, Zhan Q, Yu X, Li W, Huang H. Establishment and reliability and validity test of medical staff Security scale Chinese. *Occupational Med.* (2021) 48:379–85.

26. Kelley K, Bilson DF, Chattopadhyay B. Sequential accuracy in parameter estimation for population correlation coefficients. *Psychol Methods.* (2019) 24:492–515. doi: 10.1037/met0000203

27. Salas-Vallina A AJLÁ. The challenge of increasing employees' well-being and performance: how human resource management practices and engaging leadership work together toward reaching this goal. *Hum Resour Manage-Us.* (2021) 3:333–47. doi: 10.1002/hrm.22021

28. Yu X, Zhao Y, Li Y, Hu C, Xu H, Zhao X, et al. Factors associated with job satisfaction of frontline medical staff fighting against COVID-19: a Cross-Sectional study in china. *Front Public Health.* (2020) 8:426. doi: 10.3389/fpubh.2020.00426

29. Lu Y, Hu XM, Huang XL, Zhuang XD, Guo P, Feng LF, et al. Job satisfaction and associated factors among healthcare staff: A cross-sectional study in Guangdong Province, China. *BMJ Open.* (2016) 6:e11388. doi: 10.1136/bmjopen-2016-011388

30. Jiang L. *Study on the correlation between shift and working hours and sleep quality of medical staff in Class A hospitals.[master's thesis]*. Lanzhou: University of Lanzhou (2020).

31. Zhou Jiangjin X, Guo A. Analysis of chronic overwork of medical staff in Grade A hospitals hospital management forum. *Nursing Open.* (2013) 30:51–3.

32. Gao Y, Liu C, Fan X, Wu M, Jiang Y. Issues related to the health status, work pressure and occupational environments of medical staff at level a tertiary public hospitals in Shanghai. *Ann Palliat Med.* (2021) 10:8203–14. doi: 10.21037/apm-21-1777

33. Dong S, Millar R, Shi C, Dong M, Xiao Y, Shen J, et al. Rating hospital performance in china: review of publicly available measures and development of a ranking system. *J Med Internet Res.* (2021) 23:e17095. doi: 10.2196/17095

34. Pan J, Qin X, Hsieh CR. Is the pro-competition policy an effective solution for China's public hospital reform? *Health Econ Policy Law*. (2016) 11:337–57. doi: 10.1017/S1744133116000220

35. Falatah R, Almuqati J, Almuqati H, Altunbakti K. Linking nurses' job security to job satisfaction and turnover intention during reform and privatization: a cross-sectional survey. *J Nurs Manag*. (2021) 29:1578–86. doi: 10.1111/jonm.13279

36. Civilotti C, Berlanda S, Iozzino L. Hospital-Based healthcare workers victims of workplace violence in Italy: a scoping review. *Int J Environ Res Public Health.* (2021) 18:5860. doi: 10.3390/ijerph18115860

37. Zhao G, Yin C. Impact of job control on hospital workers' safety performance: a moderated mediation analysis of the influences of hospital safety climate and social support. *Nurs Open.* (2022) 2:781–9. doi: 10.1002/nop2.1345

38. Shang J, You L, Ma C, Altares D, Sloane DM, Aiken LH. Nurse employment contracts in Chinese hospitals: impact of inequitable benefit structures on nurse and patient satisfaction. *Hum Resour Health.* (2014) 12:1. doi: 10.1186/1478-4491-12-1

39. Qi M, Hu X, Liu J, Wen J, Hu X, Wang Z, et al. The impact of the COVID-19 pandemic on the prevalence and risk factors of workplace violence among healthcare workers in China. *Front Public Health.* (2022) 10:938423. doi: 10.3389/fpubh.2022.938423

40. Sun L, Zhang W, Qi F, Wang Y. Gender differences for the prevalence and risk factors of workplace violence among healthcare professionals in Shandong, China. *Front Public Health.* (2022) 10:873936. doi: 10.3389/fpubh.2022.873936

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The relationship between physician burnout and depression, anxiety, suicidality and substance abuse: A mixed methods systematic review

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Introduction: The World Health Organization defines burnout as a problem associated with employment, a category distinct from psychological disorders such as depression, anxiety, suicidality and disorders of substance abuse. Evaluating the association between burnout as an occupational exposure and psychological morbidity may indicate that burnout can act as an occupational risk factor for mental ill-health. The systematic review explores this relationship in physicians due to the increased risk in this population and the implications for healthcare delivery.

Methods: A mixed methods systematic review of the literature was conducted across Medline, Cinahl Plus, PsycInfo, Web of Science and The Cochrane Library. Databases were systematically searched using keywords relating to physician burnout and depression, anxiety, suicidality and substance abuse. Identified articles were screened for eligibility by two independent researchers. Data extraction was performed and studies assessed for risk of bias. Quantitative and qualitative results were integrated using a convergent segregated approach and results portrayed as a narrative synthesis.

Results: Sixty-one articles were included in the review. There was notable heterogeneity in the measurement and criteria used to define burnout limiting the assimilation of results. Despite this, all studies that measured the association between depression and burnout reported a significant association. Studies that reported association between burnout and anxiety were similarly uniformly consistent. Most studies that reported the association between burnout and suicidality indicated that a significant association exists however difficulty in measurement of suicidality may have influenced variability of results. The reported association between substance abuse and burnout was more variable, suggesting that any association is likely to be weak or influenced by other variables. Qualitative studies described the manifestations of chronic workplace stress as well as perceived links with psychological morbidity. These included lack of time for work-life balance, the contribution of professional relationships and a culture of invulnerability that exists among physicians.

Conclusion: The systematic review cannot conclude causality but suggests that physician burnout is associated with depression, anxiety and suicidality. Qualitative

data provides insight into the nature of this association. The review indicates the need for longitudinal research and provides considerations for intervention strategies to prevent the development and progression of burnout.

Systematic review registration: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020172938, identifier: CRD42020172938.

KEYWORDS

burnout—professional, depression, anxiety, suicidal ideation (SI), substance misuse, systematic review

1. Introduction

Burnout syndrome is a condition caused by excessive workplace stress and is often characterized by the dimensions of emotional exhaustion, depersonalization and reduced personal accomplishment (1, 2). The World Health Organization defines burnout as "a syndrome resulting from chronic workplace stress that has not been successfully managed" (3). As such, physicians and other healthcare workers have been identified as an at-risk group due to the number of occupational factors associated with the profession (4, 5). Studies comparing rates of burnout in physicians to other members of the workforce find consistently higher rates of burnout in physicians (6, 7). Overall prevalence of physician burnout can be difficult to quantify given the heterogeneity definition criteria for burnout within the literature. However, the most commonly quoted prevalence estimates are 50% or greater (8) giving some indication of the scale and gravity of the problem.

Burnout in physicians has well-documented associations with sub-optimal patient care (9) and poor clinical outcomes, as well as absenteeism and decreased productivity (10). Mathematical studies estimating the cost of physician burnout to healthcare systems suggested an overall cost of $4.6 billion within the American healthcare system and $7,600 per physician (11). This estimate does not consider the cost of burnout that is harder to quantify, such as effect on other healthcare staff and disruption to patient continuity of care. The association between burnout and outcomes for the affected individual makes up a smaller proportion of this research subgroup. Many studies that evaluate individuals with burnout, consider burnout as an endpoint as opposed to an exposure or possible risk factor for other outcomes leaving a gap in the literature of the impact of burnout in relation to secondary associations for example of depression, anxiety, substance abuse and suicidality for the physician as an individual (12).

Suicide is among the highest causes of physician mortality and is reportedly the only cause of death where the risk is higher among physicians than the general population (13). Rates of suicide are twice as high among physicians than the general public, with female physicians being between twice and six times as likely to die by suicide than other female groups (14). This contrasts with lower rates of illness such as cardiovascular disease, tobacco-related cancers and stroke (6). It is likely that lower rates of physical illness can be accounted for by knowledge of risk factors, the impact of health-related behavior, symptoms and access to services (7). This poses the question as to why rates of suicide continue to be high despite similar knowledge, with few physicians receiving mental healthcare before their deaths (15). Denial of symptoms, self-diagnosis and treatment, stigma and concerns about career prospects have been hypothesized as possible barriers to help-seeking, although research in this area is limited (16).

Mood disorders such as depression and anxiety which are also highly prevalent among physicians have been identified as important risk factors for physician suicide (16). Lifetime risk of depression among physicians is suggested to be as high as 15% for men and 20–30% for women (17) as compared to reported lifetime risk estimates among the general population of 9% for men and 15% for women (18). Comorbid substance misuse disorders are common among physicians with mood disorders, suicidal ideation or completed suicide (19). Although established, the relationships between substance abuse, mood disorders and suicide are complex, and causation is likely to occur in both directions with some physicians self-medicating due to underlying mood disorders and in others mood disorders may be precipitated by substance misuse (20). Overall rates of alcohol and substance abuse have a similar prevalence to the general population, however severity of addiction at presentation and late presentation are features that are more common in this group. Referral to services is frequently made by concerned colleagues due to absenteeism, intoxication at work or poor work performance (21). Despite late presentation, evidence from intervention programs specifically targeting physicians suggest highly successful treatment rates for those who engage with services (22, 23).

Although a relatively small area of burnout research, occupational stress and burnout have been identified as factors associated with psychiatric morbidity (24, 25). Controversy exists regarding the nature of the relationship between burnout and well-defined illness such as depression, anxiety and substance abuse. For example, researchers have argued that the considerable overlap between features of depression or clinical anxiety and burnout would suggest that they should not be considered as distinct entities (26). Others highlight the importance of the distinction, which avoids pathologizing burnout as it has the potential for modification at an organizational, structural and societal level (27) and should therefore only be considered an occupational risk factor for the development of psychiatric illness. As part of the description in the ICD 11, the WHO categorically states that burnout exists in the context of the workplace and should not be applied to symptoms that occur in other parts of life (3). The objective of this research is to further investigate the relationship between physician burnout and the outcomes of depression, anxiety, substance abuse and suicidality. Clarifying

the nature of the association between burnout and depression, anxiety, substance abuse and suicidal ideation may help to identify strategies required to modify this relationship, an effective point of intervention as well as the type of specialist services needed.

There has been an exponential increase in the volume of research conducted into burnout within the last decade (28) and the range of research goals and interests varies considerably. Burnout research can be broadly categorized six subgroups; contributing factors, prevalence, measurement and validation of psychometric tests, interventions and treatment, consequences of burnout and studies aiming to determine the underlying physiological processes or identify biomarkers (28). This research will focus on the consequences of burnout for physicians, exploring the association between burnout and outcomes of depression, anxiety, suicidality and/or substance abuse addressing the gap in the literature for this association within this high-risk group.

1.1. Aims and objectives

The aim of this research was to undertake a systematic review of existing literature to answer the research question "*What is the relationship between physician burnout and depression, anxiety, suicidality and substance abuse?*" using a mixed-methods approach to both measure the association between burnout (as an occupational exposure) and each of the specified outcomes and to explore the nature of this association.

The research objectives were:

a) To systemically search the literature to identify articles relating to the association between physician burnout and depression, anxiety, suicidality and/or substance abuse.
b) To critically appraise and assimilate identified studies to describe the association between burnout and outcomes of depression, anxiety, suicidality and/or substance abuse.
c) Explore the nature of any identified associations between burnout and depression, anxiety, suicidality and/or substance abuse through qualitative literature synthesis.

2. Methods

The study protocol was designed in accordance with the Preferred Reporting Items of Systematic Review and Meta-analysis-Protocol (PRISMA-P) guidelines (29). The protocol was registered with the International Prospective Register for Systematic Reviews (PROSPERO) (CRD 42020172938). Protocol was adhered to throughout the research process in keeping with PRISMA guidance. Ethical approval was received from Edinburgh University Usher ethics committee.

2.1. Research design

A mixed methods systematic review of the literature was carried out. Burnout as a phenomenon occurs as a result of complex interaction between environment, personality and experience (30). To explore the relationship between burnout and depression, anxiety, suicidality or substance misuse it is important not only to measure the degree of association but also explore the perceived links that account for this association through the lens of those affected. A mixed methods approach was chosen so that quantitative findings may investigate and measure the degree of association, while qualitative findings may be used to enrich the understanding of the social processes involved.

2.2. Search strategy

The research question was clarified using a PEO format (Population, Exposure, Outcome). The PEO format is considered to be more suitable for research questions relating to etiology and risk than the traditional PICO (population, intervention, comparator, outcome) format (31). A comprehensive selection of search terms for each aspect of the research question were identified during initial scoping review as well as subject heading searches of selected databases. Search terms were adapted for the key concept headings of (i) physicians, (ii) burnout, (iii) depression, (iv) anxiety, (v) suicide, and (vi) substance abuse. Searches were conducted across the following electronic databases; Medline, Cinahl Plus, PsycINFO, Web of Science and the Cochrane Library. Relevant articles were also identified by means of hand-searching reference lists of included studies. The final terms used and search strategy for each database can be seen in Supplementary material 1 limits were set in terms of publication date or type. Limits were set to English Language.

2.3. Screening and study selection

Searches of selected databases was performed on February 15th 2020. In keeping with PRISMA guidelines, title/abstract and full text screening were carried out by two independent reviewers, with a third reviewer available for any disagreements should they arise (29). Studies were accepted or rejected based on predefined eligibility criteria as outlined in Table 1, with reasons for exclusion recorded.

2.4. Quality assessment

All included studies underwent a quality assessment by two reviewers. Quantitative studies were assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Tool specific to the study design, cross-sectional or cohort study (32). Qualitative studies were assessed using Critical Appraisal Skills Program (CASP) Qualitative Research Assessment Tool (33). Both the JBI and CASP tools allow for objective assessment without scoring systems and studies may be included or excluded based on results. The format is similar in both tools with questions regarding potential areas of bias to be answered as "Yes" "No," or "Unclear." For the purposes of this review, studies were deemed low, moderate, or

TABLE 1 Eligibility criteria.

	Inclusion criteria	Exclusion criteria
Population	➢ Doctors/physicians ➢ All grades ➢ All specialties ➢ Hospital and non-hospital	➢ Medical students ➢ Healthcare workers other than doctors ➢ Studies that include physicians/doctors but where physicians are not analyzed separately
Exposure	➢ Burnout ➢ Quantitative studies must specify an objective measure of burnout	➢ Occupational stress only without measure of burnout
Outcome	➢ At least one of: (i) Depression (ii) Suicide/suicidal ideation (iii) Anxiety/anxiety disorders (iv) Substance misuse/abuse/addiction. ➢ Quantitative studies must specify an objective measure of outcome	➢ Outcomes other than: (i) Depression (ii) Suicide/suicidal ideation (iii) Anxiety/anxiety disorders (iv) Substance misuse/abuse/addiction
Study design	➢ Primary studies that investigate the relationship between burnout and outcomes: - Quantitative studies must report the *association/correlation* between exposure and outcome - Qualitative studies must explore burnout and at least one outcome	➢ Purely narrative review articles with no original measure of exposure/outcome - Quantitative studies assessing only prevalence of burnout, depression, suicide, anxiety or substance abuse with no measure of correlation/association - Studies assessing interventions to reduce burnout unless baseline measure of association reported
Other	➢ Studies in English or with English translation	➢ Studies in language other than English or with no English translation

high risk of bias and results were described narratively and in table format.

2.5. Data extraction

Data was extracted and recorded using pre-piloted data extraction forms. Using a parallel approach to data extraction, quantitative and qualitative studies were assessed separately using different data extraction tools. For quantitative studies the following data was recorded; (i) bibliographic information, (ii) study design, (iii) study population characteristics—type of physician, stage of training, (iv) number of participants, (v) measure of burnout used, (vi) what outcome(s) were measured, (vii) measure of outcome used and (viii) results (i.e., measure of association). For qualitative studies the following information was recorded; (i) bibliographic information, (ii) setting, (iii) research method, (iv) study aims, (v) number of participants, (vi) themes explored, (vii) data analysis and (viii) authors conclusions.

2.6. Evidence synthesis

Evidence was synthesized using a convergent segregated method whereby results were analyzed separately, in parallel and subsequently integrated in a narrative synthesis (34). Aggregation of quantitative results by means of meta-analysis was limited by heterogeneity of studies (35). This was primarily due to variation of population characteristics as well as variability of measurement tools and criteria used to define burnout. A descriptive method was chosen, where results are presented by narrative synthesis. Evidence was then integrated using a configurative analysis whereby themes were compared, linked and juxtaposed between qualitative and quantitative evidence.

3. Results

3.1. Search results

The search was carried out on February 15th 2020. Initial searches resulted in 2,159 articles for review. Once duplicates were removed 1,312 articles remained. One thousand three hundred and twelve articles underwent title and abstract screening by two independent reviewers, of which 1,227 were excluded. Three articles were identified from reference list searching and included in full text review. Eighty-eight articles underwent full text screening by both reviewers. Twenty-seven studies were excluded following full text screening for reasons outlined in 1. Sixty-one articles were subsequently included in the systematic review. Of the included studies, 53 used purely quantitative research methods (35–86), five studies contained only qualitative data (87–91) and three studies were designed using mixed methods (92–94). PRISMA P flow diagram of search and included studies can be seen in Figure 1.

3.2. Quantitative

3.2.1. Quantitative quality assessment

Quality of included studies containing quantitative data was assessed using Joanna Briggs Institute Critical Appraisal Tools (95). The checklist for cross-sectional studies was used to assess cross-sectional studies and checklist for cohort studies was used to assess the one included cohort study (36). The checklist for cross-sectional studies consists of eight questions, each to be answered yes, no or unclear. In this review studies were given an overall rating based on answers. Studies were considered to be high quality if all questions were answered yes, moderate quality if 6–7 questions were answered yes or any questions answered unclear and low quality if more than two questions were answered no.

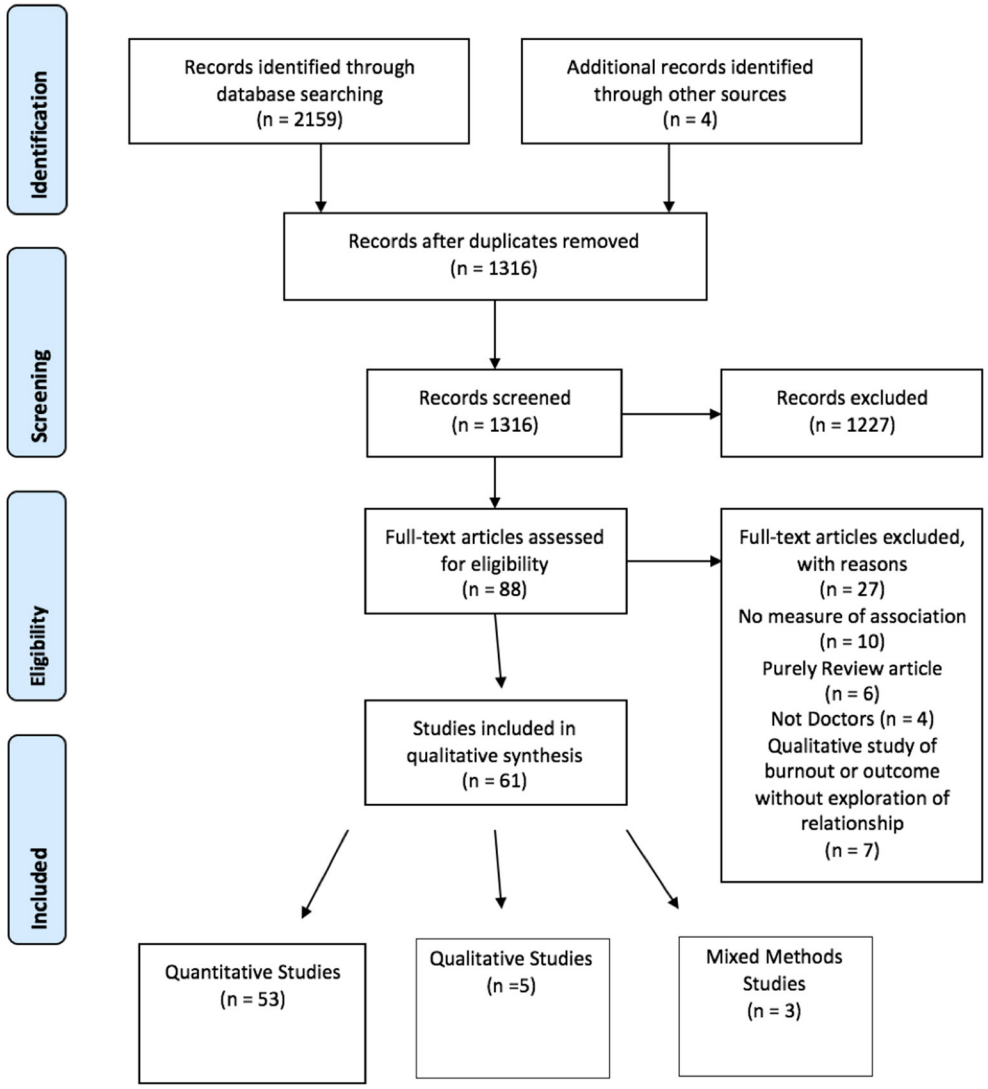

FIGURE 1
PRISMA - P flow diagram.

Sixteen cross-sectional studies were given an overall rating of high quality, 32 studies were deemed to be of moderate quality and five were given an overall rating of low quality. The one included cohort study was given an overall rating of moderate quality (36). No studies were excluded based on quality, however quality assessment was used to inform the interpretation of results. Quantitative quality analysis results table can be seen in Supplementary Table 2.

3.2.1.1. Study participants

All studies described inclusion criteria that represented the population of interest in the review. Ten studies (36, 37, 43, 46, 57, 60, 63, 68, 77, 78, 84) did not mention survey response rates. No definitive criteria for acceptable survey response rates exist, however 10 included studies (35, 40, 52, 54, 62, 65, 67, 71, 74, 82, 83) had response rates of <40% which would be uniformly considered low (96). All included studies provided detailed descriptions of participants demographic information.

3.2.1.2. Exposure and outcome measurement

Measurement of exposure was considered low quality in only four studies (43, 73, 75, 82). One study used a single question surrogate adapted from the MBI to assess burnout domains (82). Two studies used measures of overall occupational stress or distress as measures of burnout (73, 75) and one study drew correlations from a larger study and therefore did not describe exposure measurement in detail (43). Studies that used "self-reported" presence or absence of outcome as a means of outcome measurement were assessed as low quality as they lacked external validity.

3.2.1.3. Confounding factors

Thirty-one studies used appropriate methods to account for potential confounding factors (35, 37, 40, 41, 46, 47, 50, 52–54, 57, 58, 60, 62–65, 69, 71–77, 80, 82, 83, 85, 86). Of these one used a control group (44) whereas all others used multivariate analysis to account for confounders.

3.2.1.4. Cohort follow-up

The one included cohort study did not report loss of follow-up over time and only included participants that completed surveys throughout follow-up (36). There was no mention of incomplete data or efforts made to address incomplete response rates, indicating possible selection bias.

3.2.2. Quantitative results

3.2.2.1. Study and population characteristics

Quantitative studies consisted of 54 cross-sectional studies and one cohort study (36). Study populations were well-defined and covered a range of specialties and grades of physicians. Twelve studies did not specify grade or specialty but included all physicians (35, 43, 51–53, 56, 66, 67, 70, 78, 82, 85). One study specifically investigated consultant physicians (63) whereas twenty studies specifically investigated residents, interns or trainees (36, 37, 39–42, 44, 46, 47, 49, 50, 54, 55, 62, 69, 73, 74, 81, 93, 97). Specialties investigated included Internal Medicine (36–39, 57, 69, 75, 77), Psychiatry (38, 41, 61, 79), Orthopedics (40, 71), Obstetrics and Gynecology (42, 58, 74–76, 86), Pediatrics (44, 57, 75, 93), Oncology (45, 64, 92), General Surgery (46, 55, 65, 75, 83), Family Medicine/General Practice (47, 68, 77), Emergency Medicine (48, 57, 73, 81), Intensive care (59, 84), Plastic Surgery (59), Anesthesia (60, 72, 75, 84), Vascular Surgery (59) and Neurology (75). Number of study participants per study ranged from 48 (42) to 7,905 (65). Studies were conducted across 24 countries. The majority were conducted in the USA (36–38, 42, 46–48, 51, 55, 60, 62, 65, 73, 74, 81–83, 86), four studies were conducted in Japan (50, 64, 79, 93), three in each of France (40, 45, 71), Turkey (44, 68, 78) and China (53, 69, 70), two studies in each of Italy (41, 77), Finland (43, 61) and the UK (58, 63) and one study in all remaining countries including the Netherlands (39), Egypt (49), Brazil (52), Hong Kong (35), Lebanon (54), Pakistan (56), Malaysia (57), India (92), Israel (59), Canada (66), Austria (67), Germany (75), Romania (76), Mexico (80), Lithuania (84), and Denmark (85). Participation across all studies was voluntary and subjects were recruited *via* hospital email lists, training college registers, governing bodies and teaching conferences. Among studies that reported response rates, rates ranged from 16% (67) to 100% (69).

3.2.2.2. Measure of exposure

All studies used a validated measurement tool to assess levels of burnout. The Maslach Burnout Inventory (MBI) was the most frequently used burnout assessment tool, used in 46 studies (35–42, 44–53, 55, 57–61, 63–66, 68–72, 74, 76, 78–86, 92, 93). There were notable differences in the interpretation of MBI results with regards classifying and quantifying burnout. The presence of burnout was defined as a dichotomous outcome in 23 studies (35, 36, 38, 39, 46, 48–52, 55, 57–59, 64, 65, 69, 80–84, 86), based on one or all domain cutoff scores. Eleven studies (40, 41, 45, 47, 63, 70–72, 79, 85, 92) categorized levels of burnout as ordinal variables such as low, moderate or high based on overall score (40, 41, 45, 47, 63, 70–72, 79, 85) or burnout domain scores (92). Twelve studies interpreted burnout scores a continuous variable, 10 of which analyzed each domain score separately (37, 42, 44, 53, 60, 61, 66, 68, 74, 76, 78, 93) and two studies (60, 61) used an overall burnout score by combining the results of all domain scores. Other measures of burnout included the Oldenburg burnout inventory used in two studies (62, 77) the Copenhagen Burnout inventory (56), the Burnout Measure (54), the Copenhagen Psychosocial Stress Questionnaire (75), the Health Professional Stress Inventory (73) and the Hamburg Burnout Inventory (67) used in one study each.

3.2.2.3. Depression

Depression as an outcome was investigated by $n = 42$ studies (36–38, 40–42, 44–52, 54–59, 61–64, 66–69, 71–76, 78, 80, 81, 84, 86, 92, 93). Three studies used "self-reported current or history of depression" as a measure of depression (58, 61, 76) whereas all others used validated depression screening or diagnostic questionnaires. The most frequently used questionnaire was the Patient Health Questionnaire (PHQ), used in 14 studies (37, 38, 40, 41, 45, 46, 50, 54, 55, 62, 64, 84, 86, 92). The PHQ is most commonly used in its 9-question form (PHQ9), other forms included the abbreviated PHQ2 and longer PHQ12. The PHQ uses nine questions to address depression severity and is an abbreviated version of the Primary Care Evaluation of Mental Health Disorders Patient Health Questionnaire (PRIME-MD) (98), a diagnostic instrument for common mental disorders. The full PRIME-MD tool was used in five studies (36, 51, 59, 80, 81). Six studies used the Center for Epidemiological Studies Depression Scale (CES-D) (42, 47, 73, 74, 93, 99). Other tools employed included the Beck's Depression Inventory used in four studies (49, 66, 68, 78), the Hospital Depression and Anxiety Scale employed by Karaoglu et al. (44), the Depression, Anxiety and Stress Scale (DASS) used by three researchers (52, 56, 57) and the Harvard National Depression Scale used by Looseley et al. (72).

3.2.2.3.1. Association of burnout and depression

Despite notable variation in the measurement and interpretation of burnout score, all 45 studies that investigated the relationship between burnout and depression reported a statistically significant association (36–38, 40–42, 44–52, 54–59, 61–64, 66–69, 71–76, 78, 80, 81, 84, 86, 92, 93). Thirteen studies reported the relationship between presence of burnout and the risk of depression or depressive symptoms as odds ratios (OR) (40, 45, 52, 57, 58, 61, 62, 67, 69, 71, 80, 84, 86) which ranged from 0.89 (57) to 10.68 (69). Studies that measured correlation between overall burnout score or burnout severity with overall depression score reported similar significant results with correlation measuring between $r = 0.41$ (61) and $r = 0.74$ (54, 67). Five studies compared the prevalence of positive depression screens between those with burnout or high burnout and those with low or no burnout and evaluated for statistically significant differences (see Figure 2). The only longitudinal cohort study included in the review (36), aimed to evaluate the association between persistent burnout and depression in internal medicine residents in Colorado during their first 3 years of residency. While they found significantly higher rates of depression in those with persistent burnout they also reported that both burnout and depression scores decreased over time.

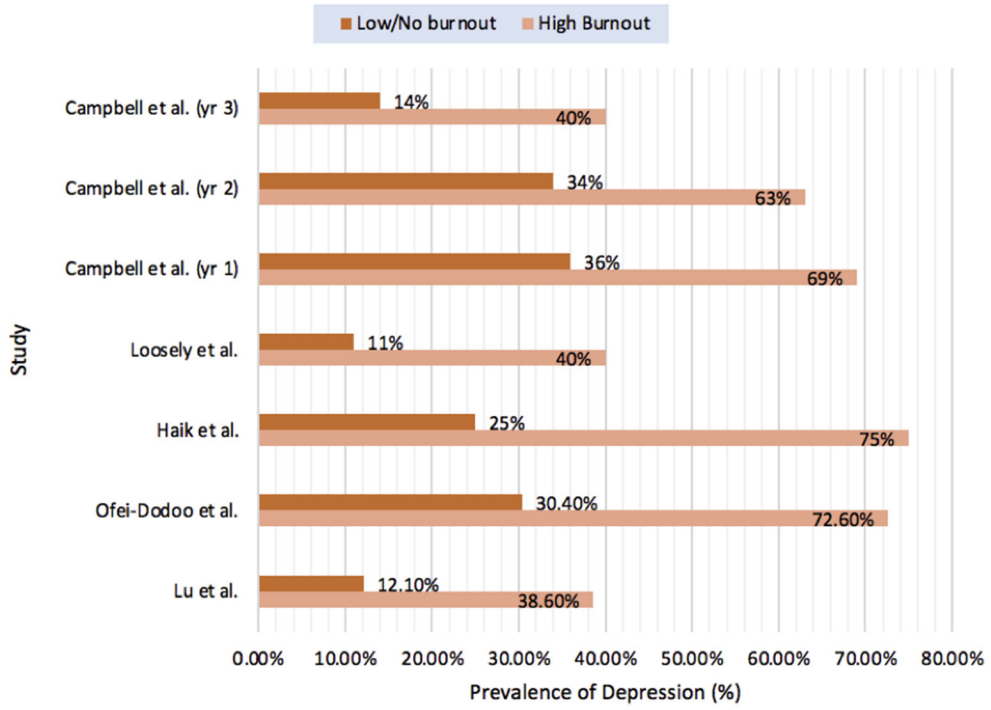

FIGURE 2
Prevalence of depression in those with burnout compared to those no/low burnout.

Twelve studies evaluated the association between depression and burnout domains separately (44–50, 61, 63, 64, 68, 78, 92). Consistent significant associations were also found between the EE burnout domain and depression whereas other domains were less frequently measured, less consistently significant and where significant showed weaker association. Correlation between burnout domain scores and depression scores was measured by eight studies (44, 47, 49, 50, 63, 64, 68, 78), all of which found statistically significant correlation between EE scores and depression scores which ranged between $r = 0.16$ (64) and $r = 0.7$ (50). Only four studies found significant correlation between DP and depression scores (47, 49, 63, 78), with 3 other studies reporting correlations that were not statistically significant (50, 64, 68). Correlation that was significant was generally lower than that with EE, between $r = 0.3$ (78) and $r = 0.6$ (49). Only 4 studies used PA as a burnout domain during analysis as not all studies considered this to be required for overall measurement of burnout (49, 64, 68, 78). Of these, 3 studies reported significant negative correlation between PA and burnout scores (49, 64, 78) and one reported a correlation that was not significant (68). Similarly, those studies that reported odds ratios between burnout domains and depression reported consistently positive associations between EE and depression (45, 46, 61, 92) with less consistent or weaker association with other domains (45, 46). One of these studies only used the domain EE for multivariate analysis (92) and one study found that only EE and overall MBI score were independently associated with depressive symptoms using logistic regression (61). The studies which measured the association between burnout and depression can be seen in Table 2. Results of the association between burnout and depression categorized by statistical analysis used can be seen in Supplementary Table 3.

3.2.2.4. Anxiety

Anxiety as an outcome was measured by $n = 12$ studies (44, 46, 52–54, 56–58, 63, 68, 70, 92). Only two studies assessed anxiety as their primary outcome (53, 70) both of which used the Zung Self-rated Anxiety Scale as a measure of anxiety symptoms. One study used 'self-reported symptoms' as a measure of outcome with all others using validated anxiety questionnaires. The Depression, Anxiety and Stress Scale (DASS) was used in two studies (56, 57). Other tools used to measure anxiety included the Hospital Depression and Anxiety Scale used by Karaoglu et al. (44), the Speilberg State Trait Anxiety Index and State trait personality Index used by Lebares et al. (46) and Khan et al. (63), respectively, and the Beck's Anxiety Inventory used in one study (68).

3.2.2.4.1. Association of anxiety and burnout

Twelve studies assessed the relationship between burnout or burnout domains and anxiety (44, 46, 52–54, 56–58, 63, 68, 70, 92), six of which assessed burnout domains separately (44, 46, 63, 68, 92, 100). Although a fewer number of studies, similar to results for depression, all studies found significant association between burnout and anxiety or the EE domain and anxiety. Other burnout domains were less consistently significant.

Six studies investigated the association between presence of burnout or overall burnout score and anxiety symptoms, all of which reported a significant association. Three of these studies reported the risk of anxiety in the presence of burnout as odds ratios which ranged between 1.08 (57) and 3.95 (58). Two studies

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TABLE 2 Burnout and depression results.

References	Population	Number of participants	Measure of association	Results
Ashraf et al. (56)*	Physicians (all)	157	Association of work related/client related/person related burnout with depression scores	Person related burnout ($\chi^2 = 28.35$, $p < 0.0001$) Client related burnout ($\chi^2 = 16.08$, $p < 0.05$) Work related burnout ($\chi^2 = 29.74$, $p < 0.0001$)
Becker et al. (74)	Obstetric and gynecology residents	118	Prevalence of low depression scores in low burnout domains	81% with low EE not depressed ($P = 0.016$) 73% with low DP not depressed ($P = 0.032$) 83% with high PA scores not depressed ($P < 0.0001$)
Bernburg et al. (75)	Internal medicine, neurology, surgery, pediatrics, anesthesiology, obstetrics and gynecology	435	Correlation between burnout and depressive symptoms	$R = 0.25$ ($p < 0.01$)
Boo et al. (57)*	Internal medicine, pediatric, emergency medicine physicians	313	Odds of depression with high burnout	OR 0.89 ($p = 0.007$)
Bourne et al. (58)*	Obs/Gyn residents and consultants	3,102	Odds of depression with burnout	OR 4.05 (95%CI 3.26–5.04)
Campbell et al. (36)	Internal medicine residents	86	Compared prevalence of Depression in those with vs. without Burnout (over 3 years)	Year 1: 69 vs. 36% ($p < 0.002$) Year 2: 63 vs. 34% ($p < 0.007$) Year 3: 40 vs. 14% ($p < 0.005$).
Carter et al. (37)	Medical residents	107	Correlation between burnout domain scores and depression scores	EE: $r = 0.63$ DP: $r = 0.5$ PA $r = -0.43$
Chaukos et al. (38)	Medical and psychiatry residents	68	Compared depression scores in those with burnout vs. no burnout	4.9 ± 5.8 vs. 1.8 ± 2.5 ($p = 0.035$)
Daruvala et al. (92)*	Oncology physicians—surgical/medical/radiation oncology	114	Odds of depression with low or high EE Odds of depression or anxiety with low or high EE	OR 2.7 ($p = 0.09$) OR 4.2 ($p < 0.00001$)
Faivre et al. (40)*	Orthopedic residents	107	Odds of depression in those with moderate/severe burnout	OR 19.3 (p = 0.0048)
Faivre et al. (71)*	Trauma and orthopedic surgeons	441	Odds of depressive symptoms with burnout	OR = 6.3 ($p = 0.0006$)
Ferrari et al. (41)*	Psychiatric residents	108	Correlation between depression scores and domain scores.	EE: $r = 8.4$, ($p = 0.00$) Cynicism: $r = -4.00$ ($p = 0.00$).
Govardhan et al. (42)*	Obstetrics/gynecology residents	49	Correlation between high depression scores and domain scores	Correlation with high DP: $P = 0.019$ Correlation with high EE: $P < 0.001$
Haik et al. (59)	Burn physicians, plastic surgeons, intensive care physicians	55	Comparison of prevalence of depression with burnout vs. without burnout	75 vs. 25% ($p < 0.00001$)
Iorga et al. (76)	Obstetrics/gynecology physicians	116	Compared mean numbers of those with depression in those with and without positive burnout domain scores	EE: 31 vs. 21 ($p = 0.002$) DP: 9.93 vs. 6.79 ($p = 0.033$) PA: 31.86 vs. 37.47 ($p = 0.015$)
Janko et al. (62)*	Vascular surgery trainees	177	Odds of moderate/severe depression with high burnout	OR 2 ($P < 0.01$)
Karaoglu et al. (44)*	Pediatric residents (and control group)	74	Correlation between depression and burnout domain scores	EE and depression $r = 0.65$
Khan et al. (63)*	Consultants (all)	593	Correlation between depressive symptoms and EE and DP	EE: $r = 0.61$ ($p < 0.01$) DP: $r = 0.40$ (p < 0.01)
Korkeila et al. (61)	Psychiatrists/child psychiatrists	3,313	Correlation between depression and overall burnout score	$R = 0.41$ ($p < 0.001$)
Lazarescu et al. (45)*	Radiation oncologists	242	Odds of depression with moderate/severe burnout or positive domain scores.	Moderate/severe burnout—OR: 2.96 ($P < 0.001$). EE—OR: 4.7 ($P < 0.001$) PA—OR: 2.2 ($P = 0.003$)

(Continued)

TABLE 2 (Continued)

References	Population	Number of participants	Measure of association	Results
Lebares et al. (46)*	General surgical residents	566	Odds of severe depression with high EE or DP scores	EE: OR 4.8163 ($p < 0.0001$) DP: OR 2.3557 ($p < 0.0009$)
Lebensohn et al. (47)*	First year family medicine residents	168	Correlation between depression scores and EE and DP scores	EE $r = 0.584$ ($p < 0.001$) DP $r = 0.518$ ($p < 0.001$)
Looseley et al. (72)*	Anesthesiologists	397	Comparison of prevalence of depression risk in high burnout risk vs. low burnout risk groups	40 vs. 11% ($p < 0.0001$)
Lu et al. (48)	Year 2–4 and attending emergency physicians	77	Prevalence of burnout in those with positive depression screen compared to those without	38.6 vs. 12.1% ($p = 0.011$)
Mampuya et al. (64)	Radiation oncologists	87	Correlation between burnout domains and psychological morbidity (depression)	EE: $r = 0.16$ ($p < 0.01$) PA: $r = -0.1$ ($p < 0.01$)
Mikalauskas et al. (84)*	Anesthetists and intensive care physicians	220	Odds of burnout in those with depression	OR 10.3 ($p < 0.01$)
Mohammed et al. (49)	Resident physicians	84	Correlation between severity of depression and domain scores	EE: $r = 0.61$ ($p < 0.001$). DP: $r = 0.63$ ($p < 0.001$). PA: $r = -0.56$ ($p < 0.001$)
Nishimura et al. (50)	Post-graduate year 1 and 2 resident physicians	39	Correlation between overall depression score and EE and DP scores (across 3 years)	EE: $r = 0.615$ ($p < 0.001$) T1 $r = 0.706$ ($p < 0.001$) T2 $r = 0.601$ ($p < 0.01$) T3 DP: $r = 0.279$ ($p < 0.086$) T1; $r = 0.047$ ($p < 0.817$) T2 $r = 0.176$ ($p < 0.445$) T3
Nomura et al. (93)	Pediatric residents	41	Comparison of mean EE and DP scores in those with high depression scores vs. those without	EE: 15.6 vs. 12.5 ($p < 0.02$) DP: 13 vs. 9.8 ($p < 0.01$)
Ofei-dodoo et al. (51)*	Physicians (all)	197	Compared prevalence of depression in those with burnout vs. those without	72.6 vs. 30.4% ($p < 0.001$)
Pasqualucci et al. (52)*	Physicians (all)	606	Odds of depression with burnout	OR = 2.7, CI = 1.7–4.1 ($p < 0.000$)
Rath et al. (86)*	Obstetrics/gynecology physicians	369	Odds of positive screen for depression in those with burnout	OR 7.34 ($p < 0.0001$)
Sahin et al. (78)	Physicians (all)	158	Correlation between depression scores and burnout domain scores	EE: $r = 0.516$ ($p < 0.0001$) DP: $r = 0.311$ ($p < 0.0001$) PA: $r = -0.218$ ($p < 0.0001$)
Talih et al. (54)*	Interns and residents (all)	118	Correlation between severity of burnout scores and depression scores	$r = 0.72$ ($p < 0.001$)
Thommassen et al. (60)	Physicians (all)	131	Correlation between depression and burnout domain scores	EE: statistically significant correlation ($P < 0.0001$), DP: a weaker correlation ($P < 0.08$) PA: no correlation
Toral-villanueva et al. (80)*	Junior doctors	312	Odds of depression in those with burnout	OR 5.6 (95% CI 3.3–9.5)
Whitely et al. (73)	Emergency medicine residents	486	Correlation between burnout scores and depression scores	$R = 0.67$ ($P < 0.0001$)
Williamson et al. (81)	Emergency medicine residents	334	Compared mean burnout domain scores of those that screened positive for depression vs. those that did not	EE: 26.8 vs. 17.8 DP: 15.3 vs. 11.2 PA: 36.4 vs. 40.8
Williford et al. (55)*	Surgical residents	92	Comparison of Depression score severity in those with burnout vs. those without	Increase of 6 points on depression score with burnout: coefficient [SE = 6.08 (1.41)] ($P < 0.001$)
Wurm et al. (67)	Physicians (all)	5,897	Odds of major depression with mild/moderate/severe burnout. Correlation between burnout score and depression score	Mild: OR 2.99 (95% CI 2.21–4.06) Moderate: OR 10.14 (95% CI 7.58–13.59) Severe: OR 46.84 (95% CI 35.25–62.24) $R = 0.74$ ($p < 0.001$)

(Continued)

TABLE 2 (Continued)

References	Population	Number of participants	Measure of association	Results
Yilmaz et al. (68)*	Family physicians	343	Correlation between depression and domain scores	EE: $r = 0.41$ ($P = 0.0001$) Not significant association with depersonalization and PA
Zhang et al. (69)	Internal medicine residents	159	Odds of depression with burnout (domains also analyzed separately)	OR 10.68 ($p < 0.00001$) Significantly associated with EE and DP but not PA

*Assessed multiple outcomes.

measured the correlation between burnout scores and anxiety scores, both of which reported similar correlation of $r = 0.46$ (54) and 0.47 (70).

Six studies used separate burnout domains and evaluated the association of at least one domain with anxiety disorders or symptoms. The largest included study aimed to investigate anxiety disorders and related factors among 1,134 Chinese physicians (53) and found significant correlation between both EE and DP and anxiety disorders. The studies which measured the association between burnout and anxiety can be seen in Table 3. Results of association categorized by statistical analysis used can be seen in Supplementary Table 4.

3.2.2.5. Suicidal ideation

Suicidal ideation or suicidal risk and its association with burnout was assessed by $n = 16$ studies (35, 39, 41, 45, 46, 51, 54, 55, 58, 61, 65, 71, 72, 77, 79, 86). The presence or absence of suicidal ideation as a self-reported binary outcome was used by five studies (35, 39, 58, 61, 79). Pompili et al. (77) used the Beck's Hopelessness Index as a measure of suicide risk, a 20-question scale that measures feeling of hopelessness which has been shown to correlate with suicidal risk (101). Other tools used included the suicidal ideation component of the PHQ used in six studies (45, 46, 51, 54, 55, 71), a Suicide Ideation and Behavior Questionnaire (79) and a suicidal ideation question from the Meehan Inventory (65) were used in one study each.

3.2.2.5.1. Association of suicidal ideation and burnout

Fifteen studies investigated the relationship between suicidality and burnout (35, 39, 41, 45, 46, 51, 54, 55, 58, 65, 71, 72, 77, 79, 86). Of these only Siu et al. (35) reported on both suicidal ideation and previous suicide attempts. Ten studies reported significant association (35, 39, 45, 46, 51, 54, 58, 65, 77, 86). Four studies (40, 41, 61, 72) reported higher levels of suicidal ideation in those with burnout but without a measure of association or correlation. One study found no statistically significant association between burnout and suicidal ideation (55).

Only three studies were designed with the primary aim of investigating suicidal ideation or risk (39, 65, 77) and each of these reported a significant positive association with burnout or a burnout domain. The largest study investigated 7,900 surgeons and reported that for each point increase in EE and DP scores and each point decrease in PA score participants were 5.7 to 10% more likely to report suicidal ideation (65). They also reported that the increase in prevalence of suicidal ideation increased in relation to severity of burnout and that this relationship was independent of depressive symptoms. Van der Heijdan et al. (39) reported increased suicidal ideation among 2,000 Dutch medical residents with burnout (20.7 vs. 7.6% $p < 0.0001$) as well as significant correlation between burnout domains and suicidal ideation ($r = 0.25$, $p < 0.001$; $r = 0.17$, $p < 0.001$; $r = -0.07$, $p < 0.01$ for EE, DP, and PA, respectively). Siu et al. (35) reported a statistically significant higher percentage with suicidal ideation in those with "high" burnout levels compared to "low" burnout levels (10% vs. 2.7, $p = 0.03$) however there had were no suicidal acts reported by any participant. The studies which measured the association between burnout and suicidality can be seen in Table 4.

3.2.2.6. Alcohol and substance misuse

The association between alcohol or substance misuse and burnout and analyzed by $n = 16$ studies (35, 42, 43, 46, 47, 54, 58, 60, 62, 72, 80, 82–86). The most frequently used measurement tool was the Alcohol Use Disorders Identification Test (AUDIT) which was employed by six studies (46, 54, 80, 82, 83, 85). AUDIT contains 10 questions that relate to alcohol consumption and alcohol consumption behavior and acts as a tool for identifying harmful alcohol consumption (102). Other outcome measures included the CAGE questionnaire, a four-question screening tool used to identify harmful drinking habits (103), which was used in two studies (84, 86). One study used the Alcohol Behavior Index (43) and one used validated single question screening tool (62). Self-reported substance use or alcohol consumption questionnaires with cutoff scores given for harmful consumption was used in two studies. Substance Misuse was assessed by four studies (54, 58, 80, 82), two of which used the Alcohol, Smoking and Substance Involvement Screening Tool (ASSIST) while the other two studies used self-reported use of substances.

3.2.2.6.1. Alcohol and substance misuse

Of the 16 studies that explored the relationship between burnout and substance misuse, 14 studies reported the association between alcohol consumption (35, 42, 43, 46, 47, 54, 62, 72, 80, 82–86) and burnout while only four studies measured the association with other substances (58, 60, 80, 82). One study specifically mentions cannabis use (60) otherwise specific substances were not named. Only one study reported a statistically significant association between abuse of substances other than alcohol and burnout (58).

TABLE 3 Burnout and anxiety results.

References	Population	Number of participants	Measure of association	Results
Ashraf et al. (56)*	Physicians (all)	157	Association of related/client relate/person related burnout with anxiety scores	Person related burnout ($\chi^2 = 30.63$, $p < 0.0001$).
Boo et al. (57)	Internal medicine, pediatric, emergency medicine physicians	313	Odds of anxiety with high burnout	OR 1.079 ($p = 0.08$)
Bourne et al. (58)*	Obs/Gyn residents and consultants	3,102	Odds of anxiety with burnout	OR 3.59 (95%CI 3.07–4.21)
Daruvala et al. (92)	Oncology physicians—surgical/medical/radiation oncology	114	Odds of anxiety with low or high EE Odds of depression or anxiety with low or high EE	OR 1.67 ($p = 0.3$) OR 4.2 ($p < 0.00001$)
Karaoglu et al. (44)	Pediatric residents (and control group)	74	Correlation between anxiety and burnout domain scores	EE and anxiety $r = 0.74$
Khan et al. (63)	Consultants (all)	593	Correlation between anxiety symptoms and EE and DP	EE: $r = 0.57$ ($p < 0.01$) DP: $r = 0.40$ ($p < 0.01$)
Lebares et al. (46)*	General surgical residents	566	Odds of high anxiety with high EE or DP scores	EE: OR 7.2490 ($p < 0.0001$) DP: OR 2.9767 ($p < 0.0001$)
Pasqualucci et al. (52)	Physicians (all)	606	Odds of anxiety with burnout	OR = 2.5, CI = 1.7–3.7 ($p < 0.000$)
Sun et al. (53)	Physicians (all)	1,134	Correlations between anxiety disorder and EE and Cynicism	EE: $r = 0.46$ (m + f) ($p < 0.01$), Cynicism: $r = 0.49$ (m) $r = 0.51$ (f) ($p < 0.01$)
Talih et al. (54)*	Interns and residents (all)	118	Correlation between severity of burnout scores and anxiety scores	$r = 0.47$ ($p < 0.001$).
Yilmaz et al. (68)	Family physicians	343	Correlation between anxiety and domain scores	EE: $r = 0.34$ ($P = 0.001$) Not significant association with depersonalization and PA
Zhou et al. (70)	Physicians (all)	1,129	Correlation between anxiety and burnout symptoms	$R = 0.45$ ($p < 0.001$)

*Assessed multiple outcomes.

Fourteen studies reported the relationship between alcohol misuse and burnout and eight of these reported no significant association. Inconsistent results suggest that any association that exists is likely to be weak or subject to other confounding variables. The three largest studies, that were designed specifically to investigate the association between burnout and alcohol misuse did however report a significant positive association (43, 82, 83). The largest included study was a cross-sectional analysis of over 7,000 surgeons which found that significantly more participants with burnout also had symptoms of alcohol misuse (29.6 vs. 25% $p < 0.0001$) and alcohol dependence (34.9 vs. 25% $p < 0.00001$) than those without (82). This study also reported a significant increase in the alcohol misuse or dependence with increasing frequency of features of EE and DP. Similarly, a large cross-sectional analysis designed to investigate the association between alcohol misuse and burnout domains reported positive association between burnout and risky alcohol behavior (OR 1.89 $p < 0.014$) and significant associations with each burnout domain, the largest of which being with DP (OR 2.23 $p < 0.00001$) (85). This study also investigated the association between burnout and alexithymia, or the inability to identify and describe feelings (104) and found a significant association. The findings suggested that alexithymia acted as a mediator between burnout and alcohol misuse, particularly between DP and alcohol misuse. The studies which measured the association between burnout and misuse can be seen in Table 5.

3.3. Qualitative

3.3.1. Study design and aims

A total of seven qualitative studies were included in the review (87–92, 94). Five studies were purely qualitative in design (87–91) and two used mixed methods (92, 94). All qualitative studies used in depth interviews as a data collection method. Number of participants ranged from 10 (90) to 47 (88). Qualitative study characteristics are outlined in Table 6.

3.3.2. Qualitative quality assessment

Quality assessment of qualitative studies was conducted using the CASP Tool for qualitative studies (33). The included qualitative studies and their quality appraisal scoring can be seen in Supplementary Table 6. The tool contains ten questions relating to research design, recruitment, data collection including relationship with participants and ethical issues and data analysis and findings. Each question is answered yes, no or unclear as appropriate. For the purposes of this review, studies were given a rating of low, moderate

TABLE 4 Burnout and suicidality results.

References	Population	Number of participants	Measure of association	Results
Bourne et al. (58)*	Obs/Gyn residents and consultants	3,102	Odds of suicidal thoughts with burnout	OR 6.37 (95% CI 3.95–10.7)
Faivre et al. (71)	Trauma and orthopedic surgeons	441	Prevalence of suicidal ideation with burnout	8.6% of those with burnout reported suicidal ideation
Ferrari et al. (41)	Psychiatric residents	108	Rate of suicidal ideation measured in those with burnout	High rate of suicidal ideation but no measure of correlation.
Lazarescu et al. (45)	Radiation oncologists	242	Odds of Suicidal Ideation with moderate/severe burnout or positive domain scores.	Moderate/Severe burnout- OR: 0.46 ($P = 0.01$). EE: OR: 2.9 ($P = 0.002$).
Lebares et al. (46)	General surgical residents	566	Odds of suicidal ideation with high EE or DP scores	EE: OR 5.7840 ($p < 0.0001$) DP: OR 2.1827 ($p < 0.0165$)
Looseley et al. (72)*	Anesthesiologists	397	Prevalence of suicidal ideation in burnout groups	2.6% reported suicidal ideation
Ofei-dodoo et al. (51)	Physicians (all)	197	Compared prevalence of suicidal ideation in those with burnout vs. those without	100 vs. 46.9% ($p < 0.01$)
Pompili et al. (77)	Internal medicine physicians and GPs	134	Correlation between burnout domain scores and hopelessness scores (marker for suicide risk)	Exhaustion: $r = 0.2$ ($p < 0.05$) Disengagement: $r = 0.22$ ($p < 0.05$)
Rath et al. (86)*	Obstetric/gynecology physicians	369	Odds of screening positive for suicidal ideation in those with burnout	OR 4.92 ($p < 0.001$)
Shanafelt et al. (65)	Surgeons	7,905	Correlation between burnout domains and suicidal ideation	EE: OR 1.069 ($P < 0.001$) DP: OR 1.109 ($P < 0.001$) PA: OR 1.057 ($P < 0.001$)
Siu et al. (35)*	Physicians (all)	226	Presence of suicidal ideation in those with high burnout vs. those with low burnout	10 vs. 2.6 % ($p = 0.03$).
Talih et al. (54)	Interns and residents (all)	118	Likelihood of suicidal ideation in those with burnout	Burnt-out residents more likely to have suicidal ideation: $\chi^2 = 9.4$ ($p = 0.002$)
Tateno et al. (79)	Psychiatric trainees	95	Compared differences in presence of suicidal ideation in those with and without positive burnout domains	No significant differences in presence of suicidal ideation on all domains
Van der Heijden et al. (39)	Medical residents	2,115	Presence of Suicidality in those with moderate Burnout vs. those with no burnout	20.5 vs. 7.6% ($p < 0.001$)
Williford et al. (55)*	Surgical residents	92	Comparison of presence of suicidal ideation in those with burnout vs. those without	No significant association between burnout and suicidal ideation $P = 0.11$

*Assessed multiple outcomes.

or high based on number of questioned answered yes. Studies were considered high quality if nine questions or more were answered yes, moderate if between five and eight questions were answered yes and low if less than five questions were answered yes.

Three studies were given considered high quality (88, 91, 92), three were considered moderate quality (89, 90, 94) and one study was deemed low quality (87).

3.3.2.1. Study design and recruitment

All included studies outlined the aims and research question clearly and all were suited to qualitative research methods. Recruitment of participants was clearly described and justified by Daruvala et al. (92), Riley et al. (88) and Wainwright et al. (91) including details regarding whether saturation was achieved and how this was decided. Spiers et al. (89) attempted to recruit participants from groups that self-identified as living with mental illness as well as groups living without or recovered, however recruitment for those living with mental illness was much more successful than other groups. There was no mention of recruitment method in other studies (87), introducing the possibility of selection bias.

3.3.2.2. Data collection

All included studies used in-depth interviews as means of data collection. All but one study (87) clearly described interview strategy including whether cues and prompts were used. A sample of topics guides used were provided two studies (88, 89). The relationship between the interviewer and participants was addressed by four studies with only one study specifically stating that reflexivity was practiced by interviewers throughout the process (88). Potential ethical concerns were discussed and addressed by four studies (89–92).

3.3.2.3. Data analysis and findings

Rigorous data analysis was employed by six of the seven included studies (88–92, 94). This included detailed description of

coding of themes and the process of analysis, with contribution from multi-disciplinary research team members and sufficient evidence to demonstrate findings.

3.2.3. Data analysis and synthesis

Four studies used a thematic analysis of qualitative data (88, 89, 91, 92), whereby content is analyzed to identify recurring patterns or themes (105). Two studies (90, 94) adopted a phenomenological data analysis method which attempts to analyze the meaning behind the personal experience of a phenomenon described (106). Content analysis was used in one study (87), which focuses on the language of qualitative data and aims to categorize verbal content (107).

3.2.4. Qualitative results

3.2.4.1. Workload, exhaustion, and loss of work-life balance

Work-environment factors featured as an important factor common to the development of both burnout and mental illness in six of the included qualitative studies. Findings from Riley et al. (88) suggest that burnout is most strongly linked to lack of empathy related to chronic overwork, one study participant described how "working too many sessions…you lose your milk of human kindness." The theme of lack of time for personal life and non-clinical duties including shift duration, lack of leave and night duty is also explored by both Daruvala et al. (92) and Hamader et al. (87). Hamader et al. (87) aimed to highlight reasons for high levels of burnout and depression and ranked lack of sleep, long shifts, stressful shifts and night shifts among their top causes of burnout, anxiety and depression. Similarly, Loiselle et al. (94)

TABLE 5 Burnout and substance abuse results.

References	Population	Number of participants	Measure of association	Results
Bourne et al. (58)*	Obs/Gyn residents and consultants	3,102	Odds of substance abuse with burnout	OR 2.57 (95%CI 1.71–3.89)
Govardhan et al. (42)	Obstetric/gynecology residents	49	Association between alcohol misuse and burnout	No association with alcohol.
Hyman et al. (60)	Anesthesiologists	170	Prevalence of Substance and Alcohol Abuse in those with burnout vs. those without	No increase in substance or alcohol abuse
Janko et al. (62)	Vascular surgery trainees	177	Odds of alcohol abuse with high burnout	No significant association with alcohol abuse
Juntunen et al. (43)	Physicians (all)	2,671	Correlation between high domain scores and Alcohol misuse	Positive correlation with EE and DA, negative correlation with PA
Lebares et al. (46)*	General surgical residents	566	Risk of alcohol misuse with high EE or DP scores	Alcohol misuse was not associated with high EE or DP scores
Lebensohn et al. (47)	First year family medicine residents	168	Association between alcohol/medication misuse and domain scores	Greater alcohol use associated with EE and DP
Looseley et al. (72)*	Anesthesiologists	397	Prevalence of alcohol intake in burnout groups	No significant difference in alcohol intake
Mikalauskas et al. (84)*	Anesthesiologists and intensive care physicians	220	Odds of burnout in those with alcohol abuse/abuse of sedative medications	Alcohol: OR 3.2 ($p < 0.01$) Sedative medication: OR 4.9 ($p < 0.05$)
Oreskovich et al. (83)	Surgeons	7,197	Compared prevalence of alcohol misuse and dependence in those with burnout vs. without	Misuse: 29.6 vs. 25% ($p < 0.001$) Dependence: 34.9 vs. 25% ($p < 0.001$)
Oreskovich et al. (82)	Physicians (all)	7,206	Compared prevalence of burnout in those with alcohol abuse/dependence disorders compared to those without	52.5 vs. 44.7% ($p < 0.0001$)
Pedersen et al. (85)	Physicians (all)	1,841	Odds of alcohol abuse with burnout and each burnout domain	Burnout: OR = 1.86 ($P < 0.014$) EE: OR = 1.89 ($P < 0.001$) DP: OR = 2.23 ($P < 0.001$) PA: OR = 1.66 (P = 0.008)
Rath et al. (86)*	Obstetric/gynecology physicians	369	Odds of screening positive for alcohol misuse in those with burnout	OR 2.93 ($p < 006$)
Siu et al. (35)*	Physicians (all)	226	Presence of increased alcohol consumption in those with high burnout vs. low burnout	No association with increased alcohol consumption
Talih et al. (54)*	Interns and residents (all)	118	Likelihood of increased alcohol consumption and depression	No significant association with alcohol consumption.
Toral-villanueva et al. (80)*	Junior doctors	312	Odds of alcohol or drugs misuse in those with burnout	No significant association with alcohol or drugs Alcohol: OR 1.4 (95% CI 0.8–2.5) Drugs: OR 3.0 (95% CI 0.5–16.7)

*Assessed multiple outcomes.

TABLE 6 Qualitative study characteristics.

References	Study design	Participants	Country	Number of participants	Research method	Study aim	Data analysis
Hamader et al. (87)	Qualitative	Junior doctors	Germany	11	In-depth interview	Analyze reasons and possible interventions for rising levels of burnout, anxiety, depression.	Mayrings method of content analysis
Daruvala et al. (92)	Mixed-methods	Oncology physicians	India	28	In-depth interview	To explore burnout and its associations.	Coding and thematic analysis
Loiselle et al. (94)	Mixed-methods	Academic physicians (all specialties)	USA	40	In-depth interviews	A transcendental meditation technique—randomized control trial. To assess whether technique decreased burnout/depression/anxiety.	Phenomenological analysis
Riley et al. (88)	Qualitative	General practitioners	UK	47	In-depth interview	Reporting experience of GPs living with distress and mental illness.	Coding and thematic analysis
Spiers et al. (89)	Qualitative	General practitioners	UK	47	In depth interviews	Exploring barriers and facilitators to help seeking in GPs with mental distress (depression/anxiety/suicidal ideation and/or burnout).	Coding and thematic analysis
Spiers et al. (90)	Qualitative	General practitioners	UK	10	In depth interviews	Deeper analysis of a small subset of a larger study to understand experience of GPs living with severe mental illness.	Phenomenological analysis
Wainwright et al. (91)	Qualitative	Anesthesia trainees	UK	12	Semi-structured interviews	Identify the personal and professional factors associated with the development of burnout/depression/stress.	Thematic analysis

and Wainwright et al. (91) document exhaustion due to multiple commitments and lack of time for non-clinical duties as factors in the development of burnout and depression. Nearly all interviewees in Wainwright's (91) study discussed how both work-related and non-clinical work-related pressure led to bouts of exhaustion with one participant describing it as "constantly running on empty."

3.2.4.2. Chronic workplace stress and interpersonal relationships

Almost all participants in a report on the experience of general practitioners living with mental illness describe chronic states of anxiety at work (88), with some reporting physical symptoms of anxiety such as panic attacks, hyperventilation and nausea. Other participants describe features of depression related to work such as crying on way home from a day's work or easy irritability and anger. Spiers et al. (90), Wainwright et al. (91), and Hamader et al. (87) describe factors identified as contributing to the development of chronic work-related stress. Wainwright et al. (91) identifies a number of participants who spoke about feeling unsupported and unsafe or on-edge at work. Both Hamader et al. (88) and Spiers et al. (90) identify lack of collegiality and unsupportive workplace relationships as a source of work-related stress. One participant used language described as "violent" when describing the interactions with colleagues such as "awful," "livid," and "blood bath" (90). However, Spiers et al. (90) and Wainwright et al. (91) also discuss and acknowledge the protective role of supportive work environments and relationships. Wainwright et al. (91) describes the importance of sharing the training experience with peers and Spiers et al. (90) gives numerous examples of how the supportive relationships offer an outlet for inevitable work-related distress.

3.2.4.3. Culture of invulnerability

When investigating barriers and facilitators to help seeking among distressed physicians Spiers et al. (90) identifies a "culture of invulnerability" among physicians, with similar themes described by Wainwright et al. (91), Loiselle et al. (94), and Riley et al. (88). Spiers et al. (90) described the pressure toward "presenteeism" among physicians with several participants describing being ill as a sign of failure. Riley et al. (88) also describes the perception of illness as "failure" or as one interviewee describes it the belief "that you're not strong enough." Wainwright et al. (91) records how participants perceived others to think that seeking professional help is a sign of weakness. An important example of the normalization of chronic stress and illness is a description of how suicidal thoughts can become both constant and normalized among general practitioners, with one interviewee describing it as "filling his waking thoughts and nights" (88). Loiselle et al. (94) attributes the normalization of chronic stress to lack of knowledge of self-care and concludes that this has implications for managing burnout which ultimately leads to clinical depression.

3.2.3.4. Intervention targets

Three studies discuss possible intervention targets to prevent the development of work-related stress, burnout, depression and anxiety. Similar to the overarching themes, described in all studies, intervention targets broadly relate to work conditions and time spent at work, work relationships and the culture of invulnerability in the workplace. Spiers et al. (90) describes "survival strategies"

employed by GPs living and working with mental illness. These include "asserting boundaries" such as not taking on too much and therefore maintaining a work-life balance. Wainwright et al. (91) also highlights the importance of time for non-clinical activities as a target to prevent the development of burnout, anxiety and depression. Both Hamader et al. (87) and Wainwright et al. (91) describe how adequate support, supervision and mentorship may be preventative, by providing psychological support and promoting collegial exchange. Spiers et al. (90) and Wainwright et al. (91) discuss the need to address stigma and move toward a culture change that acknowledges and supports distress at work. Finally, Wainwright et al. (91) highlights a recognition among physicians about their own responsibility for self-care, an important target for managing chronic occupational stress.

4. Discussion

4.1. Integration of qualitative and quantitative findings

Quantitative findings suggest significant relationships between physician burnout and depression and anxiety but less significant or unclear relationships between physician burnout and substance abuse and suicidality. Qualitative studies explored factors related to burnout, anxiety, depression and suicidality as a continuum and add insight and depth to the association identified in quantitative studies. Key areas explored that relate to the development and progression of both exposure and outcome included work related factors such as daily stress and time pressure, challenging or supportive workplace relationships and culture regarding sick leave, mental illness and help-seeking. This will be explored further in the discussion section.

Daily work-related stress exacerbated by the quantity of time spent at work and the lack of time for personal activities formed a central theme of qualitative data. Many quantitative studies also explored and addressed factors described in qualitative interviews and their mediating roles in the development and progression of burnout. Williford et al. (55), who found a statistically significant increase in depression scores in those with burnout asked participants to rank factors that they perceived to be associated with the risk of developing burnout. The highest ranked factor was lack of time for exercise, self-care and doing things they enjoyed. This was followed by conflicting work and personal commitments, a by-product of lack of time. While several quantitative studies investigated the association between hours worked, shift work and burnout or outcomes, results were inconsistent. Nomura et al. (93) and Haik et al. (59) found no significant association between hours worked, night shifts and burnout and Shanafelt et al. (65) similarly reported no association between hours worked and suicidal ideation. There were however frequent associations drawn between outside work activities and decreased levels of burnout and depression, such as time for self-care (92) and increased levels of physical activity (47). This might suggest that number of hours worked or shift patterns may be less important than quality of time spent not at work and work-life balance. Janko et al. (62) found higher levels of burnout in those without access to programmatic social events. Wainwright et al. (91) suggests that recognition of the importance of self-care such as prioritizing outside work activities may be an important target for the prevention of burnout, depression and stress.

The role of collegiality and work relationships is another factor that qualitative studies suggest links workplace stress with burnout and progression to mental illness. While describing the experience of physicians living with mental illness, Spiers et al. (89) describes the influence of poor work relationships as "sometimes actively destructive" but also highlights the protective effect of collegial relationships. Supportive mentorship is suggested as an outlet for the inevitable work-related stress experienced by general practitioners. Hyman et al. (60), who found significant correlation between mental composite scores and burnout scores, also found that professional and personal support was associated with lower EE scores. Janko et al. (62) also identified that those in the highest burnout quartile had higher rates of depression also found that trainees with a self-identified mentor had significantly lower overall burnout scores.

Finally, a culture of invulnerability among physicians is described by both Hamadar et al. (87) and Riley et al. (88) whereby admitting personal struggle and accessing support services is seen as "weakness" or "failure." Riley et al. (87) noted that although feelings of chronic anxiety were prevalent among General Practitioners, even some of those affected did not identify as having mental ill-health. One large cross-sectional study that found a significant association between burnout and suicidal ideation that was independent of depression and symptoms of depression also found that those with suicidal ideation were less likely to seek professional help and more likely to self-prescribe (65). Talih et al. (54) reported a positive association between burnout, depression, anxiety and suicidal ideation and also found that burnout correlated with self-administration of psychotropic medication and that more than 50% of those with suicidal ideation had not sought professional help. Reluctance to seek professional help was also reported to be associated with burnout by Rath et al. (86) as well as with depression and substance abuse. Willford et al. (55) asked study participants to rank barriers to help seeking in severe burnout, shame and denial ranked among the highest reasons for not accessing support services. Spiers et al. (89) noted that no participant spontaneously spoke about available support services despite describing personal issues with burnout and mental health.

None of the included qualitative studies explored alcohol or substance abuse as an outcome of burnout or occupational stress. This adds weight to the inconsistent findings of quantitative studies, suggesting that substance or alcohol abuse may be a coping mechanism that is more individual specific instead of directly correlated.

4.2. Findings in the context of existing literature

A review of burnout literature that analyzed quantity and content of publications prior to 2011 described an exponential rise in relevant material after 2005 (28). Considering that studies included in the current systematic review were predominantly

published after this date, it is apparent that its relevance continues to increase. The large volume of recently published material prompts the need for methodologically appropriate assimilation and interpretation of data. While a number of systematic reviews of the literature have been published, the focus primarily has been on prevalence in different subgroups, interventions, and the impact on patient centered outcomes such as patient safety and quality of healthcare delivery. To the best of our knowledge this is the only systematic review to investigate the relationship between physician burnout and the specific outcomes of depression, anxiety, suicidality and substance abuse and to include qualitative findings to explore the perceived links between exposure and outcome.

The results of this review indicate a consistently positive and strong association between burnout and depression and between burnout and anxiety. This is in keeping with findings among other occupations. Koutsimani et al. (108) reported similar findings in a systematic review that examined the relationship between burnout and depression and burnout and anxiety in all employed adults. The review included only studies that measured correlation and performed a meta-analysis. It was noted that the correlation was not so strong as to suggest that burnout, depression or anxiety are the same entity and concludes that treating them as separate constructs will have implications for potential intervention and targeted solutions. There was also significant heterogeneity of included studies in the review, for reasons similar to those that precluded meta-analysis in the current review.

The current systematic review found inconsistent association between burnout and suicidality and between burnout and substance abuse. Suicide has a well-documented association with depression, however despite similar prevalence of depression among physicians and the general population (109) rates of suicide are higher (110). The question remains as to whether burnout acts a predictor of suicidality independent of depression. Shanafelt et al. (65) reported a strong association between burnout and suicidal ideation that increases with burnout severity and argues that burnout is an independent risk factor after controlling for depression. Medical students were excluded from the current review however a large cohort study of American medical students also found burnout to be independent risk factor for suicidal thoughts and reports reversibility of suicidal ideation with recovery from burnout over time (109). Inconsistencies in results regarding suicidality may be attributed to the challenges measuring suicidal ideation or difference between suicidal ideation and overall suicide behavior. Suicidal ideation is one of the strongest predictors for suicidal acts (111) but is subjective and notoriously difficult to measure (112). Both stigma and "normalization" of suicidal thoughts, as described in qualitative studies included in the review, may lead to study participants denying true intentions. A study that investigated whether the suicidal ideation section of the PHQ 9 predicted suicide in American Veterans found that suicidal ideation as indicated by response to PHQ 9 was significantly associated with death by suicide. It was also reported however, that 71% of suicides that occurred during the study time period occurred among those who reported no suicidal ideation (113).

Findings relating to alcohol and substance misuse favor no or very small association with burnout with the majority of studies finding no significant association. Four studies did find increased rates of alcohol misuse in those with burnout indicating that an association may exist. Pederson et al. (85) noted a significant association that was strongest in the DP domain. DP has been discussed in the literature as a coping strategy for EE (114). It may follow that substance and alcohol abuse may be a maladaptive coping mechanism employed by some physicians with burnout instead of directly and uniformly correlated. It is likely that genetic predisposition, opportunity and personal factors also contribute (115). A qualitative analysis of physicians abusing prescription medication found that those using substances to alleviate stress and anxiety had initially been using the medication to manage pain and were self-prescribing, indicating that substance misuse did not necessarily directly result from stress but may occur as a form of self-treatment (116). Measurement of substance and alcohol misuse present similar challenges as often those effected will be reluctant to admit to the problem for fear of repercussion.

Only seven qualitative studies that addressed the research question were identified by the current review indicating a relative scarcity of qualitative data. However, qualitative research surrounding burnout as a phenomenon does exist. A systematic review and qualitative metasynthesis of physician's perspectives on burnout describes organizational, relation and individual factors associated with the development of burnout (117). The review ranks and structures the factors as a timeline. The development of burnout is described as beginning with organizational factors such high workload, stress and lack of time, followed by relational factors including relational difficulties with other professionals and ultimately individual factors such as guilt, helplessness and doubt are experienced last. Factors highlighted as protective mirror stress factors but are ranked in the opposite direction. Individual protective factors such as self-care were considered most important followed by supportive relationships and finally organizational factors. The researchers point out that those affected will protect themselves individually first and foremost but suggest that relation and organization protective factors should play a more prominent role in the prevention of burnout, given their role in its development. Although this qualitative analysis of burnout contains no mention of other psychological outcomes, many of the same themes are explored in relation to the progression of burnout and development of mental illness in the current review. This would suggest that the factors identified as risk factors for the development of burnout may be implicated in the development of depression, anxiety or suicidal ideation without intervention.

Qualitative studies included in the current review explore both a "culture of invulnerability" that exists among physicians and "normalization" of chronic stress, anxiety and features of mental illness including suicidal thoughts. These factors are explored as barriers to help seeking that may contribute to the progression of burnout to psychological morbidity. This may also offer insight into the reason for the timeline of protective factors described by Sibeoni et al. (117). Admitting to personal struggle has been described as "failure" or "weakness" thus prompting physicians to seek individual solutions such as resilience and self-care first. Lebares et al. (118) found that mindfulness and resilience traits were associated with lower levels of burnout, anxiety and depression but also suggests that organizational based interventions should be developed concomitantly. Fostering a healthy work environment would support the individual while allowing them to draw on their natural strengths. This is supported by two systematic reviews

designed to investigate and compare burnout interventions that suggest that organizational based interventions have a higher treatment effect (119) which is longer lasting (120) than individual based interventions.

In a systematic review that examines the personal and professional consequences of burnout in physicians, Williams et al. (121) describes the phenomenon of burnout as a "loss spiral" or "burnout cascade." It is hypothesized that the severity of consequence relates to the progression of burnout. Initially loss of empathy or intention to leave predominate, followed by depression or anxiety and finally suicidal ideation or physical health problems at the terminal end of the spectrum. Burnout is considered as a continuum rather than an end-state and research attesting to positive association between burnout and all factors considered to be relevant to the "loss spiral" is explored. This study most closely relates to the current review and findings complement one another. Both report significant association between burnout and depression and burnout and anxiety. These outcomes are studied in more detail in the current review with inclusion of more relevant studies adding weight and credibility to the association. The current review finds a weaker association between burnout and suicidality which may be accounted for by the association only occurring in the case of severe or end-stage burnout as is described by Williams et al. (116). Williams et al. (116) reports an association with alcohol abuse and it is described as a means of coping with increasing distress. The current review questions this association as results are inconsistent and favor no direct association. However, as discussed, individual coping style and personal factors may account for the link between burnout and alcohol abuse. Williams et al. (116) discuss the need for organizational processes and effective leadership in preventing progression through the burnout cascade through targeted interventions. Changing the workplace culture that discourages help-seeking and promoting team-work and support are described as "resources" that make up for the loss in the "loss spiral." Qualitative findings from the current review that explore workplace stress, burnout, depression, anxiety and suicidality as continuum support this view.

4.3. Limitations

There was limitation from the review methods and search strategy chosen as due to language and budgetary constraints, studies with no English translation were excluded allowing for potential exclusion of relevant studies.

There is considerable heterogeneity of included studies particularly relating to population characteristics and measurement of exposure and outcome. This not only precludes meta-analysis of results but may also affect the generalizability of findings. Most studies featured subgroups of physicians and focused on either one institution or one group of institutions. Although study results are not sufficiently different as to suggest that degree of association was significantly different between subgroups, caution must be taken when considering study results together. There were also notable differences in method of measurement of exposure and interpretation of measurement results. Although the most commonly used measurement tool was used in 46 of 54 studies, interpretation of measurement score was much more variable. While 17 studies evaluated burnout domain scores as separate continuous variables as is recommended by MBI guidelines (114) the remainder used alternative interpretations such as defining burnout "cutoff" scores and evaluating burnout as a dichotomous variable. While rationale for interpretation is clearly outlined in all studies, differences may influence overall strength of association as the interpretation of exposure is not consistent across all studies. Previous systematic reviews have noted differences in effect sizes when different measurement tools are used and specifically noted lower effect sizes when the MBI is used compared to other burnout measurement tools (122). Results may therefore differ depending on measurement tool used and may distort results when considered as a whole.

This review was carried out prior to the increase in burnout literature relating to physicians and burnout related to the COVID pandemic. Future studies could update this review encompassing evolving literature studying the association of depression, anxiety, substance abuse and suicidality within the context of workplace burnout during and after the COVID Pandemic.

There are a number of limitations within the included studies which need to be considered. For example the participants of included studies may have been subject to selection bias and not representative of the study population. By design cross-sectional analysis is vulnerable to selection bias (123). Participation was voluntary across all studies and therefore respondents may represent a self-selected group. Specific to this review, participants with burnout may be less likely to respond due to lack of time or motivation or alternatively more likely to respond due to interest in the subject matter. This can be addressed with sample size calculation or high response rates. Many studies used internet-based surveys to address confidentiality concerns and encourage response rates. Recall bias can play a role in the measurement of exposure and outcome. Cross-sectional analysis takes place in a single moment in time and therefore responses may only be representative of current state or short time-period prior to survey as opposed to overall long-term state. Further to this cross-sectional analysis allows for limited means to account for confounding factors may distort reported association between exposure and outcome (123). Only half of included studies addressed the possibility of confounding. One study used a control group to control for confounding; however, this study was deemed to have low overall quality.

Additionally, often there was inability of study design to determine causality. Many studies report the depression or depressive symptoms as a risk factor for burnout calling into question the direction of causality.

4.4. Recommendations

Recommendations:

- The current review not only highlights the volume of studies that address the research question but also gives an indication

as to the gaps that continue to exist in the literature. The inability of cross-sectional studies to provide information regarding the temporal relationship between exposure and outcome is the most frequently discussed limitation among included quantitative studies. The consistency of significant findings regarding the association between burnout and depression and burnout and anxiety suggest that an association does exist however it is impossible, based on study design, to make any assumption regarding causality or direction of association. A well-designed prospective cohort study could give insight into how burnout develops over time, how severity changes in the face of different factors and whether other psychological outcomes precede, coincide with or occur as a result of burnout.

- The relative scarcity of qualitative literature compared to quantitative studies suggests the need for further qualitative investigation of the research question. Literature suggests that burnout is a complex process that does not occur in a vacuum but encompasses multiple social, environmental and personal facets. Full exploration of such a phenomenon benefits from in-depth qualitative analysis that can add insight, detail and context to findings measured by quantitative analysis.
- Meaningful assimilation and comparison of study results is limited by the heterogeneity of burnout measurement, most notably the lack of consensus regarding the interpretation of burnout measurement scores and importance of burnout domains. Future research would benefit from clarity regarding the definition of burnout and burnout domains.
- Despite the discussed limitations and gaps in knowledge provided by the current review, findings allow a number of suggestions for practice and policy. Results regarding physician burnout and depression are consistent and thus highlight the importance of the relationship. Although a smaller number, findings are similarly consistent for burnout and anxiety. This identifies burnout as a possible target for intervention to prevent more serious psychological illness indicating the importance of its early recognition. Qualitative data provides detailed description of how feelings of depression and anxiety relate to workplace stress and highlights perceived links. Although intervention is outside the scope of this review the results highlight how intervention may be considered.
- Qualitative data suggests that the relationship is influenced by both individual factors such as work-life balance and organizational factors such as collegiality and the culture and stigma surrounding wellbeing and help-seeking. This suggests that both individual and organizational interventions are required to fully address the problem of burnout and its progression. A recent review of interventions targeting physician burnout described primarily interventions relating to individual factors such as relaxation techniques and coping strategies (124). Our review would suggest that equal emphasis should be placed on organizational interventions that promote collegiality and a workplace culture that acknowledges vulnerability and encourages help-seeking.

5. Conclusion

The current systematic review presents findings suggestive of a significant association between both burnout and depression and burnout and anxiety in physicians and an important relationship between burnout and suicidality. The relationship between substance misuse and physician burnout is less clear with results indicating that any association may be related to specific components of burnout or confounded by other personality or environmental variables. Lack of longitudinal data limits any assumption regarding causality or direction of the association and is therefore a suggested target for future research. Similarly, heterogeneity of criteria used to define burnout limits comparison of results and future research may benefit from consensus regarding burnout measurement. Detailed description of the manifestations of chronic workplace stress, burnout, depression, anxiety and suicidal ideation provided by qualitative results highlighting the importance, nature and consequences of the relationship. Qualitative data also suggests perceived links that facilitate the progression of workplace stress and burnout to psychological outcomes including lack of time for work-life balance, a workplace culture that normalizes psychological distress acting as a barrier to help-seeking and poor collegial relationships. The WHO defines burnout as a problem related to employment (3). Our results indicate that as such it may act as risk factor for more serious psychological morbidity in physicians and that both individual and organizational interventions may be beneficial.

Data availability statement

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

Author contributions

ER conceived the study idea and conducted data analysis. ER and TJ contributed to study design. ER and KH conducted the search, screening, and data extraction. ER, TJ, and JP drafted the manuscript. All authors approved the manuscript for publication.

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 conflicts 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/fpubh.2023.1133484/full#supplementary-material

References

1. Maslach C, Jackson SE. Burned-out cops and their families. *Psychol Today*. (1979) 12:59–62.

2. Freudenberger HJ. Staff burn-out. *J Soc Issues*. (1974) 30:159–65. doi: 10.1111/j.1540-4560.1974.tb00706.x

3. The World Health Organisation. *WHO | International Classification of Diseases, 11th Revision (ICD-11). Internation Classification of Diseases 11th Revision (ICD-11)* (2019).

4. Afonso AM, Cadwell JB, Staffa SJ, Zurakowski D, Vinson AE. Burnout rate and risk factors among anesthesiologists in the United States. *Anesthesiology*. (2021) 134:683–96. doi: 10.1097/ALN.0000000000003722

5. Jun J, Ojemeni MM, Kalamani R, Tong J, Crecelius ML. Relationship between nurse burnout, patient and organizational outcomes: systematic review. *Int J Nurs Stud*. (2021) 119:103933. doi: 10.1016/j.ijnurstu.2021.103933

6. Center C, Davis M, Detre T, Ford DE, Hansbrough W, Hendin H, et al. Confronting depression and suicide in physicians: a consensus statement. *JAMA*. (2003) 289:3161–6. doi: 10.1001/jama.289.23.3161

7. Frank E, Biola H, Burnett CA. Mortality rates and causes among U.S. physicians. *Am J Prev Med*. (2000) 19:155–9. doi: 10.1016/S0749-3797(00)00201-4

8. Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, et al. Prevalence of burnout among physicians a systematic review. *JAMA*. (2018) 320:1131–50. doi: 10.1001/jama.2018.12777

9. Rathert C, Williams ES, Linhart H. Evidence for the quadruple aim: a systematic review of the literature on physician burnout and patient outcomes. *Med Care*. (2018) 56:976–84. doi: 10.1097/MLR.0000000000000999

10. Dewa CS, Loong D, Bonato S, Thanh NX, Jacobs P. How does burnout affect physician productivity? A systematic literature review. *BMC Health Serv Res*. (2014) 14:325. doi: 10.1186/1472-6963-14-325

11. Han TD S, Shanafelt, Sinsky CA, Awad KM, Dyrbye LN, Fiscus LC, et al. Estimating the attributable cost of physician burnout in the United States. *Ann Intern Med*. (2019) 170:784–90. doi: 10.7326/M18-1422

12. Maslach C, Leiter MP. Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry*. (2016) 15:103. doi: 10.1002/wps.20311

13. Carpenter LM, Swerdlow AJ, Fear NT. Mortality of doctors in different specialties: findings from a cohort of 20 000 NHS hospital consultants. *Occup Environ Med*. (1997) 54:388–95. doi: 10.1136/oem.54.6.388

14. Schernhammer ES, Colditz GA. Suicide rates among physicians: a quantitative and gender assessment (meta-analysis). *Am J Psychiatry*. (2004) 161:2295–302. doi: 10.1176/appi.ajp.161.12.2295

15. Sansone RA, Sansone LA. Physician suicide: a fleeting moment of despair. *Psychiatry*. (2009) 6:18.

16. Brooks SK, Gerada C, Chalder T. Review of literature on the mental health of doctors: are specialist services needed? *J Mental Health*. (2011) 20:146–56. doi: 10.3109/09638237.2010.541300

17. Tyssen R, Vaglum P, Gronvold NT, Ekeberg O, NT G, Ekeberg Ø. The impact of job stress and working conditions on mental health problems among junior house officers. A nationwide Norwegian prospective cohort study. *Med Educ*. (2000) 34:374–84. doi: 10.1046/j.1365-2923.2000.00540.x

18. Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, et al. Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand*. (2004) 109:21–7. doi: 10.1111/j.1600-0047.2004.00325.x

19. Rose GL, Brown RE. The impaired anesthesiologist: not just about drugs and alcohol anymore. *J Clin Anesth*. (2010) 22:379–84. doi: 10.1016/j.jclinane.2009.09.009

20. Swendsen JD, Merikangas KR. The comorbidity of depression and substance use disorders. *Clin Psychol Rev*. (2000) 20:173–89. doi: 10.1016/S0272-7358(99)00026-4

21. Marshall EJ. Doctors' health and fitness to practise: treating addicted doctors. *Occup Med*. (2008) 58:334–40. doi: 10.1093/occmed/kqn081

22. Morse RM, Martin MA, Swenson WM, Niven RG. Prognosis of physicians treated for alcoholism and drug dependence. *JAMA*. (1984) 251:743–6. doi: 10.1001/jama.251.6.743

23. Bosch X. First impaired physicians therapy program appears to be successful in Spain. *J Am Med Assoc*. (2000) 283:3186–7. doi: 10.1001/jama.283.24.3186-JMN0628-2-1

24. Renzi C, Di Pietro C, Tabolli S. Psychiatric morbidity and emotional exhaustion among hospital physicians and nurses: association with perceived job-related factors. *Arch Environ Occup Heal*. (2012) 67:117–23. doi: 10.1080/19338244.2011.578682

25. Vandevala T, Pavey L, Chelidoni O, Chang N-F, Creagh-Brown B, Cox A. Psychological rumination and recovery from work in intensive care professionals: associations with stress, burnout, depression and health. *J Intensive Care*. (2017) 5:16. doi: 10.1186/s40560-017-0209-0

26. Bianchi R, Boffy C, Hingray C, Truchot D, Laurent E. Comparative symptomatology of burnout and depression. *J Health Psychol*. (2013) 18:782–7. doi: 10.1177/1359105313481079

27. Messias E, Flynn V. The tired, retired, and recovered physician: professional burnout versus major depressive disorder. *Am J Psychiatry*. (2018) 175:716–9. doi: 10.1176/appi.ajp.2018.17121325

28. Heinemann LV, Heinemann T. Burnout research: emergence and scientific investigation of a contested diagnosis. *SAGE Open*. (2017) 7:2158244017697154. doi: 10.1177/2158244017697154

29. Moher D, Liberati A, Tetzlaff J, Altman DG, Group TP. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. (2009) 6:e1000097. doi: 10.1371/journal.pmed.1000097

30. Severinsson E. Moral stress and burnout: qualitative content analysis. *Nurs Heal Sci*. (2003) 5:59–66. doi: 10.1046/j.1442-2018.2003.00135.x

31. Munn Z, Stern C, Aromataris E, Lockwood C, Jordan Z. What kind of systematic review should i conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences. *BMC Med Res Methodol*. (2018) 18:5. doi: 10.1186/s12874-017-0468-4

32. Joanna Briggs Institute. *Critical Appraisal Tools*. (2005). Vol. 6. p. 2006. Available online at: http://www.cebm.net/critical-appraisal/

33. Critical Appraisal Skills Programme. *CASP Qualitative Checklist*. Casp (2018). p. 1. Available online at: http://www.casp-uk.net/casp-tools-checklists (accessed January 21, 2022).

34. Pearson A, White H, Bath-Hextall F, Salmond S, Apostolo J, Kirkpatrick P. A mixed-methods approach to systematic reviews. *Int J Evid Based Healthc*. (2015) 13:121–31. doi: 10.1097/XEB.0000000000000052

35. Siu Dr. CFY, Yuen SK, Cheung Dr. A. Burnout among public doctors in Hong Kong: cross-sectional survey. *Hong Kong Med J*. (2012) 18:186–92.

36. Campbell J, Prochazka A V, Yamashita T, Gopal R. Predictors of persistent burnout in internal medicine residents: a prospective cohort study. *Acad Med J Assoc Am Med Coll*. (2010) 85:1630–4. doi: 10.1097/ACM.0b013e3181f0c4e7

37. Carter RD. Physician wellness: impact of stress, burnout, and depression on medical trainee empathy.*Dissert Abstracts Int Sect A Hum Soc Sci*. (2019) 80.

38. Chaukos D, Chad-Friedman E, Mehta DH, Byerly L, Celik A, McCoy THJ, et al. Risk and resilience factors associated with resident burnout. *Acad Psychiatry*. (2017) 41:189–94. doi: 10.1007/s40596-016-0628-6

39. Van der Heijden F, Dillingh G, Bakker A, Prins J, van der Heijden F, Dillingh G, et al. Suicidal thoughts among medical residents with burnout. *Arch Suicide Res Off J Int Acad Suicide Res*. (2008) 12:344–6. doi: 10.1080/13811110802325349

40. Faivre G, Kielwasser H, Bourgeois M, Panouilleres M, Loisel F, Obert L. Burnout syndrome in orthopaedic and trauma surgery residents in France: a nationwide survey. *Orthop Traumatol Surg Res*. (2018) 104:1291–5. doi: 10.1016/j.otsr.2018.08.016

41. Ferrari S, Cuoghi G, Mattei G, Carra E, Volpe U, Jovanovic N, et al. Young and burnt? Italian contribution to the international BurnOut Syndrome Study (BOSS) among residents in psychiatry. *Med Lav*. (2015) 106:172–85.

42. Govardhan LM, Pinelli V, Schnatz PF. Burnout, depression and job satisfaction in obstetrics and gynecology residents. *Conn Med*. (2012) 76:389–95.

43. Juntunen J, Asp S, Olkinuora M, Aärimaa M, Strid L, Kauttu K. Doctors' drinking habits and consumption of alcohol. *BMJ*. (1988) 297:951–4. doi: 10.1136/bmj.297.6654.951

44. Karaoglu N, Pekcan S, Durduran Y, Mergen H, Odabasi D, Ors R. A sample of paediatric residents' loneliness-anxiety-depression-burnout and job satisfaction with probable affecting factors. *J Pak Med Assoc*. (2015) 65:183–91.

45. Lazarescu I, Dubray B, Joulakian MB, Blanchard P, Chauvet B, Mahé M-A, et al. Prevalence of burnout, depression and job satisfaction among French senior and resident radiation oncologists. *Cancer Radiother J La Soc Fr Radiother Oncol*. (2018) 22:784–9. doi: 10.1016/j.canrad.2018.02.005

46. Lebares CC, Guvva E V, Ascher NL, O'Sullivan PS, Harris HW, Epel ES, et al. Burnout and stress among US surgery residents: psychological distress and resilience. *J Am Coll Surg*. (2018) 226:80–90. doi: 10.1016/j.jamcollsurg.2017.10.010

47. Lebensohn P, Dodds S, Benn R, Brooks AJ, Birch M, Cook P, et al. Resident wellness behaviors: relationship to stress, depression, and burnout. *Fam Med*. (2013) 45:541–9.

48. Lu DW, Dresden S, McCloskey C, Branzetti J, Gisondi MA, Branzetti J. Impact of burnout on self-reported patient care among emergency physicians. *West J Emerg Med*. (2015) 16:996–1001. doi: 10.5811/westjem.2015.9.27945

49. Mohammed KA-M, Ali EG, Youssef IM, Fahmy MT, Haggag WE. Depression and burnout among residents. *Arab J Psychiatry*. (2014) 25:40–51. doi: 10.12816/0004114

50. Nishimura Y, Miyoshi T, Obika M, Ogawa H, Kataoka H, Otsuka F. Factors related to burnout in resident physicians in Japan. *Int J Med Educ*. (2019) 10:129–35. doi: 10.5116/ijme.5caf.53ad

51. Ofei-Dodoo S, Kellerman R, Gilchrist K, Casey EM. Burnout and quality of life among active member physicians of the medical society of Sedgwick County. *Kansas J Med*. (2019) 12:33–9. doi: 10.17161/kjm.v12i2.11701

52. Pasqualucci PL, Damaso LLM, Danila AH, Fatori D, Lotufo Neto F, Koch VHK. Prevalence and correlates of depression, anxiety, and stress in medical residents of a Brazilian academic health system. *BMC Med Educ*. (2019) 19:193. doi: 10.1186/s12909-019-1621-z

53. Sun W, Fu J, Chang Y, Wang L. Epidemiological study on risk factors for anxiety disorder among chinese doctors. *J Occup Health*. (2012) 54:1–8. doi: 10.1539/joh.11-0169-OA

54. Talih F, Warakian R, Ajaltouni J, Shehab AAS, Tamim H, Shehab AAS. Correlates of depression and burnout among residents in a lebanese academic medical center: a cross-sectional study. *Acad Psychiatry*. (2016) 40:38–45. doi: 10.1007/s40596-015-0400-3

55. Williford ML, Scarlet S, Meyers MO, Luckett DJ, Fine JP, Goettler CE, et al. Multiple-institution comparison of resident and faculty perceptions of burnout and depression during surgical training. *JAMA Surg*. (2018) 153:705–11. doi: 10.1001/jamasurg.2018.0974

56. Ashraf F, Ahmad H, Shakeel M, Aftab S, Masood A. Mental health problems and psychological burnout in Medical Health Practitioners: a study of associations and triadic comorbidity. *Pakistan J Med Sci*. (2019) 35:1558–64. doi: 10.12669/pjms.35.6.444

57. Boo YL, Liam CCK, Lim SY, Look ML, Tan MH, Ching SM, et al. Stress and burnout syndrome in health-care providers treating dengue infection: a cross-sectional study. *Med J Malaysia*. (2018) 73:371–5.

58. Bourne T, Shah H, Falconieri N, Timmerman D, Lees C, Wright A, et al. Burnout, well-being and defensive medical practice among obstetricians and gynaecologists in the UK: cross-sectional survey study. *BMJ Open*. (2019) 9:e030968. doi: 10.1136/bmjopen-2019-030968

59. Haik J, Brown S, Liran A, Visentin D, Sokolov A, Zilinsky I, et al. Burnout and compassion fatigue: prevalence and associations among Israeli burn clinicians. *Neuropsychiatr Dis Treat*. (2017) 13:1533–40. doi: 10.2147/NDT.S133181

60. Hyman SA, Shotwell MS, Michaels DR, Han X, Card EB, Morse JL, et al. A survey evaluating burnout, health status, depression, reported alcohol and substance use, and social support of anesthesiologists. *Anesth Analg*. (2017) 125:2009–18. doi: 10.1213/ANE.0000000000002298

61. Korkeila J, Töyry S, Kumpulainen K, Toivola J-M, Räsänen K, Kalimo R, et al. Burnout and self-perceived health among Finnish psychiatrists and child psychiatrists: a national survey. *Scand J Public Health*. (2003) 31:85–91. doi: 10.1080/14034940210133880

62. Janko MR, Smeds MR. Burnout, depression, perceived stress, and self-efficacy in vascular surgery trainees. *J Vasc Surg*. (2019) 69:1233–42. doi: 10.1016/j.jvs.2018.07.034

63. Khan A, Teoh KR, Islam S, Hassard J. Psychosocial work characteristics, burnout, psychological morbidity symptoms and early retirement intentions: a cross-sectional study of NHS consultants in the UK. *BMJ Open*. (2018) 8:e018720. doi: 10.1136/bmjopen-2017-018720

64. Mampuya WA, Matsuo Y, Nakamura A, Hiraoka M. Evaluation of the prevalence of burnout and psychological morbidity among radiation oncologist members of the Kyoto Radiation Oncology Study Group (KROSG). *J Radiat Res*. (2017) 58:217–24. doi: 10.1093/jrr/rrw094

65. Shanafelt TD, Balch CM, Dyrbye L, Bechamps G, Russell T, Satele D, et al. Special report: suicidal ideation among American surgeons. *Arch Surg*. (2011) 146:54–62. doi: 10.1001/archsurg.2010.292

66. Thommasen H V, Connelly I, Lavanchy M, Berkowitz J, Grzybowski S. Short report: burnout, depression, and moving away. How are they related? *Can Fam Physician*. (2001) 47:747–9.

67. Wurm W, Vogel K, Holl A, Ebner C, Bayer D, Mörkl S, et al. Depression-burnout overlap in physicians. *PLoS ONE*. (2016) 11:e0149913. doi: 10.1371/journal.pone.0149913

68. Yilmaz A. Burnout, job satisfaction, and anxiety-depression among family physicians: a cross-sectional study. *J Fam Med Prim Care*. (2018) 7:952–6. doi: 10.4103/jfmpc.jfmpc_59_18

69. Zhang Y, Chu X, Sha Y, Zeng X, Shen T. Survey of job burnout and depression in standardized residency training programs in China. *Medicine*. (2019) 98:e16890. doi: 10.1097/MD.0000000000016890

70. Zhou J, Yang Y, Qiu X, Yang X, Pan H, Ban B, et al. Relationship between anxiety and burnout among Chinese physicians: a moderated mediation model. *PLoS ONE*. (2016) 11:e0157013. doi: 10.1371/journal.pone.0157013

71. Faivre G, Marillier G, Nallet J, Nezelof S, Clment I, Obert L. Are French orthopedic and trauma surgeons affected by burnout? Results of a nationwide survey. *Orthop Traumatol Res*. (2019) 105:395–9. doi: 10.1016/j.otsr.2018.12.009

72. Looseley A, Wainwright E, Cook TM, Bell V, Hoskins S, O'Connor M, et al. Stress, burnout, depression and work satisfaction among UK anaesthetic trainees; a quantitative analysis of the Satisfaction and Wellbeing in Anaesthetic Training study. *Anaesthesia*. (2019) 74:1231–9. doi: 10.1111/anae.14681

73. Whitley TW, Gallery ME, Allison EJ Jr, Revicki DA. Factors associated with stress among emergency medicine residents. *Ann Emerg Med*. (1989) 18:1157–61. doi: 10.1016/S0196-0644(89)80051-4

74. Becker JL, Milad MP, Klock SC. Burnout, depression, and career satisfaction: cross-sectional study of obstetrics and gynecology residents. *Am J Obstet Gynecol*. (2006) 195:1444–9. doi: 10.1016/j.ajog.2006.06.075

75. Bernburg M, Vitzthum K, Groneberg DA, Mache S. Physicians' occupational stress, depressive symptoms and work ability in relation to their working environment: a cross-sectional study of differences among medical residents with various specialties working in German hospitals. *BMJ Open*. (2016) 6:e011369. doi: 10.1136/bmjopen-2016-011369

76. Iorga M, Socolov V, Muraru D, Dirtu C, Soponaru C, Ilea C, et al. Factors influencing burnout syndrome in obstetrics and gynecology physicians. *Biomed Res Int*. (2017) 2017:1–10. doi: 10.1155/2017/9318534

77. Pompili M, Innamorati M, Narciso V, Kotzalidis GD, Dominici G, Talamo A, et al. Burnout, hopelessness and suicide risk in medical doctors. *Clin Ter*. (2010) 161:511–4.

78. Sahin B, Musaoglu E, Dogan B, Yildirim A, Arslan T, Sahin H. Profile differences of medical doctors from three different hospitals in Turkey concerning burnout, job satisfaction, and depression. *Klin Psikiyatr Dergisi-Turkish J Clin Psychiatry*. (2019) 22:148–56. doi: 10.5505/kpd.2019.73792

79. Tateno M, Jovanović N, Beezhold J, Uehara-Aoyama K, Umene-Nakano W, Nakamae T, et al. Suicidal ideation and burnout among psychiatric trainees in Japan. *Early Interv Psychiatry*. (2018) 12:935–7. doi: 10.1111/eip.12466

80. Toral-Villanueva R, Aguilar-Madrid G, Juárez-Pérez CA. Burnout and patient care in junior doctors in Mexico City. *Occup Med*. (2009) 59:8–13. doi: 10.1093/occmed/kqn122

81. Williamson K, Lank PM, Cheema N, Hartman N, Lovell EO. Comparing the maslach burnout inventory to other well-being instruments in emergency medicine residents. *J Grad Med Educ*. (2018) 10:532–6. doi: 10.4300/JGME-D-18-00155.1

82. Oreskovich MR, Shanafelt T, Dyrbye LN, Tan L, Sotile W, Satele D, et al. The prevalence of substance use disorders in American physicians. *Am J Addict*. (2015) 24:30–8. doi: 10.1111/ajad.12173

83. Oreskovich MR, Kaups KL, Balch CM, Hanks JB, Satele D, Sloan J, et al. Prevalence of alcohol use disorders among American surgeons. *Arch Surg*. (2012) 147:168–74. doi: 10.1001/archsurg.2011.1481

84. Mikalauskas A, Benetis R, Širvinskas E, Andrejaitiene J, Kinduris Š, Macas A, et al. Burnout among anesthetists and intensive care physicians. *Open Med*. (2018) 13:105–12. doi: 10.1515/med-2018-0017

85. Pedersen AF, Sørensen JK, Bruun NH, Christensen B, Vedsted P. Risky alcohol use in Danish physicians: associated with alexithymia and burnout? *Drug Alcohol Depend*. (2016) 160:119–26. doi: 10.1016/j.drugalcdep.2015.12.038

86. Rath KS, Huffman LB, Phillips GS, Carpenter KM, Fowler JM. Burnout and associated factors among members of the Society of Gynecologic Oncology. *Am J Obstet Gynecol*. (2015) 213:824.e1–9. doi: 10.1016/j.ajog.2015.07.036

87. Hamader G, Noehammer E. Prevention of anxiety, depression and burnout during medical studies and residency training (experts' opinion, medical students' and

young doctors' point of view). In: Noehammer E, editor. *Psychology of Well-Being: Theory, Perspectives and Practice*. Hauppauge, NY: Nova Science Publishers (2013). p. 33–42. Available online at: http://proxy.library.rcsi.ie/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2013-28789-003&site=ehost-live (accessed February 21, 2022).

88. Riley R, Spiers J, Chew-Graham CA, Taylor AK, Thornton GA, Buszewicz M. "Treading water but drowning slowly": what are GPs' experiences of living and working with mental illness and distress in England? A qualitative study. *BMJ Open*. (2018) 8:e018620. doi: 10.1136/bmjopen-2017-018620

89. Spiers J, Buszewicz M, Chew-Graham CA, Gerada C, Kessler D, Leggett N, et al. Barriers, facilitators, and survival strategies for GPs seeking treatment for distress: a qualitative study. *Br J Gen Pract J R Coll Gen Pract*. (2017) 67:e700–8. doi: 10.3399/bjgp17X692573

90. Spiers J, Buszewicz M, Chew-Graham CA, Riley R. The experiences of general practitioner partners living with distress: an interpretative phenomenological analysis. *J Health Psychol*. (2018) 2018:1359105318758860. doi: 10.1177/1359105318758860

91. Wainwright E, Looseley A, Mouton R, O'Connor M, Taylor G, Cook TM. Stress, burnout, depression and work satisfaction among UK anaesthetic trainees: a qualitative analysis of in-depth participant interviews in the satisfaction and wellbeing in anaesthetic training study. *Anaesthesia*. (2019) 74:1240–51. doi: 10.1111/anae.14694

92. Daruvala R, Ghosh M, Fratazzi F, Norzan SA, Laha A, Ahmed R, et al. Emotional exhaustion in cancer clinicians: a mixed methods exploration. *Indian J Med Paediatr Oncol*. (2019) 40:111–20. doi: 10.4103/ijmpo.ijmpo_168_17

93. Nomura O, Mishina H, Kobayashi Y, Ishiguro A, Sakai H, Kato H, et al. Limitation of duty hour regulations for pediatric resident wellness: a mixed methods study in Japan. *Medicine*. (2016) 95:e4867. doi: 10.1097/MD.0000000000004867

94. Loiselle ME. Academic physician burnout and transcendental meditation: a mixed methods randomized controlled trial. *Dissert Abstracts Int Sect B Sci Eng*. (2018) 79.

95. Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy K MP-F. Chapter 7: systematic reviews of etiology and risk - Joanna Briggs Institute Reviewers' manual. In: *Joanna Briggs Institute Reviewer's Manual*. JBI (2017).

96. Robertson J, Walkom EJ, McGettigan P. Response rates and representativeness: a lottery incentive improves physician survey return rates. *Pharmacoepidemiol Drug Saf*. (2005) 14:571–7. doi: 10.1002/pds.1126

97. Chaukos D, Chad-Friedman E, Mehta DH, Byerly L, Celik A, McCoy TH Jr, et al. SMART-R: a prospective cohort study of a resilience curriculum for residents by residents. *Acad Psychiatry J Am Assoc Dir Psychiatr Resid Train Assoc Acad Psychiatry*. (2018) 42:78–83. doi: 10.1007/s40596-017-0808-z

98. Kroenke K, Spitzer RL, Williams JBW, Löwe B. The patient health questionnaire somatic, anxiety, and depressive symptom scales: a systematic review. *Gen Hosp Psychiatry*. (2010) 32:345–59. doi: 10.1016/j.genhosppsych.2010.03.006

99. Zhang L, Wang F, Cheng Y, Zhang P, Liang Y. Work characteristics and psychological symptoms among GPs and community nurses: a preliminary investigation in China. *Int J Qual Heal Care*. (2016) 28:709–14. doi: 10.1093/intqhc/mzw098

100. Sun H, Warner DO, Macario A, Zhou Y, Culley DJ, Keegan MT. Repeated cross-sectional surveys of burnout, distress, and depression among anesthesiology residents and first-year graduates. *Anesthesiology*. (2019) 131:668–77. doi: 10.1097/ALN.0000000000002777

101. Aish AM, Wasserman D. Does Beck's Hopelessness Scale really measure several components? *Psychol Med*. (2001) 31:367–72. doi: 10.1017/S0033291701003300

102. Saunders JB, Aasland OG, Babor TF, De La Fuente JR, Grant M. Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction*. (1993) 88:791–804. doi: 10.1111/j.1360-0443.1993.tb02093.x

103. Ewing JA. Detecting alcoholism: the CAGE questionnaire. *JAMA*. (1984) 252:1905–7. doi: 10.1001/jama.1984.03350140051025

104. Goerlich KS. The multifaceted nature of alexithymia - a neuroscientific perspective. *Front Psychol*. (2018) 9:1614. doi: 10.3389/fpsyg.2018.01614

105. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nurs Health Sci*. (2013) 15:398–405. doi: 10.1111/nhs.12048

106. Biggerstaff D, Thompson AR. Interpretative phenomenological analysis (IPA): a qualitative methodology of choice in healthcare research. *Qual Res Psychol*. (2008) 5:214–24. doi: 10.1080/14780880802314304

107. Mayring P. Qualitative content analysis. *Companion Qual Res*. (2004) 1:159–76.

108. Koutsimani P, Montgomery A, Georganta K. The relationship between burnout, depression, and anxiety: a systematic review and meta-analysis. *Front Psychol*. (2019) 10:284. doi: 10.3389/fpsyg.2019.00284

109. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Acad Med J Assoc Am Med Coll*. (2006) 81:354–73. doi: 10.1097/00001888-200604000-00009

110. Lindeman S, Läärä E, Hakko H, Lönnqvist J. A systematic review on gender-specific suicide mortality in medical doctors. *Br J Psychiatry*. (1996) 168:274–9. doi: 10.1192/bjp.168.3.274

111. Ten Have M, De Graaf R, Van Dorsselaer S, Verdurmen J, Van't Land H, Vollebergh W, et al. Incidence and course of suicidal ideation and suicide attempts in the general population. *Can J Psychiatry*. (2009) 54:824–33. doi: 10.1177/070674370905401205

112. Freedenthal S. Challenges in assessing intent to die: can suicide attempters be trusted? *OMEGA*. (2007) 55:57–70. doi: 10.2190/5867-6510-3388-3517

113. Louzon SA, Bossarte R, McCarthy JF, Katz IR. Does suicidal ideation as measured by the PHQ-9 predict suicide among VA patients? *Psychiatr Serv*. (2016) 67:517–22. doi: 10.1176/appi.ps.201500149

114. Maslach C, Jackson SE, Leiter M. *The Maslach Burnout Inventory Manual*. (2015). Available online at: https://www.researchgate.net/publication/277816643 (accessed September 18, 2020).

115. Mavroforou A, Giannoukas A, Michalodimitrakis E, Mavroforou A, Giannoukas A, Michalodimitrakis E. Alcohol and drug abuse among doctors. *Med Law*. (2006) 25:611–25.

116. Merlo LJ, Singhakant S, Cummings SM, Cottler LB. Reasons for misuse of prescription medication among physicians undergoing monitoring by a physician health program. *J Addict Med*. (2013) 7:349–53. doi: 10.1097/ADM.0b013e31829da074

117. Sibeoni J, Bellon-Champel L, Mousty A, Manolios E, Verneuil L, Revah-Levy A. Physicians' perspectives about burnout: a systematic review and metasynthesis. *J Gen Intern Med*. (2019) 34:1578–90. doi: 10.1007/s11606-019-05062-y

118. Lebares CC, Hershberger AO, Guvva E V, Desai A, Mitchell J, Shen W, et al. Feasibility of formal mindfulness-based stress-resilience training among surgery interns: a randomized clinical trial. *JAMA Surg*. (2018) 153:e182734. doi: 10.1001/jamasurg.2018.2734

119. Panagioti M, Panagopoulou E, Bower P, Lewith G, Kontopantelis E, Chew-Graham C, et al. Controlled interventions to reduce burnout in physicians a systematic review and meta-analysis. *JAMA Intern Med*. (2017) 177:195–205. doi: 10.1001/jamainternmed.2016.7674

120. LaMontagne AD, Keegel T, Louie AM, Ostry A, Landsbergis PA. A systematic review of the job-stress intervention evaluation literature, 1990-2005. *Int J Occup Environ Health*. (2007) 13:268–80. doi: 10.1179/oeh.2007.13.3.268

121. Williams ES, Rathert C, Buttigieg SC. The personal and professional consequences of physician burnout: a systematic review of the literature. *Med Care Res Rev*. (2019) 2019:1077558719856787. doi: 10.1177/1077558719856787

122. Panagioti M, Geraghty K, Johnson J, Zhou A, Panagopoulou E, Chew-Graham C, et al. Association between physician burnout and patient safety, professionalism, and patient satisfaction a systematic review and meta-analysis. *JAMA Intern Med*. (2018) 178:1317–30. doi: 10.1001/jamainternmed.2018.3713

123. Wang X, Cheng Z. Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*. (2020) 158:S65–71. doi: 10.1016/j.chest.2020.03.012

124. Wiederhold BK, Cipresso P, Pizzioli D, Wiederhold M, Riva G. Intervention for physician burnout: a systematic review. *Open Med*. (2018) 13:253–63. doi: 10.1515/med-2018-0039

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Burnout and job stress of anesthesiologists in the tertiary class A hospitals in Northwest China: A cross-sectional design

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Purpose: Our purpose was to assess job stress and burnout among anesthesiologists in the tertiary class A hospitals in Northwest China, analyze the possible causes and adverse consequences of increased job stress and burnout of anesthesiologists in this region, and put forward suggestions in combination with the current national policies.

Methods: We sent 500 electronic questionnaires to all anesthesiologists practicing in the tertiary class A hospitals in Northwest China from 1960 to 2017 on April 2020. A total of 336 (67.2%) questionnaires were returned and could be used for analysis. Burnout and job stress were assessed by using the modified Maslach Burnout Inventory—Human Services Survey and Chinese Perceived Stress Scale, respectively.

Results: First, as for emotional exhaustion, the situations of anesthesiologists with different working years and workloads are different with statistical significance ($P < 0.05$). Second, as for depersonalization, the situations of anesthesiologists with different ages, professional titles, working years, physical health status, and workload are different ($P < 0.05$). Third, as for personal accomplishment, the situations of anesthesiologists with different physical health status are different ($P < 0.05$). Finally, the regression results showed that the longer the fatigue working years and the worse the physical health of anesthesiologists in Northwest China, the more likely these two factors were to cause burnout ($P < 0.05$), as for job stress, there was a negative correlation between job stress and physical health status ($P < 0.05$).

Conclusion: Burnout and high job pressure are common among anesthesiologists in tertiary class A hospitals in Northwest China. We should focus on the allocation of labor intensity, pay attention to the physical and mental health of employees, establish targeted incentive mechanism, and improve the system of promotion and income rises for grassroots doctors. This may be not only conducive to the quality of medical care for patients but also conducive to the development of anesthesiology in China.

Trial registration: Identifier: ChiCTR2000031316.

KEYWORDS

anesthesiologist, burnout, job stress, questionnaire, tertiary class A hospital

Introduction

Burnout is a comprehensive symptom of physical and mental exhaustion and energy exhaustion, which includes emotional exhaustion, depersonalization, and reduced personal accomplishment (1). Job pressure refers to the pressure on people due to excessive workload, change of post, and excessive work responsibility (2).

An Italian study in 2020 assessed burnout among anesthesiologists and intensivists and showed that 79.9% (686) exhibited moderate levels of burnout (3). A cross-sectional study in Kosovo surveyed 154 anesthesiologists and anesthesia technicians in Kosovo and found that approximately one-third of Kosovar anesthesiologists and anesthesia technicians exhibited high levels of burnout (4). A U.S. study included 3,898 members of the American Society of Anesthesiologists and showed that 59.2% of the study subjects were at high risk of burnout (5). Numerous similar studies have shown a high risk of burnout in the group of anesthesiologists. As the world's most populous country, medical resources are relatively more scarce in China.

In China, the number of anesthesiologists per 10,000 population is only 0.4, far lower than the number of anesthesiologists per 10,000 population in developed countries in Europe and America (6). With the aging of the population in our country and increasing serious perioperative complications, the anesthesia risk is also increasing day by day. At the same time, the shortage of anesthesiologists and the uneven distribution of medical resources lead to increased job stress and burnout of anesthesiologists, which will not only affect the physical and mental health of anesthesiologists but also bring hidden dangers to the safety and quality of anesthesia (7).

Some studies have shown that the level of burnout in other occupations is related to the knowledge gap, for example, working sailors (8) and nurses in the operating room (9). There was also a knowledge gap in the level of burnout among frontline physicians in Bangladesh during the COVID-19 pandemic (10).

In Northwest China, the economy is relatively backward, the distribution of medical resources is unbalanced, and the level of medical and health services lags behind other regions (11). Therefore, to fully mobilize the enthusiasm of the medical staff, improve the level of medical services, and fully understand both the advantages and disadvantages of medical resources in this region is important for promoting the development of medical services. Thus, in this study, 500 anesthesiologists' job stress and burnout were investigated and analyzed in order to provide a reference for instructing anesthesiologists to relieve the pressure and improve the level of burnout.

Methods

The Research Ethics Committee of Xi'an Honghui Hospital affiliated with Xi'an Jiaotong University (Chairperson: Peng Xu) approved the study on 9 April 2020, and written informed consent from patients was obtained.

This article adheres to the applicable Enhancing the QUAlity and Transparency of Health Research (EQUATOR) guidelines.

Using a random sampling method, an anonymous cross-sectional design was conducted among anesthesiologists in the tertiary class A hospitals in Northwest China. For sample size estimation, a pilot study of 167 cases before the survey indicated a burnout rate of 48%. We assumed that a 5% error was acceptable and then the confidence level was set at 95%. By considering the response rate, the sample size was 308. Based on this, a total of 500 questionnaires were sent out, of which 408 were recovered and 336 were effective. Thus, among the returned questionnaires, the effective rate was 82.4%.

First section

The first section of the questionnaire included 11 questions designed to capture demographic, social, and work characteristics of the anesthesiologists, such as gender, age, educational background, professional title, working years, family economic status, physical health status, type of hospital, proportion of anesthesiologists in your department to the operating room, ratio of anesthesiologists to surgeons, and operation volume in recent 2 years.

Second section

Burnout: The modified Maslach Burnout Inventory—Human Service Survey (MBI-HSS) (12) was used to assess burnout. The modified Maslach Burnout Inventory—Human Service Survey is widely used to assess burnout in healthcare workers. Research has shown that the Maslach Burnout Inventory—Human Service Survey has acceptable validity and reliability in measuring nurse burnout and can help healthcare administrators provide interventions to reduce nurse burnout (13). The measurement invariance of the MBI-HSS in gender and occupation was also confirmed in a Vietnamese study (14). The 16-item MBI is a measure of burnout and is subdivided into three subscales as follows: (a) Emotional exhaustion (six items): This subscale refers to a lack of emotional resources, that is, the feeling of having given everything and having nothing left to give. (b) Lack of personal accomplishment (six items): This subscale assesses feelings of doubt about one's ability to perform tasks and lack of successful achievement in one's work with people. (c) Depersonalization (four items): This subscale measures an unfeeling and impersonal response toward recipients of one's service, care, treatment, or instruction. The scoring method of four points was used, never so scored 0 points, rarely so scored 1 point, sometimes so scored 2 points, and often so scored 3 points. In the subscale of "emotional exhaustion", values $\geq$19 are considered to indicate burnout; in the subscale of "personal accomplishment", values $\leq$2.5 are considered to indicate burnout; and in the "depersonalization" subscale, values $\geq$17 are considered to indicate burnout.

Third section

Job stress: The work stress of anesthesiologists was evaluated by the Chinese Perceived Stress Scale (CPSS) (15). The CPSS is a reliable and valid instrument for patients with common mental disorders with different employment status, exhibiting a stable two-factor structure with satisfactory internal consistency and construct validity (16, 17).

There were 14 items in CPSS, which had never scored 0, rarely scored 0.5, sometimes scored 1, and often scored 1.5. It was conceived to assess how many life situations are appraised as stressful, that is, how unpredictable and overloaded respondents find their lives. Higher scores indicate higher levels of job stress. At the end of the questionnaire, an open question was included for respondents to identify the main job stress factors encountered in their daily lives. The seven most frequently referred factors were identified.

Procedures

The electronic version of the questionnaire was built on the Wenjuanxing platform (https://www.wjx.cn). WeChat publishing is a widely used mobile social platform that attracts a broad range of users in China. As of September 2015, WeChat had more than a billion created accounts and 650 million active users. Throughout the nation, the coverage of WeChat has more than 90% of smartphone users (18). It is considered a valid questionnaire if it is collected within 3 days, and the time for filling in the questionnaire is not <15 min.

Statistical analysis

Data were analyzed using the SPSS software package (Released 2017. IBM SPSS Statistics for Mac, version 25.0. Armonk, NY: IBM Corp.). The descriptive analysis uses the number and percentage of cases to describe the general data (such as gender, age, educational background, and professional title), makes an independent sample *t*-test on the scores of burnout and job stress of anesthesiologists of different gender, and makes one-way ANOVA on the situation of burnout and job stress of anesthesiologists of different age, professional title, education background, etc., among which, in one-way ANOVA, the variables with $P < 0.15$ were included in the multivariate analysis, the entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. The multiple linear regression model was used to evaluate the independent correlation between the included variables, such as job stress and burnout. A two-tailed $P < 0.05$ was considered statistically significant.

Results

The questionnaire was distributed and collected on April 2020. Of the 32 tertiary class A hospitals (there are 32 tertiary class A hospitals in three Northwest provinces) and 500

TABLE 1 Descriptive statistics of the survey ($n = 336$).

Project	Category	Number	Proportion (%)
Gender			
	Male	157	46.73
	Female	179	53.27
Age (y)			
	<25	6	1.79
	25–30	73	21.73
	31–35	79	23.51
	36–45	114	33.93
	>45	64	19.05
Education			
	Junior college and below	22	6.55
	Undergraduate	262	77.98
	Master	49	14.58
	Doctor	3	0.89
Title			
	Intern	3	0.89
	Resident physician	115	34.23
	Attending doctor	131	38.99
	Deputy chief physician	77	22.92
	Chief physician	10	2.98
Working life (y)			
	<5	74	22.03
	5–10	79	23.51
	11–20	100	29.76
	21–30	66	19.64
	>30	17	5.06
Family financial situation			
	Rich	16	4.76
	General	227	67.56
	Income = expenditure	83	24.70
	Poor	10	2.98
Physical condition			
	Healthy	52	15.48
	Sub-health	251	74.70
	Suffer from disease	33	9.82
Type of hospital			
	Public teaching hospital	57	16.96

(Continued)

TABLE 1 (Continued)

Project	Category	Number	Proportion (%)
	Public specialized hospital	61	18.15
	Public general hospital	218	64.88
Anesthesiologist / OR			
	>3:1	14	4.17
	2.5–3:1	28	8.33
	2–2.5:1	53	15.77
	1–2:1	202	60.12
	<1	39	11.61
Anesthesiologist / surgeon			
	<0.1	53	15.77
	0.1–0.2	161	47.92
	0.21–0.3	73	21.73
	>0.3	49	14.58
Operation volume in recent two years			
	<3,000	100	29.76
	3,000–6,000	80	23.81
	6,001–12,000	86	24.70
	12,001–20,000	25	7.44
	>20,000	48	14.29

Data are presented as frequency and percentage.
OR, operating room.

anesthesiologists and anesthesia residents, 32 hospitals and 336 individuals completed the survey (response rates 100% and 82.4%, respectively). The descriptive statistics are shown in Table 1.

In Northwest China, the economy is relatively backward, the distribution of medical resources is unbalanced, and the level of medical and health services lags behind other regions (11).

The results of the burnout analysis showed that the scores of emotional exhaustion, depersonalization, and personal accomplishment were 20.23 ± 3.515, 17.98 ± 2.310, and 2.43 ± 0.670, respectively. 1. The emotional exhaustion of anesthesiologists with different working years and workloads was different, and the difference was statistically significant ($P < 0.05$); 2. The depersonalization of anesthesiologists with different ages, titles, working years, physical conditions, and workloads was different, and the difference was statistically significant ($P < 0.05$); and 3. The personal accomplishment of anesthesiologists with different physical conditions was different, and the difference was statistically significant ($P < 0.05$) (Table 2).

Analysis of job stress: anesthesiologists with different physical health statuses and workloads had different job stress, and the difference was statistically significant ($P < 0.05$) (Table 3).

Correlation analysis of influencing factors of anesthesiologists' burnout: the longer the anesthesiologists' working life, the worse the health status and the more serious the depersonalization, and the difference was statistically significant ($P < 0.05$). The better the anesthesiologists' physical condition, the longer the working life and the higher the sense of personal accomplishment. The difference was statistically significant ($P < 0.05$) (Tables 4–6).

Correlation analysis of influencing factors of job stress of anesthesiologists: the better the physical health condition of anesthesiologists, the less the job pressure, and the difference was statistically significant ($P < 0.05$) (Table 7).

Discussion

This study assesses both burnout and job stress among anesthesiologists and provides a good understanding of the current psychological status of anesthesiologists among all colleagues and related personnel in the anesthesia industry. Using Northwest China as the background of the study is relevant and can cause the relevant departments to care for anesthesiologists in Northwest China and incline resources. However, this study also has limitations. For example, the sample size was limited. We distributed 500 questionnaires, yet only 406 were returned, of which only 336 were valid, which may have led to selection bias in the study results. In further research studies in the future, we can expand the sample size, keep in touch with the study participants after distributing the questionnaire, and supervise them to complete the questionnaire to reduce selective bias.

The medical and health industry is a profession with high requirements and a low sense of control, and a profession with a high incidence of burnout (19). At present, there are 76,000 anesthesiologists in China. The number of anesthesiologists per 10,000 people in China is ∼0.4, compared with three in the United States and 2.8 in the United Kingdom. According to British and American standards, China should have 310,000 anesthesiologists. In fact, the total number of anesthesiologists in China is <100,000 and also less than one-third of the standard configuration, and the gap is 200,000 (20). At the same time, China's surgery volume accounts for approximately 10% of the global surgery volume, and it is still growing at a rate of 10% (21). In recent years, the doctor–patient relationship has become increasingly tense, coupled with factors such as the income, promotion, and physical condition of anesthesiologists, which make the environment of anesthesiologists worse, thus, job stress and burnout are increasing day by day (22).

As for emotional exhaustion, the phenomenon of emotional exhaustion with working years of 5–10 years is serious. Most anesthesiologists who have worked for 5–10 years have accumulated professional knowledge and skills and can play an independent role at work. In hospitals at all levels, they are the main force of their department. Therefore, their emotional exhaustion is severe, which is consistent with the research results of Filippo (23). With the increase in working years, the phenomenon of emotional exhaustion began to ease. This may be explained by the fact that, with the continuous increase of working years, their medical experience continues to be accumulated, and technical literacy is more and more suitable for the needs of the post, and

TABLE 2 Score of burnout ($\bar{x} \pm s$).

Project		Emotion exhaustion	t/F	*P* value	Depersonalization	t/F	*P* value	Personal accomplishment	t/F	*P* value
All		20.23 ± 3.515			17.98 ± 2.310			2.43 ± 0.670		
Gender										
	Male	20.30 ± 3.603	0.357	0.721	17.90 ± 2.318	−0.624	0.533	2.36 ± 0.699	−1.837	0.067
	Female	20.16 ± 3.445			18.06 ± 2.307			2.50 ± 0.639		
Age (y)										
	<25	21.17 ± 2.994	1.399	0.234	16.50 ± 1.871	19.849	<0.001	2.67 ± 0.816	0.980	0.418
	25–30	19.96 ± 3.482			16.63 ± 1.837			2.36 ± 0.674		
	31–35	20.97 ± 3.158			17.41 ± 2.066[b]			2.52 ± 0.714		
	36–45	20.06 ± 3.561			18.48 ± 2.239[abc]			2.39 ± 0.645		
	>45	19.81 ± 3.866			19.48 ± 2.116[abcd]			2.48 ± 0.642		
Education										
	Junior college and below	19.86 ± 3.536	0.605	0.612	18.95 ± 2.572	1.829	0.142	2.36 ± 0.658	0.638	0.591
	Undergraduate	20.35 ± 3.465			17.98 ± 2.311			2.42 ± 0.683		
	Master	19.82 ± 3.828			17.57 ± 2.160[a]			2.55 ± 0.614		
	Doctor	18.67 ± 2.887			18.00 ± 1.000			2.33 ± 0.577		
Title										
	Resident physician	19.67 ± 3.786	1.324	0.261	16.67 ± 2.082	10.996	<0.001	2.33 ± 1.155	0.316	0.867
	Attending doctor	20.41 ± 3.474			17.03 ± 2.178			2.41 ± 0.712		
	Deputy chief physician	20.31 ± 3.111			18.17 ± 2.160[b]			2.42 ± 0.667		
	Chief physician	20.14 ± 4.119			18.95 ± 2.265[bc]			2.48 ± 0.598		
	Resident physician	17.80 ± 3.676[bcd]			19.50 ± 1.900[b]			2.60 ± 0.699		
Working life (y)										
	<5	19.76 ± 3.507	3.696	0.006	16.39 ± 1.893	23.336	<0.001	2.42 ± 0.683	0.325	0.861
	5–10	21.10 ± 3.095[a]			17.39 ± 1.938[a]			2.48 ± 0.714		
	11–20	20.64 ± 3.518			18.59 ± 2.279[ab]			2.38 ± 0.663		
	21–30	19.11 ± 3.424[bc]			19.03 ± 1.969[ab]			2.47 ± 0.638		
	>30	20.12 ± 4.540			20.00 ± 2.151[abc]			2.47 ± 0.624		
Family financial situation										
	Rich	19.31 ± 4.254	1.236	0.296	18.06 ± 1.526	0.160	0.923	2.38 ± 0.719	0.582	0.627

(Continued)

10.3389/fmed.2023.1140552

TABLE 2 (Continued)

Project		Emotion exhaustion	t/F	*P* value	Depersonaliza-tion	t/F	*P* value	Personal accomplishment	t/F	*P* value
	General	20.07 ± 3.598			17.94 ± 2.333			2.41 ± 0.662		
	Income = expenditure	20.80 ± 2.929			18.11 ± 2.225			2.52 ± 0.687		
	Poor	20.40 ± 4.624			17.70 ± 3.561			2.40 ± 0.699		
Physical condition										
	Healthy	19.33 ± 3.513	2.307	0.100	17.10 ± 2.320	6.463	0.002	2.52 ± 0.667	4.147	0.017
	Sub-health	20.33 ± 3.501			18.05 ± 2.270[a]			2.47 ± 0.647[a]		
	Suffer from disease	20.82 ± 3.486			18.85 ± 2.224[a]			2.19 ± 0.742[a]		
Type of hospital										
	Public teaching hospital	20.32 ± 3.704	0.236	0.918	17.70 ± 2.398	0.752	0.557	2.49 ± 0.658	0.343	0.849
	Public specialized hospital	20.22 ± 3.893			18.06 ± 2.402			2.50 ± 0.614		
	Public general hospital	20.29 ± 3.366			18.12 ± 2.282			2.41 ± 0.691		
Anesthes-iologists/OR										
	>3:1	20.14 ± 3.592	0.857	0.490	17.79 ± 1.888	1.380	0.240	2.14 ± 0.663	1.586	0.178
	2.5–3:1	19.89 ± 3.583			17.61 ± 1.812			2.29 ± 0.600		
	2–2.5:1	19.53 ± 3.577			17.72 ± 2.324			2.38 ± 0.657		
	1–2:1	20.37 ± 3.434			17.98 ± 2.366			2.47 ± 0.677		
	<1	20.72 ± 3.790			18.72 ± 2.395[c]			2.56 ± 0.680[a]		
Anesthes-iologists / surgeon										
	<0.1	21.17 ± 3.766	3.334	0.020	17.85 ± 2.348	1.090	0.354	2.62 ± 0.527	1.701	0.167
	0.1–0.2	20.40 ± 3.353			18.10 ± 2.200			2.39 ± 0.726[a]		
	0.21–0.3	19.26 ± 3.346[ab]			17.62 ± 2.202			2.40 ± 0.640[b]		
	>0.3	20.08 ± 3.752			18.29 ± 2.739			2.43 ± 0.645		
Operation volume in recent 2 years										
	<3,000	19.85 ± 3.377	3.638	0.006	17.95 ± 2.208	4.345	0.002	2.45 ± 0.702	1.349	0.251
	3,000–6,000	20.29 ± 3.725			18.48 ± 2.624			2.49 ± 0.595		
	6,001–12,000	20.04 ± 3.337			17.69 ± 2.175b			2.34 ± 0.703		
	12,001–20,000	19.08 ± 3.475			16.56. ± 1.981[abc]			2.28 ± 0.737		
	>20,000	21.83 ± 3.379[abcd]			18.48 ± 2.010[d]			2.56 ± 0.616		

Data are presented as mean ± SD. The univariate analysis was performed using a *t*-test and ANOVA.

OR, operating room.

A $P < 0.05$ was regarded as statistically significant. Compared with the first group, [a]$P < 0.05$. Compared with the second group, [b]$P < 0.05$. Compared with the third group, [c]$P < 0.05$. Compared with the fourth group, [d]$P < 0.05$.

10.3389/fmed.2023.1140552

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TABLE 3 Score of job stress ($\bar{x}\pm s$).

Project		CPSS	t/F	*P* value
All		7.51 ± 1.772		
Gender				
	Male	7.54 ± 1.712	0.314	0.754
	Female	7.48 ± 1.828		
Age (y)				
	<25	7.83 ± 0.983	1.700	0.150
	25–30	7.07 ± 1.549		
	31–35	7.72 ± 1.825[b]		
	36–45	7.51 ± 1.806		
	>45	7.72 ± 1.890[b]		
Education				
	Junior college and below	7.68 ± 2.378	0.159	0.924
	Undergraduate	7.51 ± 1.699		
	Master	7.47 ± 1.916		
	Doctor	7.00 ± 1.000		
Title				
	Resident physician	7.00 ± 1.732	0.520	0.721
	Attending doctor	7.34 ± 1.696		
	Deputy chief physician	7.62 ± 1.778		
	Chief physician	7.61 ± 1.886		
	Resident physician	7.40 ± 1.838		
Working life (y)				
	<5	7.07 ± 1.658	1.834	0.122
	5–10	7.82 ± 1.655		
	11–20	7.58 ± 1.865		
	21–30	7.50 ± 1.581		
	>30	7.59 ± 2.599		
Family financial situation				
	Rich	7.69 ± 2.522	0.186	0.906
	General	7.47 ± 1.791		
	Income = expenditure	7.54 ± 1.541		
	Poor	7.80 ± 1.989		
Physical condition				
	Healthy	6.96 ± 2.258	4.063	0.018
	Sub-health	7.55 ± 1.640[a]		
	Suffer from disease	8.03 ± 1.723[a]		
Type of hospital				
	Public teaching hospital	7.81 ± 1.620	0.652	0.625
	Public specialized hospital	7.46 ± 1.982		
	Public general hospital	7.48 ± 1.731		
Anesthesiologist/ OR				
	>3:1	7.14 ± 2.349	1.728	0.143
	2.5–3:1	7.36 ± 1.660		
	2–2.5:1	7.28 ± 1.703		
	1–2:1	7.49 ± 1.779		
	<1	8.15 ± 1.598[cd]		
Anesthesiologist / surgeon				
	<0.1	7.72 ± 2.051	0.599	0.616
	0.1–0.2	7.55 ± 1.643		
	0.21–0.3	7.32 ± 1.763		
	>0.3	7.43 ± 1.893		
Operation volume in recent 2 years				
	<3,000	7.34 ± 1.940	3.695	0.006
	3,000–6,000	7.71 ± 1.722		
	6,001–12,000	7.29 ± 1.542		
	12,001–20,000	6.88 ± 1.536[b]		
	>20,000	8.23 ± 1.777[acd]		

Data are presented as mean ± SD. The univariate analysis was performed using a t-test and ANOVA.

OR, operating room; CPSS, Chinese Perceived Stress Scale.

A $P < 0.05$ was regarded as statistically significant. Compared with the first group, [a]$P < 0.05$. Compared with the second group, [b]$P < 0.05$. Compared with the third group, [c]$P < 0.05$. Compared with the fourth group, [d]$P < 0.05$.

then, the burnout will reduce. The higher the annual operation volume is, the more serious the emotional exhaustion is. The increase in workload will directly lead to the excessive fatigue of anesthesiologists. Excessive fatigue not only affects the physical and mental health of anesthesiologists but also causes great potential harm to patients. In the study of Gordon (24), it was found that as many as 50% of the anesthesiologists interviewed admitted that they had medical errors when they were tired.

With the increase in age, working years, and professional titles of anesthesiologists, their depersonalization is more and more serious. With the increasing age and working years of an anesthesiologist, the accumulated fatigue, work pressure, dissatisfaction, and sub-health will reach a peak, which makes the phenomenon of depersonalization more serious. The phenomenon is manifested in negative work and indifference to colleagues.

TABLE 4 Results of multiple linear regression of emotional exhaustion.

Project	B	Std b	t	*P* value
Constant	18.548		14.346	<0.001
Working life	−0.157	−0.052	−0.930	0.353
Anesthesiologist/OR	0.255	0.068	1.246	0.213
Anesthesiologist/surgeon	−0.392	−0.102	−1.869	0.062
Operation volume in recent 2 years	0.249	0.097	1.718	0.087

The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.044$, Adjusted $R^2 = 0.030$, F = 3.052, and $P = 0.010$.
OR, operating room.
$P < 0.05$ was regarded as statistically significant.

TABLE 5 Results of multiple linear regression of depersonalization.

Project	B	Std b	t	*P* value
Constant	13.967		18.034	<0.001
Age	0.008	0.107	0.842	0.401
Education	−0.035	−0.007	−0.135	0.893
Title	−0.124	−0.046	−0.592	0.554
Working life	0.788	0.400	3.201	0.002
Physical condition	−0.608	−0.132	−2.693	0.007
Operation volume in recent 2 years	0.164	0.097	1.847	0.066

The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.240$, Adjusted $R^2 = 0.227$, F = 17.354, and $P < 0.010$.
A $P < 0.05$ was regarded as statistically significant.

TABLE 6 Results of multiple linear regression of personal accomplishment.

Project	b	Std b	t	*P* value
Constant	1.883		10.362	<0.001
Gender	0.132	0.098	1.817	0.070
Physical condition	0.180	0.134	2.488	0.013
Working life	0.778	0.400	3,201	0.002

The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.028$, Adjusted $R^2 = 0.022$, F = 4.807, and $P = 0.009$.
The $P < 0.05$ was regarded as statistically significant.

TABLE 7 Results of multiple linear regression of personal accomplishment job stress.

Project	b	Std b	t	*P* value
Constant	5.008		7.943	<0.001
Age	0.280	0.171	1.294	0.196
Working life	−0.150	−0.099	−0.742	0.459
Physical condition	−0.477	−0.135	−2.471	0.014
Anesthesiologist/OR	0.180	0.095	1.749	0.081
Operation volume in recent 2 years	0.133	0.102	1.843	0.066

The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.049$, Adjusted $R^2 = 0.034$, F = 3.379, and $P = 0.005$.
OR, operating room.
$P < 0.05$ was regarded as statistically significant.

From the correlation analysis, it is found that the length of working years is positively related to the occurrence of depersonalization, while the health status is negatively related to the occurrence of depersonalization, and the difference is statistically significant. Therefore, the relevant departments should pay attention to the physical and mental health of anesthesiologists, which will help to delay depersonalization and improve burnout (25).

In Northwest China, the better an anesthesiologist's health is, the higher his accomplishment will be. In Northwest China, the economy is underdeveloped, and the medical level is relatively backward. People are still in the dilemma of difficult and expensive medical treatment (26). Novel coronavirus pneumonia (COVID-19) has been prevalent worldwide in 2020, which has caused millions of people to die. The number of deaths has reached 60,000, and the number of infections and deaths is rising (27, 28). This makes us more convinced that nothing matters except for a healthy body. A healthy body can bring more sense of personal achievement to anesthesiologists in Northwest China. There was a positive correlation between personal accomplishment, physical health, and working years, and the difference was statistically significant. With the accumulation of working years, the academic level, experience and technology, and salary and income of anesthesiologists will reach a new level, and the sense of personal accomplishment will naturally increase. Coupled with a healthy body, a great sense of personal accomplishment can often be obtained, reducing the occurrence of burnout.

In total, 88.1% of anesthesiologists in this questionnaire had high job stress, among whom the greater the workload, the worse the physical health, and the higher the job stress of anesthesiologists, and the difference was statistically significant. In the correlation analysis, job stress was negatively correlated with physical health, and the difference was statistically significant. The aforementioned shortage of anesthesiologists in China and the increasing workload lead to the physical and mental fatigue of medical staff and the sudden rise of pressure (29). In addition, the sudden death rate of anesthesiologists is increasing year by year. According to the researchers such as Shan, the proportion of sudden death of anesthesiologists in China is the highest, reaching 26% (30). As for the reasons of excessive workload, worry about medical litigation, sleep deprivation, and interpersonal relationship processing, anesthesiologists will often be in a certain degree of physiological or psychological disease states (31), and anesthesiologists in a sick state will naturally feel the job stress increase at work. Therefore, the healthy body and mind of an anesthesiologist are the premise and guarantee of his normal work.

In conclusion, burnout and high job pressure are common among anesthesiologists in Northwest China. The increasing workload, unfair promotion system, and long-term sub-health lead to a decline in their physical health. In terms of anesthesiologists themselves, they should improve their psychological quality,

maintain their mental health, constantly enrich and improve their professional level, and improve the communication ability between doctors and patients (32). For the department leaders and the health administrative departments, we should first reduce the risk of occupational exposure of anesthesiologists, then adjust the overall allocation of resources in the hospital, pay attention to the improvement and renewal of medical equipment, and more importantly, ensure the fairness and impartiality of the salary and promotion system, strengthen the overall input and construction of the anesthesiology department, and strive to establish contact with the international community soon (33). Only when we pay attention to the problems of anesthesiologists, we can guarantee the safety and service quality of patients in the northwest region and even in the whole country, and anesthesiologists in China can make great progress (34).

Data availability statement

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

Ethics statement

The studies involving human participants were reviewed and approved by the Research Ethics Committee, Xi'an Honghui Hospital Affiliated to Xi'an Jiaotong University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

J-mY: conceptualization. GY: writing—original draft preparation. L-yP: writing—reviewing and editing. B-hD: methodology. X-lF: software. ZQ: visualization. All authors have read and agreed to the published version of the manuscript.

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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.

Publisher's note

References

1. Durham M, Bush P, Ball A. Evidence of burnout in health-system pharmacists. *Am J Health Syst Pharm.* (2018) 75:S93–S100. doi: 10.2146/ajhp170818

2. Chirico F. Job stress models for predicting burnout syndrome: a review. *Annali dell'Istituto superiore di sanita.* (2016) 52:443–56. doi: 10.4415/ANN_16_03_17

3. Vargas M, Spinelli G, Buonanno P, Iacovazzo C, Servillo G, De Simone S. Burnout among anesthesiologists and intensive care physicians: results from an Italian National Survey. *Inquiry.* (2020) 57:46958020919263. doi: 10.1177/0046958020919263

4. Neziri S, Tahirbegolli B, Selmani E, Gallopeni F. Assessment of burnout levels among anesthesiologists and anesthesiology technicians in Kosovo: a cross-sectional study. *Int J Risk Saf Med.* (2022) 33:261–8. doi: 10.3233/JRS-200038

5. Afonso AM, Cadwell JB, Staffa SJ, Zurakowski D, Vinson AE. Burnout rate and risk factors among anesthesiologists in the United States. *Anesthesiology.* (2021) 134:683–96. doi: 10.1097/ALN.0000000000003722

6. Li Q, Han T, Zhang Y, Zhang Q, Kong X, Yang Y, et al. A nationwide survey on neonatal medical resources in mainland China: current status and future challenges. *BMC Pediatr.* (2019) 19:436. doi: 10.1186/s12887-019-1780-4

7. Lapa T, Madeira F, Viana J, Pinto-Gouveia J. Burnout syndrome and wellbeing in anesthesiologists: the importance of emotion regulation strategies. *Minerva Anestesiol.* (2017) 83:191–9. doi: 10.23736/S0375-9393.16.11379-3

8. Shi LC Dai JJ, Wang HR, Wang JL, Miao LQ, Yang LR. Current status of job burnout in in-service sailors from 13 provinces and cities in China. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi.* (2017) 35:893–7. doi: 10.3760/cma.j.issn.1001-9391.2017.12.003

9. Lv AQ, Sun CN, Liu X, Li WH. [tudy on the relationship between job stress, job burnout and turnover intention of nurses in the operating room of a provincial top three hospital. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi.* (2020) 38:577–80. doi: 10.3760/cma.j.cn1210942-20200203-000039

10. Rashid F, Erfan Uddin RAM, Mehedi HMH, Dhar S, Bhuiyan NH, Sattar MA, et al. Burnout syndrome among frontline doctors of secondary and tertiary care hospitals of Bangladesh during COVID-19 pandemic. *PLoS ONE.* (2022) 17:e0277875. doi: 10.1371/journal.pone.0277875

11. Cai H, Wang H, Guo T, Bao G. Application of Telemedicine in Gansu Province of China. *PLoS ONE.* (2016) 11:e0158026. doi: 10.1371/journal.pone.0158026

12. Maslach Burnout Inventory. Available online at: https://www.mindgarden.com/117-maslach-burnout-inventory-mbi (accessed May 2, 2019).

13. Pisanti R, Lombardo C, Lucidi F, Violani C, Lazzari D. Psychometric properties of the Maslach Burnout Inventory for Human Services among Italian nurses: a test of alternative models. *J Adv Nurs.* (2013) 69:697–707. doi: 10.1111/j.1365-2648.2012.06114.x

14. Bui THT, Tran TMD, Nguyen TNT, Vu TC, Ngo XD, Nguyen THP, et al. Reassessing the most popularly suggested measurement models and measurement invariance of the Maslach Burnout Inventory - human service survey among Vietnamese healthcare professionals. *Health Psychol Behav Med.* (2022) 10:104–20. doi: 10.1080/21642850.2021.2019585

15. Lu W, Bian Q, Wang W, Wu X, Wang Z, Zhao M. Chinese version of the Perceived Stress Scale-10: a psychometric study in Chinese university students. *PLoS ONE.* (2017) 12:e0189543. doi: 10.1371/journal.pone.0189543

16. Ng SM. Validation of the 10-item Chinese perceived stress scale in elderly service workers: one-factor versus two-factor structure. *BMC Psychol.* (2013) 1:9. doi: 10.1186/2050-7283-1-9

17. Shih S, Chan A, Yeung E, Tsang A, Chiu R, Chu M, et al. Psychometric properties and correlates of Chinese version of Perceived Stress Scale (CPSS-10) in people with common mental disorders with different employment Statuses. *Hong Kong J Occup Ther.* (2021) 34:103–12. doi: 10.1177/15691861211032318

18. Montag C, Becker B, Gan C. The multipurpose application wechat: a review on recent research. *Frontiers in psychology.* (2018) 9:2247. doi: 10.3389/fpsyg.2018.02247

19. Lederer W, Paal P, von Langen D, Sanwald A, Traweger C, Kinzl J. Consolidation of working hours and work-life balance in anaesthesiologists—a cross-sectional national survey. *PLoS One.* (2018) 13:e0206050. doi: 10.1371/journal.pone.0206050

20. Li Z, Yang J, Wu Y, Pan Z, He X, Li B, et al. Challenges for the surgical capacity building of township hospitals among the Central China: a retrospective study. *Int J Equity Health.* (2018) 17:55. doi: 10.1186/s12939-018-0766-4

21. Lu J, Wang W, Cheng W, Chen L, Huang J, Ethridge C, et al. Current status of cardiovascular anesthesia in China. *Anesth Analg.* (2017) 125:1855–62. doi: 10.1213/ANE.0000000000002051

22. De Hert S. Burnout among anesthesiologists: it's time for action! *J Cardiothorac Vasc Anesth.* (2018) 32:2467–8. doi: 10.1053/j.jvca.2018.06.010

23. Sanfilippo F, Noto A, Foresta G, Santonocito C, Palumbo G, Arcadipane A, et al. Incidence and factors associated with burnout in anesthesiology: a systematic review. *Biomed Res Int.* (2017) 2017:8648925. doi: 10.1155/2017/8648925

24. Gordon P, Llewellyn R, James M. Drug administration errors by South African anaesthetists–a survey. *S Afr Med J.* (2006) 96:630–2. doi: 10.1080/22201173.2006.10872432

25. Katz J. The impaired and/or disabled anesthesiologist. *Curr Opin Anaesthesiol.* (2017) 30:217–22. doi: 10.1097/ACO.0000000000000423

26. Zeng C, Lane N, Englund M, Xie D, Chen H, Zhang Y, et al. In-hospital mortality after hip arthroplasty in China: analysis of a large national database. *Bone Joint J.* 2019:1209–17. doi: 10.1302/0301-620X.101B10.BJJ-2018-1608.R1

27. Velavan T, Meyer C. The COVID-19 epidemic. *Trop Med Int Health.* (2020) 25:278–80. doi: 10.1111/tmi.13383

28. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun.* (2020) 109:102433. doi: 10.1016/j.jaut.2020.102433

29. Saadat H, Kain Z. Wellness interventions for anesthesiologists. *Curr Opin Anaesthesiol.* (2018) 31:375–81. doi: 10.1097/ACO.0000000000000598

30. Zhang H, Li F, Lei H, Xu S. Rising sudden death among anaesthesiologists in China. *Br J Anaesth.* (2017) 119:167–9. doi: 10.1093/bja/aex167

31. De Oliveira G. Biological evidence of the impact of burnout on the health of anesthesiologists. *J Clin Anesth.* (2017) 41:62. doi: 10.1016/j.jclinane.2017.06.011

32. Scaioli G, Schafer WLA, Boerma WGW, Spreeuwenberg P, van den Berg M, Schellevis FG, et al. Patients' perception of communication at the interface between primary and secondary care: a cross-sectional survey in 34 countries. *BMC Health Serv Res.* (2019) 19:1018. doi: 10.1186/s12913-019-4848-9

33. Ravi S. Strengthening health systems through international blood product sharing agreements. *Health security.* (2017) 15:110–7. doi: 10.1089/hs.2016.0039

34. Zhao J, Yu W, Tong C, Xie Z, Sun J, Zhou S, et al. Adopting the American anesthesia oral examination in China: value and roadblocks. *J Clin Anesth.* (2016) 30:42–5. doi: 10.1016/j.jclinane.2015.12.047

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Improved professional practices in social services through Emotional Labor strategies

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The present study provides an analysis of Emotional Labor (EL) and its consequences for professional social work practitioners in Georgia. This mixed-methods study comprised two stages. First, a qualitative study was conducted to determine the organizational characteristics defined by social work practitioners ($N = 70$). Second, a quantitative study was undertaken among the members of the Georgian Association of Social Workers ($N = 165$) to determine the direct and indirect influences of organizational characteristics on EL and work outcomes, namely, personal accomplishment and burnout. The results are pragmatic and applicable for organizations providing social services to gain positive results at the individual and organizational levels.

KEYWORDS

Emotional Labor, social work, burnout, professional growth, Georgia

Introduction

Social work as a profession aims to enhance human wellbeing and assist people in need to meet their basic and complex needs (IFSW, 2014). Social work practitioners are service providers who mostly need to perform Emotional Labor (EL) in addition to Intellectual Labor. According to Grandey (2000), EL is "the process of regulating both feelings and expressions for organizational goals". The term "Emotional Labor" was first established by Hochschild (2003) who explained it as "the management of feelings to create a publicly observable facial and bodily display; Emotional Labor is sold for a wage and therefore has exchange value" (p. 7). The employees have to make sincere efforts to practice and adhere to the organization's emotional display rules (Zapf and Holz, 2006; Johnson and Spector, 2007). Generally, employees are expected to be polite, warm, and friendly to internal and external stakeholders while expressions of anger and frustration are strongly discouraged (Smollan, 2006; Sisley and Smollan, 2012).

Hochschild (1983) definition of EL presumes that service providers attempt to manage their emotions either by engaging in Surface Acting (employees modify their displays without shaping inner feelings) or Deep Acting (employees modify internal feelings to be consistent with display rules) (Kariou et al., 2021). Ashforth and Humphrey (1993) defined EL as expressing socially desired emotions during service transactions. For instance, a service agent might naturally feel what he or she should express without stirring up emotions discussed by Hochschild (Yang and Chen, 2021). In addition, several researchers have identified social workers to have a social role in caring, focusing on prevention, sharing knowledge, listening to people, and showing commitment and emotional support to clients (Leidner, 1991; Dubayle et al., 1993; Moesby-Jensen and Nielsen, 2015).

Emotional demands are more frequent in jobs that involve relational work, and the management of social workers' emotions has been gradually recognized as a crucial element of relational client work over the decades (Turtiainen et al., 2020). Given that the profession of social work is one of the occupational categories high in EL, different measures have been discussed in social work literature to provide support to social workers to manage their emotional work. Some of the measures include social work supervision, individual counseling, and guidance on self-care (Global Social Service Workforce Alliance, 2020). The social work supervision system is considered one of the effective mechanisms that provide support to social workers. Supervision is viewed as a key means of helping staff do a difficult job and of promoting quality in social service work. Supervision in social services is a supportive relationship. It is carried out in regular meetings that focus on accountability, wellbeing, and skill development. Practice-based evidence and research have shown that structured, supportive, and reflective supervision helps to improve worker retention and performance, prevent burnout and results in a higher quality of services, and support to children and families (Global Social Service Workforce Alliance, 2020).

Supervision is necessary to support social service workers, but it is not always fully sufficient to meet staff support needs. Supervision alone cannot meet all the needs of the staff's wellbeing, and other forms of helping measures such as individual confidential counseling and guidance on self-care should be made available. Guidance on self-care should include advice on how staff can take care of themselves physically and mentally to maintain a positive attitude toward work and positively manage work tasks and relationships to better manage normal stress, prevent negative stress, and maintain a positive work-life balance (Global Social Service Workforce Alliance, 2020).

Social service workforce in Georgia

In Georgia, social work as a profession has a history of over 20 years. It began in 1999 with the first professional training in social work initiated by the Ministry of Education and Science with technical support from UNICEF-Georgia and international NGOs (Sadzaglishvili, 2017). The first batch of social workers were childcare workers responsible for providing alternative services to children and their families including the reintegration of children with their biological families as well as developing kinship care, foster care, small group homes, and preventive services. Gradually, social workers came to be involved in the fields of health/mental health, the criminal justice system, disability, and school social work. Currently, social workers are engaged in micro, mezzo, and macro levels, and their responsibilities differ depending on which level they are working. For instance, social workers at the micro-level typically conduct bio-psycho-social assessments and interventions using individual and family counseling skills while mezzo-level social workers work with communities to improve the functioning of the community, and macro-level social workers are involved in research, advocacy, and formulation of social/health/mental health policies (Sadzaglishvili, 2017).

The Georgian Association of Social Workers (GASW) has played a critical role in developing the social work profession in Georgia. It is the largest membership organization of professional social workers in Georgia with over 700 members. The GASW has been instrumental in developing social work practice, education, and a regulatory framework for Georgia (Partskhalaladze et al., 2020). It is also a part of the global social work professional community (GASW, 2022).

GASW was established in 2004 by the first group of American-educated social workers. It was set up as a local non-governmental organization (NGO) to support the continued development of the profession within Georgia. Besides providing professional expertise and support to the Government of Georgia, social service providers, and social workers, GASW has been active in establishing a strong educational framework for social work as a discipline based on recognized professional standards. In particular, GASW was instrumental in establishing social work academic programs at the state universities in 2006. As a result, Bachelor, Master, and Doctoral programs were established in social work to prepare professionals in this field (Sadzaglishvili, 2017); currently, these academic programs have ∼672 graduates, most of whom are members of the GASW. In addition, there are ∼561 "certified social workers" who have acquired very basic academic knowledge through short-term training courses and are eligible to fulfill the role of social workers, especially in the regions of Georgia (GASW, 2022).

Over the past decade and a half, Georgia has been engaged in social assistance, child welfare, and justice system reforms and these measures have strongly impacted the development of the social service workforce. Key issues that are being addressed by the social service workforce include the deinstitutionalization of the childcare system, development of family support and family substitute services, prevention of violence against children, discrimination against representatives of ethnic minority groups and migrants, social exclusion of persons with disability, and supporting families who are experiencing poverty, especially, in remote mountainous areas. The introduction of the new Law of Georgia on Social Work (2018) is a critical milestone in the development and strengthening of social workers in the country. The abovementioned introduction of social reforms being reflected in the new law has provided fresh impetus to the workforce development of social workers. The Law on Social Work also provides for the protection of the title of a social worker by stipulating that only those with a formal education in social work (e.g., a BA or MA) have the right to be employed as social workers. To prevent a workforce-related crisis, the law offers a mechanism whereby individuals without a formal education in social work but currently employed in social worker positions (or have acquired at least 1 year of prior experience working as a social worker) can obtain the authority to practice as social workers by completing a certification process (Law of Georgia on Social Work, 2018 Article 44, 3). The law also defines the certification process as a temporary measure offered only during an interim period, after which, according to the law, only individuals with social work degrees would be authorized for employment in social worker positions (Namitcheishvili and Rogers, 2018). The certification process includes the completion of a 30–45 credit training course delivered over a short period of time and is

envisaged as an interim measure to prepare a pool of social workers to meet the employment demands of the country. However, there are no specified standards set for the training course and/or the accreditation processes (GASW, 2022). On the one hand, the social service workforce is moving toward full professionalization with the introduction of the new Law on Social Work, which effectively protects the title of "social worker" by establishing that a social worker must have a qualifying education or an equivalent certification. In due time, there will no longer be uncertified social workers in Georgia, and all personnel with the title "social worker" will have a social work degree or equivalent certification confirming their competency in social work (Namitcheishvili and Rogers, 2018). However, on the other hand, no quality standards or regulations have been put in place that ensure the quality of the certificate course, which jeopardizes the professionalization of the social work workforce and its development (GASW, 2022).

Since 2020, GASW has been actively involved in the process of strengthening the capacity of the State Care Agency, which is one of the biggest service providers as well as employers of social workers with support from UNICEF and the EU. Social workers were provided with training in case management, with a particular emphasis on enhancing social work skills to deal with child abuse and child neglect cases, as well as to identify, assess, and prevent the risk of suicide in children and adolescents. GASW also developed and conducted a training module for implementing safety standards in the State Care Agency, which was meant for all the social workers at the Agency. The training included topics such as organizational culture and its impact on work ethic, safety at the workplace, professional burnout and its prevention, and briefings on the procedures and distribution of responsibilities among the agency staff aimed at meeting safety standards. In addition, GASW has supported the State Care Agency in introducing social work supervision system and building the capacity of social work supervisors.

A recent GASW study reported that the social workers employed by the State Care Agency found their work emotionally exhaustive as they had to function in stressful and complex situations (GASW, 2022). In particular, the GASW study revealed that social workers felt that they worked 24/7, though this is their perception rather than a reality as the total number of working hours per month is according to the hours allowed by the labor laws of the country. In addition, the report also revealed several other factors impacting the social workers: (1) They personally became aware of the effects of severe poverty, loss, violence, or discrimination on individuals known to them. They were impacted by the suffering of others every day in their work and found it difficult to manage their own feelings, even while they sought to provide practical assistance, guidance, and advocacy for others; (2) Often they were left alone with their clients as the accessible and diverse family support services were limited to meet the needs of the clients; (3) Furthermore, they faced their own challenges, such as low remuneration, or lacked resources to support their work such as computers, data, transport, or secure meeting spaces for the clients to respect their confidentiality; (4) Social workers often worked in multi-professional environments where, at times, other professionals did not understand their role and mandate (given that the concept of social work practice is relatively new in Georgia) and were required to advocate for themselves and for their clients. Considering these factors, social workers found their work emotionally highly demanding and pressing and felt professionally diminished (GASW, 2022).

It should be noted that in the process of supporting the State Care Agency workforce, GASW used a participatory approach. All processes included the social work practitioners, the professional association, the professional union, and experts and organizations working on human rights. GASW regularly collects data on its members' professional development and job satisfaction to plan activities for them in the future.

Theoretical framework of Emotional Labor

The concept of emotion is generally related to the cognitive assessment of a situation and physiological excitement (Grandey, 2000, p. 98). Emotion is a short-term condition (fear, rage, joy, and anger), which is associated with a particular stimulus/irritant. Mood, on the other hand, is more diffused and less connected with any particular stimulus (Frijda, 1993). While emotions are related to a specific behavior, the same cannot be said about mood. The term "affect" is more general and includes both emotion and mood. Emotions can cause a specific behavior (escape, quarrel, hugs) and can have a direct or indirect influence on a person's physiological, cognitive, and social processes.

The theory of emotion regulation by Gross (1998) can be most accurately applied to the mechanism of EL performance (Grandey, 2000). It is defined as "the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998, p. 275), and provides a beneficial guiding framework for EL. According to the emotion regulation theory, the individual can regulate emotions at two points: (1) antecedent-focused emotion regulation, where the individual modifies the situation or the perception of the situation to adjust his or her emotions, and (2) response-focused emotion regulation, when the person tends to an emotional response but manipulates how he or she expresses that emotional response by "directly influencing physiological, experiential, or behavioral responding" (Gross, 1998, p. 285; Yang and Chen, 2021).

Conservation of Resources (COR) theory assumes that individuals make an effort to obtain, retain, and protect resources, especially resources that they value and are central to fulfilling their core needs and objectives (Hobfoll, 1989). According to COR theory, stress is experienced after negative events if resources have been threatened, lost, and/or not gained after the significant previous investment. The theory suggests that the physical, mental, and emotional wellbeing of people are resources exposed to loss or depletion by the stress of performing EL. That is, EL leads to the loss of resources and has various negative outcomes such as burnout, negative affect, and low level of performance (Yang and Chen, 2021).

The study of EL has also been discussed by various researchers through the prism of resource conservation theory (Brotheridge and Lee, 2002; Goldberg and Grandey, 2007; Grandey and Gabriel, 2015; Huang et al., 2015). The form of Surface Acting in EL

is related to emotional dissonance and requires resources to overcome existing emotions and to express another emotion, i.e., the individual loses resources in the process. It is associated with stress and stress with Emotional Exhaustion, among others. EL with Deep Acting also requires resources to modify current experienced emotion into desired emotion, but it is an invested resource that results in substituting it with customer satisfaction, positive feedback from management, and self-confidence, which relates to the effectiveness of work, etc. EL with Deep Acting is not connected to stress according to the resources conservation theory (Park et al., 2014). Based on this theory, the Surface Acting strategy for performing EL is linked to stress and Emotional Exhaustion, while the result of EL adopting Deep Acting and Genuine Acting strategies can be a source of wellbeing or job satisfaction.

Social Exchange Theory is considered among the most influential conceptual paradigms for explaining behavior in the work environment. It is derived from classical anthropological studies (e.g., Malinowski 1922, 1932 in Mauss, 1967), according to which the exchange is presented in terminologies related to economic and social values. In terms of economical exchange, there is profit and loss between the parties. Social exchange relationships develop when employers "care for the employees", and this helps to get the desired/useful results (Cropanzano et al., 2001). In other words, social exchange relationships are mediators or interventional variables for a beneficial and fair transaction, and this relationship contributes to employees' effective working behavior and positive attitude. This cause-and-effect relationship has attracted much attention, the majority of which uses Blau's (1964) conceptual framework for the definition of social exchange relationships. Social exchange is a more behavior-oriented construction, both observable and concrete than general feelings. According to this theory, the service personnel who perform EL through Deep Acting establish simpler and higher-quality exchange relationships than the personnel who use Surface Acting to perform EL. Surface Acting contributes to social and emotional relationships becoming distant (Graen and Uhl-Bien, 1995).

The Self-Determination Theory (Ryan and Deci, 2000) is a meta-theory for motivation and personal development. This theory places on a single continuum the internal (interest, curiosity, values) and external (reward, benefit, fear of assessing other people) resources for motivation along with the social and cultural factors that influence human voluntary action and initiative. According to this theory, people have basic psychological needs such as competence, relatedness, and autonomy. If these three requirements are met, then they are motivated, have a feeling of attribution and realization of their potential and functions, and develop optimally. If the abovementioned three requirements are not met, then a person is demotivated, feels rejected, and functions inefficiently (Ryan and Deci, 2000). In this context, the social and cultural environment plays an important role in satisfying basic psychological needs.

The categories of the self-determination continuum correspond to some of the forms of EL: Surface Acting, Deep Acting, and Genuine Acting (Sisley and Smollan, 2012).

"Job Burnout", according to the most widely accepted definition, is "the syndrome of Emotional Exhaustion, Depersonalization, and reduced Personal Accomplishment that can be experienced in individuals who have intensive relationships with people" (Maslach et al., 1997).

Despite the diversity and chaos of explanations surrounding the concept of "Job Burnout", researchers (Freudenberger, 1974; Maslach, 1982; Schaufeli et al., 1993) agree that "Burnout"

- emerges at the individual level;
- is an internal psychological condition, which includes emotions, moods, motives, and expectations;
- is perceived by the person as a negative experience;
- is related to problems, stress, discomfort, and complication of function;
- manifests as with symptoms in people with no psychopathological experience and healthy people;
- brings negative results; and
- reduces the performance effectiveness of the work.

According to Maslach (1982), "Job Burnout" has three dimensions: Emotional Exhaustion, Depersonalization, and reduced Personal Accomplishment. Emotional exhaustion is a condition when the person experiences the exhaustion of personal emotional resources, is very vulnerable to stressors, and has a feeling of constant fatigue, all stemming from the specificity of the service. Depersonalization is a condition characterized by cynicism and distancing from others. For example, service personnel struggling with Depersonalization are distinguished by their cynical attitude toward customers and their working environment. Reduced Personal Accomplishment is a condition when the person develops feelings of incompetence and failure, and provides a lower self-estimate of their work compared to others (Maslach and Jackson, 1981; Maslach et al., 1996, 1997).

There are different theories that suggest the sequence of development of these dimensions. According to Golembiewski's phase model, the first phase of job burnout is Depersonalization, followed by reduced Personal Accomplishment, and then, Emotional Exhaustion develops (Golembiewski, 1989). However, Maslach and Leiter (2008) believe in the opposite sequence, i.e., first Emotional Exhaustion develops, followed by Depersonalization and lastly reduced Personal Accomplishment (Maslach and Leiter, 2008). Based on their research, the authors also indicated that these three dimensions could develop and process in parallel since they are reactions to different factors of the working environment (Maslach and Leiter, 2008). In the current study, we have relied on the definition of job burnout and its three dimensions as proposed by Maslach and Leiter (2008).

Psychologists have often associated emotions and emotion management with health problems (Gross, 1989, 1998; Pennebaker et al., 1990; Steptoe, 1993; Grandey, 2000). In general, individuals have the tendency to spontaneously behave in response to the stimulus of emotions, which is a kind of defense mechanism to adapt to the environment. However, in modern-day reality, a spontaneous reaction may be unrefined to the situation. Therefore, a modern adult learns to manage emotions, suppresses the existing emotion if it is unacceptable in the social context, and expresses an emotion that is suitable for the situation, though this degrades behavior activity and increases the activity of the autonomic nervous system: Retention of negative emotions reduces

the immune system (Gross, 1989, 1998; Pennebaker et al., 1990; Grandey, 2000).

Performing EL by adopting a Surface Acting strategy results in the suppression of emotions, which creates emotional dissonance and is detrimental to both the organization and its clients. As already mentioned above, it is also harmful to the social worker's health.

Several studies on the relationships between Emotional Labor and burnout have been based on "the dissonance theory of Emotional Labor" (Jeung et al., 2018).

According to this theory, emotional dissonance is considered a cornerstone of Emotional Labor. It is conceptualized as a conflict between felt and displayed emotions, encompassing both potential and actually manifested emotions. It was found that employees gradually begin to experience burnout when their capacity for emotional dissonance is exhausted as a result of Emotional Labor. These studies also suggested that emotional dissonance was positively associated with burnout. In particular, employees were depleted of energy and became exhausted if they were continuously exposed to situations requiring emotional regulation, e.g., adherence to excessive display rules (Jeung et al., 2018).

According to some studies, emotional dissonance significantly predicts Depersonalization and Emotional Exhaustion (Cote and Morgan, 2002; Heuven and Bakker, 2003; Thisera, 2017). For instance, suppression of emotions leads to work dissatisfaction, which increases the tendency to quit a job.

Though various studies have explored the relationships between EL, Surface Acting, emotional dissonance, and burnout, there is less research and evidence regarding the relationship between Genuine Acting and burnout.

Job characteristics are defined as specific aspects of work, such as knowledge, skills, intellectual and physical requirements, and working conditions that can be perceived, defined, and evaluated. They are also called working factors. Job characteristics affect an employee's attitude toward labor and also the effectiveness of work performance.

According to Morris and Feldman (1996), high levels of autonomy reduced the level of emotional dissonance, i.e., personnel who were more autonomous were less likely to apply Surface Acting (faking emotions) to clients. Schneider and Brown also indicated the important role of social support in the context of EL; in particular, they found that high levels of emotional support reduced the frequency of EL through Surface Acting and promoted a positive outcome and job satisfaction (Schneider and Bowen, 1985). Therefore, the influence of organizational factors on the relationship between EL and the consequences of job performance needs to be researched.

The current study

The current study aimed to fill some of the research gaps identified above and collect empirical evidence to determine the relationship between EL performance and social workers' wellbeing in Georgia. In existing research, EL is presented mostly as two-dimensional or something that is performed using two strategies: Surface Acting and Deep Acting. In this study, EL is presented as a three-dimensional construct adding naturally felt emotion as Genuine Acting. We assume that social workers mostly perform EL with a Genuine Acting strategy; therefore, it would be interesting to explore how this affects their wellbeing and how organizational factors influence the relationship between EL and Personal Accomplishment or burnout. Organizational factors can be controlled and changed intentionally by a management decision. Therefore, the results from this study can support organizations to make necessary changes to improve service performance while addressing social workers' wellbeing at the same time.

Our mixed-methods study comprised two stages. In the first stage, a qualitative study was conducted to determine the organizational characteristics that might be related to EL performed by professional social workers. For this reason, focus groups with social workers employed by the State Care Agency were conducted. The State Care Agency is one of the main agencies that employ social workers in Georgia in a range of services ranging from child protection to providing services for older adults and people with disabilities. In the second stage of the study, a quantitative study which examined how EL strategies affected social workers' wellbeing was conducted. The direct and indirect influences of organizational characteristics on EL and the work outcomes that could be positive (Personal Accomplishment) or negative (burnout) among professional social workers were analyzed. In the current study, EL is presented in three dimensions: Surface Acting, Deep Acting, and Genuine Acting (naturally felt emotions). Negative work outcomes such as burnout were expressed as Emotional Exhaustion and/or Depersonalization and/or reduced Personal Accomplishment.

Organizational factors that were examined in relation to EL and work outcomes were as follows: professional growth and development, social relations at work, feedback from the managers, recognition from the agency, and salary. These factors were identified as important by social workers through focus group interviews.

Our assumptions were as follows:

1. EL dimensions will predict burnout dimensions. For instance, Surface Acting will predict all three expressions of burnout, and deep and Genuine Acting will not predict burnout; Genuine Acting and Deep Acting will predict personnel accomplishment (the opposite dimension of reduced personnel accomplishment)
2. Organizational factors will have a moderating effect to minimize negative outcomes and support positive outcomes of EL.

Materials and methods

Participants and procedure

Ethics and confidentiality

The study's ethics approval (GASW-E-01.01.2022) was obtained from the Georgian Association of Social Workers' Ethics Committee.

Qualitative study: Data collection procedures and respondents

State Care Agency social workers were selected randomly from the six big cities of Georgia (Tbilisi, Rustavi, Telavi, Batumi,

Zugdidi, and Kutaisi) where GASW had conducted a study to assess factors contributing to social workers' burnout and identify important organizational factors that could support their work performance and wellbeing.

In the qualitative study, 70 social workers (66 women and four men, with a mean age of 34.15) participated in 12 focus groups from six cities (Tbilisi, Rustavi, Batumi, Kutaisi, Zugdidi, Telavi) in Georgia. The group members were informed about the confidentiality issues.

Quantitative study: Data collection procedures and respondents

Data were collected *via* an electronic self-report survey from a GASW members' sample of 168 participants from 12 January to 24 March 2022. Participants were recruited *via* e-mail and other electronic means of communication. Convenience sampling was used, and all members of GASW were eligible to participate. To minimize participant dropout, the electronic survey link was first piloted, and the results were taken into consideration. The link was forwarded with a brief description of the goal of the study and instructions for completion. The potential participants were informed about the anonymity of the survey, the approximate time (20–25 min) needed to complete the questionnaire, and the criteria for participation, which entailed being a GASW member.

In the quantitative study, the mean age of the participants was 35.50 (SD = 15.37), with the sample consisting of 168 GASW members (6% men and 94% women), 55% of the participants were from Tbilisi and 45% were from other cities. Regarding the educational level, 46.6% had MSW degrees, 28% had certificates in social work, 18.5% had BSW degrees, and 7.1% had other degrees in psychology and related fields. Regarding the level of engagement, 22% worked at a macro level, 29.8% worked at the mezzo level, and 48.2% at the micro level. GASW members spent about 20 (SD = 23) h/week with their clients/beneficiaries.

Research concept/operationalization of the variables

The research model examined the links between EL and job burnout and the indirect influence of job characteristics on these relationships. EL, according to our research, was explained as the process of the regulation and expression of emotions relevant to job demands and the situation to satisfy the client.

In our study, EL was presented in a three-dimensional (Ashforth and Humphrey, 1993) configuration: Surface Acting, Deep Acting, and Genuine Acting, all of which were regarded as predictors/independent variables (Independent Variable—IV). Burnout and Personal Accomplishment were considered as outcomes/dependent variables (Dependent Variable—DV), whereas satisfaction regarding organizational factors, such as professional growth and development, social relations at work, feedback from the managers, recognition from the agency, and salary were envisaged as moderating variables (MV). See Figure 1 for the research model.

Based on the above-discussed theories and research results regarding Emotional Labor, the main questions that we aimed to answer were:

- Which "Emotional Labor Strategy" predicts burnout for social workers?
- Can organizational factors reduce the relationship between Emotional Labor strategies and burnout dimensions?
- Can Emotional Labor strategies predict positive outcomes like Personal Accomplishment?

To answer the main questions of the study, the following hypotheses (H) were examined:

H 1. —Surface Acting of EL will positively predict Emotional Exhaustion, Depersonalization, and reduced Personnel Accomplishment; Genuine Acting and Deep Acting will positively predict Personal Accomplishment;

H 2. —Organizational factors will have a moderating effect between Surface Acting and Emotional Exhaustion and Depersonalization;

H 3. —Organizational factors will enhance the moderation effect between Genuine Acting and Personal Accomplishment and between Deep Acting and Personal Accomplishment.

Measures

The quantitative study link encompassed a self-report inventory of (1) an adapted version of the Emotional Labor Questionnaire (Gvelesiani, 2019) and (2) Burnout (Christina Maslach, Job Burnout Inventory, MBI-GS) as well as questions on demographics and work-related variables. Data gathered on participant demographics included information on individual and workplace characteristics including age, gender, education, employment level (micro, mezzo, and macro), workload (hours spent per week in personal contact with clients), level of satisfaction with professional growth and development, social relations at work, feedback from the managers, satisfaction with salary, and recognition from the agency.

For the quantitative research instrument, questionnaires were selected based on the following criteria: (1) their theoretical basis corresponding to our research concept; (2) their adaptability to the Georgian population; and (3) their high reliability and validity.

(1) Adapted version of Emotional Labor Questionnaire

The Emotional Labor Questionnaire (Kruml and Geddes, 2000) was adapted by the Georgian psychologist Gvelesiani (2019) for her dissertation study.

The Emotional Labor Questionnaire is a 12-item self-report inventory with a 5-point Likert Scale, where 1 corresponds to never and 5 to always. Reliability indicators of the calculated scales of the Georgian version within the original test and our selection (N = 168) (internal consistency, Cronbach alpha coefficient) are presented in Table 1.

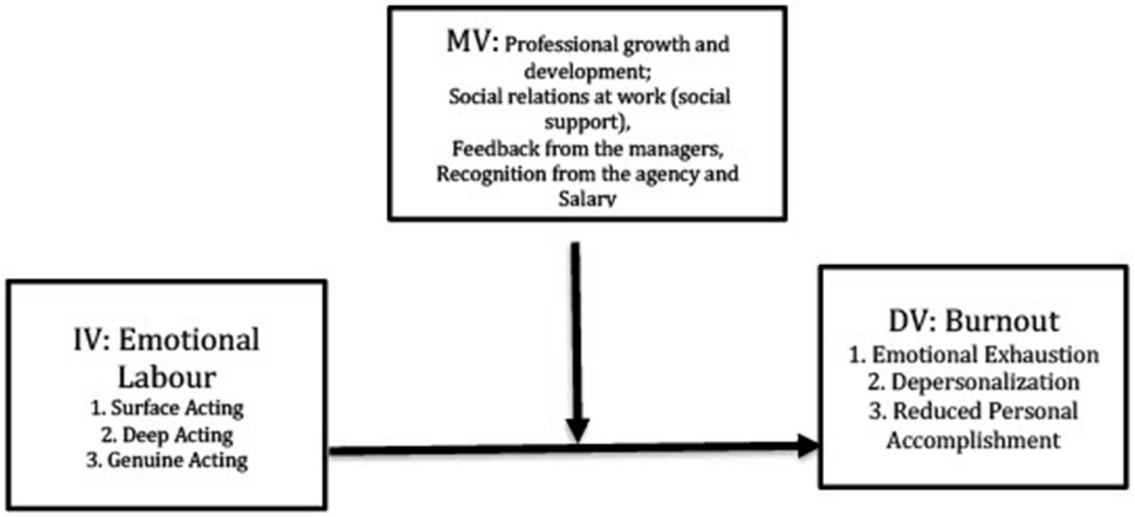

FIGURE 1
Research model: EL impact on social workers' burnout.

TABLE 1 Reliability of Emotional Labor scale.

Scale	Original version of test's Cronbach's α	Georgian version of test's Cronbach's α
Surface acting	0.66	0.72
Genuine acting	0.68	0.77
Deep acting	0.72	0.67

TABLE 2 Reliability indicators of the MBI-GS scale.

Scale	Original version of test's Cronbach's α	Georgian version of test's Cronbach's α
Emotional exhaustion	0.90	0.85
Depersonalization	0.79	0.80
Reduced personal accomplishment	0.71	0.80

Three subscales of Emotional Labor such as **Deep Acting** (I express genuine goodwill to the beneficiary; I acknowledge my role and the emotions that beneficiaries are expecting from me; I genuinely feel compassion toward the beneficiary; I experience emotions that I must display; I make an effort to actually feel the emotions that I need to display toward others; I enjoy communication with the beneficiary), **Surface Acting** (I try to change my actual feelings to match those that I must express to the beneficiary; I just pretend to have the emotions I need to display for my job; The emotions I show to the beneficiary does not match what I truly feel at the moment), and **Genuine Acting** (I try to imagine someone close to me instead of the beneficiary to feel compassion; I put on a "mask" in order to express the right emotions for the job; I need to hide my real emotions) were maintained after completion of Confirmatory Factor Analysis (CFA) with the following fit indices: $\chi 2 = 555.934$, df = 66, $p = 0.00$.

(2) Christina Maslach, Job Burnout Inventory (MBI-GS)

The questionnaire consists of 22 statements and serves to evaluate the emotional state of the workers. MBI is designed to evaluate three components of Emotional Exhaustion syndrome, namely, Emotional Exhaustion, Depersonalization, and reduced Personal Accomplishment. Filling the MBI-GS requires 5–10 min and is a self-report inventory. Nine statements of the Emotional Exhaustion subscale measure the state when a person is exhausted and emotionally tired of work. Five statements of the Depersonalization subscale assess the state of a person, which reflects the individual's inhuman and biased feedback. High scores on both subscales indicate the severity of the state of burnout. The third subscale, which combines the provision of sensitivity to the reduced Personal Accomplishment, measures the state of how a person is satisfied with their achievements and competence level. Unlike the other two subscales, low points on this scale indicate Burnout syndrome. The MBI-GS was customized to the characteristics of the population of Georgia, which meant that the tool allowed us to get reliable and valuable information on the target variables, and in the case of a representative selection of the population, the conclusions could be generalized. Reliability indicators of the counted scales of the Georgian version within the original test and our selection ($N = 168$) (internal consistency, Cronbach's alpha coefficient) are presented in Table 2.

The three subscales of the MBI-GS including **Emotional Exhaustion** (I feel fatigued when I get up in the morning; I feel I'm working too hard on my job; This work is very stressful for me; I feel I've become more callous toward people), **reduced Personal Accomplishments** (I can easily create a relaxed atmosphere; In my work, I deal with emotional problems very calmly; I have accomplished many worthwhile things in this job; I like to work closely with my colleagues), and **Depersonalization** (I treat some

people as if they were impersonal objects; I'm not really interested in what is going on with many of my colleagues) were maintained after the completion of Confirmatory Factor Analysis (CFA) with the following fit indices: $\chi 2 = 247.215$, df = 45, $p = 0.00$.

In addition, the set of questions related to satisfaction with the organizational factors, such as **professional growth** (How satisfied are you with professional growth and development in the organization?); **social support** (How satisfied are you with social interactions with colleagues in the organization?); **feedback from the managers** (How satisfied are you with feedback of your manager or supervisor?); **salary** (How satisfied are with your salary?), and **recognition** (How satisfied are you with recognition of your job performance?) were examined with a 5-point Likert scale ranging from "Dissatisfied" to "Satisfied".

The statistical analysis of the survey data was carried out using IBM SPSS 23 software. The moderation analysis was done using Andrew Hayes's program Process (PROCESS, by Andrew F. Hayes, Procedure for SPSS Release 2.16.1). The statistical analysis of moderation in our study was based on Baron and Kenny's theory (Baron and Kenny, 1986).

Qualitative data results

Qualitative data were audio-tape recorded, transcribed, and analyzed by the study's investigative team. Recorded interviews were analyzed using a pile sorting technique for identifying themes in qualitative data to identify main organizational characteristics. We used a data-reduction process in which emergent themes were identified and coded to yield a set of core themes.

The qualitative analysis revealed organizational factors such as professional growth and development, social relations at work, feedback from the managers, recognition from the agency and satisfaction with salary. A lack of these factors was identified as the main factor contributing to social workers' burnout and low job satisfaction.

Professional growth and development

Most of the interviewed social workers mentioned that they needed to improve their professional expertise to work with their beneficiaries. They expressed the need for training in positive parenting, interventions with sexual and other types of violence, and working with adults and children with disabilities and older adults.

> *"I lack of skills in dealing with cases that involve sexual violence. I need in-depth trainings in this direction." (Social Worker, Tbilisi)*
>
> *"I need more competence to work with the families of my beneficiaries." (Social Worker, Rustavi)*

Social relations at work

Social workers mentioned that it was important to get assistance from their co-workers in dealing with different cases, especially when they are newly assigned.

> *"I always help new social workers. I know how it is hard to work when you do not have on-job trainings. I do it because I know what does it mean to get help when you need it." (Social Worker, Zugdidi)*
>
> *"We are burned out, we work 24 hours… workload we have is too much, but we help each other and deal with this situation by standing by each other." (Social Worker, Rustavi)*

However, it needs to be mentioned that social workers also highlighted that supporting peers could be overwhelming and emotionally challenging if it happens in a chaotic and unstructured manner.

> *"Social support from my colleagues is important, however, sometimes this is overwhelming as we tend to share all our difficult cases to each other quite often without having any kind of structured format allowing that sharing. We all sit in one office room that we share and when my colleague is talking about his/her challenging case, and seeks to receive some peer support from us, I often feel that this is too much for me, as I have my own cases to deal with and I feel that I am dragged into other's difficulties."*

It was evident that, though peer social support is important, this should be done in a way that does not compromise social work professional standards and code of ethics. Respecting the confidentiality of the client's personal lives is critical. The use and provision of peer support should be included in the organization's policies and regulated according to professional standards. If done in a chaotic manner, it could contribute to excessive or negative stress and additional emotional pressure.

Feedback from the managers

Social workers expressed that the supervision they received played a crucial role in their job satisfaction. Reorganization within the State Care Agency that included the formation of a central supervision department improved the quality of work done by social work practitioners. Improvement in the quality of work, in turn, impacted the job satisfaction of social workers.

> *"After reorganization supervision is improved. We get intensive feedback from our supervisors. They are involved in every case." (Social Worker, Rustavi)*
>
> *"My line manager helps me and gives my feedback how to deal with the hard cases and I cannot imagine myself without her support." (Social Worker, Telavi)*

Recognition from the agency

In most instances, social workers were not satisfied with their jobs. This was mostly because they did not feel respected and social work was not considered a popular and valued profession. Therefore, social workers looked to the Agency for recognition, which could be in the form of a letter of appreciation, gifts, incentives added to the social worker's wages as a reward for good performance, or health insurance.

> *"I know that we do not get normal salary… but at least they can give us a letter of appreciation. It will mean a lot for us." (Social Worker, Kutaisi)*
>
> *"Our work is not recognized. We do not need much, at least appreciation for what we do." (Social Workers, Tbilisi)*

Satisfaction with salary

Most of the interviewed social workers mentioned that their salary was not adequate as it was much less compared to other agencies where social workers were employed.

> *"Salary is not similar in different agencies where social workers are employed. And it is reason why there is a high drop outs and transfers to different jobs." (Social Worker, Kutaisi)*
>
> *"Low salary and a high workload cause a high dropouts from this job."*
>
> *(Social Worker, Batumi)*

To conclude, all the abovementioned factors can be considered as the main organizational factors that affect social workers' job performance and wellbeing. It impacts employee turnover and the movement of social workers from one job to another, even to different professions, and increases their tendency to quit the job.

Quantitative data results

Descriptive data

Before proceeding with the hypotheses testing, frequencies, mean scores, and standard deviations of the main variables were calculated along with bivariate correlations (see Table 3).

Hypothesis testing

To test the predicting nature of variables, hierarchical multiple regression was performed. This method, in particular, through its step-by-step addition of controlling variables, allows us to evaluate each variable's effect on the explanation of dependent variable variation. The variables are centered and measured in the equation according to what contribution the independent variable/variables will add in predicting, for instance, Surface Acting. Demographic variables (gender and region) added to the model are selected based on significant correlation with the dependent variable. The final model is plural, where all the predictor variables are presented. The influence of the independent variables on the dependent variables has been assessed according to standardized beta (β) indicators.

Direct relationship/predictions

Based on hierarchical multiple regression, the following cause-effect relationship has been outlined between the dimensions of EL and the dimensions of burnout. We estimated the independent variables according to standardized beta (β) indicators.

Emotional exhaustion was predicted by Surface Acting ($\beta = 0.256$, $t = 3.304$, $p < 0.01$), and region ($\beta = 0.206$, $t = 2.805$, $p < 0.01$). According to the final model, 9% of the variation was explained by this model, $F_{(2, 165)} = 8.460$, $p < 0.01$.

Depersonalization was predicted by Surface Acting ($\beta = 0.311$, $t = 4.373$, $p < 0.01$) and gender ($\beta = 0.257$, $t = 3.612$, $p < 0.01$). Approximately 19% of the variation of Depersonalization was explained by this model, $F_{(2,165)} = 19.416$, $p < 0.01$.

Personal accomplishment was predicted by Genuine Acting ($\beta = 0.640$, $t = 10.740$, $p < 0.01$), and 41% of the variation of Personal Accomplishment was explained by this model, $F_{(1,166)} = 115.348$, $p < 0.01$.

Hypothesis H1 was confirmed as Emotional Exhaustion and Depersonalization were predicted by the Surface Acting strategy of Emotional Labor. This meant that social workers who performed EL with the Surface Acting strategy (faking emotions during interaction with the client) were predicted to get Emotional Exhaustion and Depersonalization as work outcomes, both carrying risks for the employees' health.

Hypothesis H3 was confirmed as Personal Accomplishment was a positive outcome and the results showed that it was predicted by the Genuine Acting strategy of EL.

Deep Acting's prediction was not significant. It was tested to determine if EL strategies could predict positive outcomes, like job satisfaction (in the current study sum of satisfaction with organizational factors). General job satisfaction was predicted by Genuine Acting ($\beta = 0.409$, $t = 5.768$, $p < 0.01$). Approximately 17% of the variation in job satisfaction was explained by this model, $F_{(1, 166)} = 33.275$, $p < 0.01$.

Indirect relationship/moderation

The moderating effects of the organizational factors in the relationship between EL strategies and job burnout expressions (Emotional Exhaustion, Depersonalization, reduced Personal Accomplishments) were analyzed and the statistically significant interaction models are described below.

Testing Hypothesis H2 showed that between Emotional Exhaustion and Surface Acting, and between Depersonalization and Surface Acting, organizational factors did not have significant moderating effects.

However, testing the moderating effects of organizational factors between Genuine Acting and Personal Accomplishment showed that workers who were satisfied with the organizational factors could be expected to experience more Personal

TABLE 3 Correlations, means, and standard deviations of main variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	M	SD
1. Surface acting	–											2.15	2.94
2. Deep acting	0.192*	–										3.81	2.79
3. Genuine acting	−0.114	0.515**	–									4.48	2.32
4. Emotional exhaustion	0.221*	0.119	0.141	–								2.87	2.75
5. Depersonalization	0.356**	0.102	−0.104	0.344**	–							1.44	1.74
6. Personal accomplishment	−0.131	0.383**	0.640**	0.080	0.018	–						3.97	2.67
7. Prof. growth	−0.035	0.194*	0.301**	0.055	−0.025	0.306**	–					3.61	1.09
8. Social support	−0.061	0.235**	0.298**	0.004	0.030	0.438**	0.436**	–				4.21	0.92
9. Feedback from managers	−0.042	0.208**	0.383**	0.021	−0.007	0.458**	0.515**	0.653**	–			4.27	0.96
10. Recognition	−0.095	0.087	0.363**	−0.154*	−0.050	0.436**	0.548**	0.512**	0.565**	–		3.83	1.01
11. Satisfaction with salary	−0.088	0.117	0.270**	−0.169	−0.077	0.341**	0.580**	0.398**	0.425**	0.635**	–	3.48	1.01

**$P < 0.01$; *$P < 0.05$.
For all scales, min = 1 and max = 5.

TABLE 4 Genuine acting and personal accomplishment, with professional growth as the moderator.

	Coeff	se	*t*	*p*
Constant	−2.8690	1.8970	−1.5124	0.1324
PA	1.0184	0.0986	10.3323	0.0000
Professi	3.8237	0.6304	6.0654	0000
Int_1	−0.1822	0.0315	−5.7827	0000

Model 1.
R2 = 0.5200; MSE = 2.6234; F = 59.2153.

TABLE 5 Genuine acting and personal accomplishment, with social support as the moderator.

	Coeff	Se	*t*	*p*
Constant	−1.9624	1.9357	−1.0138	0.3122
PA	1.0487	0.1091	9.6138	0.0000
SocialSu	2.8832	0.5582	5.1655	0.0000
Int_1	−0.1543	0.0293	−5.2745	0.0000

Model 1.
R2 = 0.4959; MSE = 2.7551; F = 52.7736.

TABLE 6 Genuine acting and personal accomplishment, with feedback from the managers as the moderator.

	Coeff	se	*t*	*p*
Constant	−2.0338	1.9473	−1.0444	0.2978
PA	0.9798	0.1062	9.2253	0.0000
Managers	3.0763	0.5661	5.4338	0.0000
Int_1	−0.1469	0.0286	−5.1301	0.0000

Model 1.
R2 = 0.5004; MSE = 2.7302; F = 54.7617.

TABLE 7 Genuine acting and personal accomplishment, with salary as the moderator.

	Coeff	se	*t*	*p*
Constant	−2.7535	1.9355	−1.4226	0.1567
PA	1.0388	0.1017	10.2171	0.0000
Salary	3.8184	0.6635	5.7550	0.0000
Int_1	−0.1889	0.0333	−5.6705	0.0000

Model 1.
R2 = 0.5092; MSE = 2.6823; F = 56.7133.

Accomplishment than workers who are not satisfied with the organizational factors. The results are as follows:

Regarding the moderation effects between Genuine Acting and Personal Accomplishment, the interaction was significant with the following moderators: **professional growth**; **social support**; **manager's feedback**; **salary**, and **recognition.** The results are presented in Tables 4–8.

Regarding the moderation effects between Deep Acting and Personal Accomplishment, the interaction was significant with the following moderators: **recognition**; **salary; feedback** from the managers; **social support**; and **professional growth,** and the results are presented in Tables 9–13.

Discussion

The findings of the research have supported answering the main questions and, at the same time, raised new questions to be answered in future work. The research aimed to find evidence of the impact of Emotional Labor that social workers perform with

TABLE 8 Genuine acting and personal accomplishment, with recognition as the moderator.

	Coeff	se	*t*	*p*
Constant	−2.5397	1.9269	−1.3180	0.1893
PA	1.0055	0.1025	9.8091	0.0000
Recognit	3.5734	0.6161	5.7999	0.0000
Int_1	−0.1707	0.0307	−5.5600	0.0000

Model 1.
R2 = 0.5108; MSE = 2.6735; F = 57.0820.

TABLE 9 Deep Acting and Personal Accomplishment, with recognition as the moderator.

	Coeff	se	*t*	*p*
Constant	−2.1873	2.9269	−0.7473	0.4559
PA	0.9516	0.1557	6.1113	0.0000
Recognit	3.1781	0.9359	3.3959	0.0009
Int_1	−0.1765	0.0466	−3.7854	0.0002

Model 1.
R2 = 0.2227; MSE = 6.1685; F = 15.6638.

TABLE 10 Deep Acting and Personal Accomplishment, with salary as the moderator.

	Coeff	Se	*t*	*p*
Constant	−1.9565	2.9591	−0.6612	0.5094
PA	0.8938	0.1554	5.7502	0.0000
Salary	3.5478	1.0144	3.4976	0.0006
Int_1	−0.1841	0.0509	−3.6142	0.0004

Model 1.
R2 = 0.2100; MSE = 6.2696; F = 14.5295.

TABLE 11 Deep Acting and Personal Accomplishment, with feedback from the managers as the moderator.

	Coeff	Se	*t*	*p*
Constant	−1.7600	2.9565	−0.5953	0.5525
PA	0.8655	0.1613	5.3675	0.0000
Managers	3.0089	0.8596	3.5004	0.0006
Int_1	−0.1515	0.0435	−3.4864	0.0006

Model 1.
R2 = 0.2069; MSE = 6.2937; F = 14.2650.

clients in terms of their work outcomes, which could be burnout or Personal Accomplishment.

Surface acting (faking emotions) significantly predicts the negative outcomes of work

An examination of the direct and indirect relationships revealed that Emotional Labor performed with Surface Acting (faking emotions) significantly predicted the negative outcomes of work such as Emotional Exhaustion and Depersonalization.

TABLE 12 Deep Acting And Personal Accomplishment, with social support as the moderator.

	Coeff	se	*t*	*p*
Constant	−1.4814	2.9256	−0.5064	0.6133
PA	0.8455	0.1649	5.1285	0.0000
SocialSu	2.9743	0.8436	3.5256	0.0005
Int_1	−0.1486	0.0442	−3.3603	0.0010

Model 1.
R2 = 0.2070; MSE = 6.2933; F = 14.2688.

TABLE 13 Deep Acting and Personal Accomplishment, with professional growth as the moderator.

	Coeff	se	*t*	*p*
Constant	−2.2921	2.9166	−0.7859	0.4331
PA	0.8592	0.1515	5.6694	0.0000
Professi	3.7374	0.9692	3.8560	0.0002
Int_1	−0.1793	0.0484	−3.7007	0.0003

Model 1.
R2 = 0.2186; MSE = 6.2012; F = 15.2924.

Interestingly, most social workers from the regions[1] were involved in performing Emotional Labor adopting the Surface Acting strategy and were at risk of Emotional Exhaustion. In rural Georgia, social work practitioners lack the academic knowledge of social work and accordingly are less dedicated to the profession. In fact, in the regions, there are limited human resources who are employed as social workers with a lack of academic education and a formal qualification in social work. Thus, they are less motivated internally to work in the field, which also explains why rural social workers perform their Emotional Labor mostly through Surface Acting. They need further intensive academic training to develop competencies relevant to perform services according to the social work practice standards and code of ethics. In addition, the majority of these workers are in the social work field driven by the need to find employment rather than having a professional passion. Therefore, social workers in these rural areas are at high risk of burnout.

Genuine acting strategy of Emotional Labor has a direct relationship with personal accomplishment

The Genuine Acting strategy of Emotional Labor, which is a less researched topic in general, had a direct relationship with Personal Accomplishment, which is a positive outcome and supports workers' wellbeing. Moreover, 41% of variances in Personal Accomplishment (the state of how a person is satisfied with his or her achievements and competence level) were explained by Genuine Acting. It appears that, when a social worker's personal attitudes and emotions match with the organization's demands toward clients, then positive outcomes of work, including

1 Demographic data- Employees working in the rural areas of Georgia.

the wellbeing of personnel, can be expected. Social work is a value-based profession; therefore, genuine accomplishments in social work roles are very critical. Rapport-building with clients, congruence, unconditional positive regard (UPR), accurate empathic understanding, and other principles of humanistic, person-centered counseling approaches (Rogers, 1961) make social workers' jobs extremely emotional, which require conforming to professional ethical standards at the same time. As outlined in the literature, supervision, individual confidential counseling, and guidance on self-care are effective mechanisms to support social workers to deal with Emotional Exhaustion. It is essential to ensure staff has space for reflection and supportive professional relationships so they can think through and plan their response to stressful and complex cases or other aspects of their work. These supportive mechanisms play a vital role in ensuring workers do not experience excessive or negative stress and in preventing burnout. Employers need to advise staff on how to look after themselves physically and mentally to maintain a positive attitude to work and positively manage work tasks and relationships to better manage and prevent stress and maintain a positive work-life balance.

The Deep Acting strategy of Emotional Labor was positively related to Personal Accomplishment but was not significant to predict either negative or positive outcomes.

Organizational factors have no influence on reducing negative outcomes of EL with surface acting

The findings revealed that organizational factors, such as professional growth, social support, feedback from managers, salary, and recognition have no significant influence on reducing the negative outcomes of Emotional Labor with Surface Acting strategy. It can be explained that a person who performs Emotional Labor with a Surface Acting strategy does not acknowledge the essence of the job position and professional role. These social workers mostly work in rural areas of Georgia and mainly made this career choice, as previously explained, to find employment rather than as a career development opportunity. They have difficulties internalizing social work principles and values. Thus, organizational factors have no power to influence their Surface Acting strategy as they do not fit within the requirements of social work jobs.

What makes someone choose the Surface Acting strategy? What are the antecedents of Surface Acting? According to previous research, employees who had high emotional intelligence, person-job fit, and were in a senior position, were more likely than others, to choose Deep Acting, while individuals with relatively low emotional intelligence, person-job fit, and less experience were more likely than others to follow Surface Acting (Yang and Chen, 2021). This study found the same tendency that social workers with no academic education and/or strong identification with social work values and principles tended to employ a Surface Acting strategy.

Organizational factors have significant moderation effects on the relationship between Genuine Acting and Personal Accomplishment and between Deep Acting and Personal Accomplishment

Analyzing the indirect effects of the organizational factors between Genuine Acting and Personal Accomplishment, and also Deep Acting and Personal Accomplishment, showed that they had moderate effects. In particular, professional growth, social support, manager's feedback, satisfaction with salary, and recognition had significant moderation effects on the relationships between Genuine Acting and Personal Accomplishment and between Deep Acting and Personal Accomplishment. Thus, it showed that service provider organizations can improve the wellbeing of their workers by considering organizational factors and fostering a positive organizational culture where the staff care about each other, managers are open to giving feedback to their workers, and the administration is eager to encourage workers for good performance. Organizations should also ensure that supportive supervision is provided to social workers to help to deal with the complexity of the casework, individual confidential counseling, and guidance on self-care opportunities, which are available for them to take care of themselves for achieving work-life balance. This study revealed that social workers feel that they work 24/7; however, this is their personal perception, as the study conducted by the GASW in 2022 focused on calculating the time spent during a month on work by the State Care Agency social workers proved the opposite. Social workers' subjective perception that they work 24/7 is explained by the fact that they are emotionally exhausted and burned out because of various factors. These factors stem from issues including the complexity of their work, lack of professional support and supervision, the non-existence of guidance on self-care, limited support services available in the community to empower and assist those in need, low awareness of their mandate by other agencies that they have to work with, and poor working conditions. The qualitative data from this study also supports this finding.

Limitations

The usage of mixed methods methodology can be considered a strength of our study. Nevertheless, the quantitative research was not free of limitations. The main limitation was its bias stemming from convenience sampling that included only GASW members, limiting the generalizability of the findings.

In addition, the sample mostly consisted of younger adults, primarily women. Additionally, tech-savvy individuals were likely overrepresented. In addition, the qualitative study included different individuals than those who participated in the quantitative study which could be also a problem in terms of triangulation of the obtained data. The cross-sectional design of the current study also has its known drawbacks. Finally, the measure of organizational factors used in the study was not in-depth and included only a few questions.

Conclusion and practical implications

The results of the research are pragmatic and applicable for social service provider organizations to advance personnel selection and Emotional Labor performance for practitioner social workers to increase effectiveness and gain positive results on the individual as well as on the organizational levels.

The specific findings and recommendations that could be drawn from the study for social service organizations are:

a) The social services sector is a human service, and the core instrument or resource available for vulnerable children and families is the workers themselves, and their knowledge, skills, and values. Social work is demanding. It intensely engages the worker's emotions. It requires thought as well as action to take necessary precautions to proceed ethically when intervening in the lives of others. It requires intellect as well as Emotional Labor. A kind heart, however, is not enough. Professional level and academic training are necessary. Social service work, in short, requires suitably selected and trained workers who are motivated, empathic, reflective, and skilled.
b) The social service sector (e.g., State Care Agency) should further develop and institutionalize worker support systems, such as social work supervision, individual counseling, and guidance on self-care, improve social workers working conditions and management style based on trust and feedback as it is meant as a process to help draw out and build on these qualities and skills of workers and provide emotional and professional support to prevent burnout. All these measures complement each other, and adopting one or two measures alone is not fully sufficient to meet the needs of staff.
c) The discussed forms of support to social workers for emotional management can be partly offered internally by the employing organization. In addition, the support mechanisms should be organized by and offered through various external organizations including a professional association or trade union usually paid for by the employing organization.

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.

Ethics statement

The studies involving human participants were reviewed and approved by Georgian Association of Social Workers. The patients/participants provided their written informed consent to participate in this study.

Author contributions

TG participated in developing the study questionnaire, carried out the majority of data processing, analysis and interpretation, and wrote the manuscript. SS conceptualized the research, supported the study planning, developed the study questionnaire, supported the data collection, undertook the data analysis and interpretation, and wrote the manuscript. KG and KL supported the study planning, developed the study questionnaire, supported the data collection, and contributed to the review and editing of the manuscript. SN contributed to the final review of the manuscript. All authors approved the submitted version.

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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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References

Ashforth, B. E., and Humphrey, R. H. (1993). Emotional labor in service roles: the influence of identity. *Acad. Manag. Rev.* 18, 88. doi: 10.2307/258824

Baron, R. M., and Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* 51, 1173–1182. doi: 10.1037/0022-3514.51.6.1173

Blau, P. M. (1964). Justice in social exchange. *Sociol. Inq.* 34, 193–206. doi: 10.1111/j.1475-682X.1964.tb00583.x

Brotheridge, C., and Lee, R. (2002). Testing a conservation of resources model of the dynamics of emotional labor. *J. Occup. Health Psychol.* 7, 57–67. doi: 10.1037/1076-8998.7.1.57

Cote, S., and Morgan, L. M. (2002). A longitudinal analysis of the association between emotion regulation, job satisfaction, and intentions to quit. *J. Organ. Behav.* 23, 947–962. doi: 10.1002/job.174

Cropanzano, R., Byrne, Z. S., Bobocel, D. R., and Rupp, D. E. (2001). Moral virtues, fairness heuristics, social entities, and other denizens of organizational justice. *J. Vocat. Behav.* 58, 164–209. doi: 10.1006/jvbe.2001.1791

Dubayle, V., Zurfluh, J., Redjimi, G., Lert, F., and Sobel, A. (1993). Emotional labor in service roles: the influence of identity. *Acad. Manag. Rev.* 18, 88–115.

Freudenberger, H. (1974). Staff burnout. *J. Soc. Iss.* 30, 159–165. doi: 10.1111/j.1540-4560.1974.tb00706.x

Frijda, N. H. (1993). "Mood, emotion episodes, and emotions," in *Handbook of Emotions*, eds M. Lewis, and J. M. Haviland (New York, NY: Guilford Press), 381–403.

GASW (2022). *Social Work Force Analysis*. Georgian Association of Social Workers. Georgian Association of Social Workers.

Global Social Service Workforce Alliance (2020). *Guidance Manual on Strengthening Supervision for the Social Service Workforce*. Washington, DC; Global Social Service Workforce Alliance.

Goldberg, L. S., and Grandey, A. A. (2007). Display rules versus display autonomy: emotion regulation, emotional exhaustion, and task performance in a call center simulation. *J. Occup. Health Psychol.* 12, 301–318. doi: 10.1037/1076-8998.12.3.301

Golembiewski, R. T. (1989). burnout as a problem at work: mapping its degree, duration, and consequences. *J. Manag. Issues* 1, 86–97.

Graen, G. B., and Uhl-Bien, M. (1995). Relationship-based approach to leadership: development of leader-member exchange (LMX) theory of leadership over 25 years: applying a multi-level multi-domain perspective. *Leadersh. Q.* 6, 219–247. doi: 10.1016/1048-9843(95)90036-5

Grandey, A. A. (2000). Emotional regulation in the workplace: a new way to conceptualize emotional labor. *J. Occup. Health Psychol.* 5, 95–110. doi: 10.1037/1076-8998.5.1.95

Grandey, A. A., and Gabriel, A. S. (2015). Emotional labor at a crossroads: where do we go from here? *Annu. Rev. Organ. Psychol. Organ. Behav.* 2, 323–349. doi: 10.1146/annurev-orgpsych-032414-111400

Gross, A. M. (1989). Book reviews. *Behav. Modif.* 13, 275–276. doi: 10.1177/01454455890132010

Gross, J. J. (1998). The emerging field of emotion regulation: an integrative review. *Rev. Gen. Psychol.* 2, 271–299. doi: 10.1037/1089-2680.2.3.271

Gvelesiani, T. (2019). *Impact of Personal and Organizational Factors on the Effects of Emotional Labor in the Field of Service* (TSU dissertation). Available online at: https://www.tsu.ge/assets/media/files/48/disertaciebi4/Tea_Gvelesiani.pdf (accessed December 22, 2022).

Heuven, E., and Bakker, A. (2003). Emotional dissonance and burnout among cabin attendants. *Eur. J. Work Org. Psychol.* 12, 81–100. doi: 10.1080/13594320344000039

Hobfoll, S. (1989). Conservation of resources: a new attempt at conceptualizing stress. *Am. Psychol.* 44, 513–524. doi: 10.1037/0003-066X.44.3.513

Hochschild, A. R. (1983). *The Managed Heart: Commercialization of Human Feeling*. Berkeley, CA: University of California Press.

Hochschild, A. R. (2003). *The Managed Heart: Commercialization of Human Feeling, 20th anniversary Edn*. Berkeley, CA: University of California Press.

Huang, J. L., Chiaburu, D. S., Zhang, X. A., Li, N., and Grandey, A. A. (2015). Rising to the challenge: deep acting is more beneficial when tasks are appraised as challenging. *J. Appl. Psychol.* 100, 1398–1408. doi: 10.1037/a0038976

IFSW (2014). *Global Definition of Social Work*. Melbourne: International Federation of Social Workers.

Jeung, D. Y., Kim, C., and Chang, S. J. (2018). Emotional labor and burnout: a review of the literature. *Yonsei Med. J.* 59, 187–193. doi: 10.3349/ymj.2018.59.2.187

Johnson, H. M., and Spector, P. E. (2007). "Emotional intelligence as a predictor of emotional labor and service performance," in *Symposium at the 22nd Annual Conference of the Society for Industrial and Organizational Psychology* (New York, NY).

Kariou, A., Koutsimani, P., Montgomery, A., and Lainidi, O. (2021). Emotional labor and burnout among teachers: a systematic review. *Int. J. Envion. Res. Public Health* 18, 12760. doi: 10.3390/ijerph182312760

Kruml, S. M., and Geddes, D. (2000). Exploring the dimensions of emotional labor. *Manag. Commun. Q.* 12,849. doi: 10.1177/0893318900141002

Law of Georgia on Social Work (2018). *Parliament of Georgia*. Available online at: https://matsne.gov.ge/en/document/view/4231958?publication=0 (accessed December 22, 2022).

Leidner, R. (1991). Serving hamburgers and selling insurance: gender, work, and identity in interactive service jobs. *Gender Soc.* 5, 154–177. doi: 10.1177/089124391005002002

Maslach, C. (1982). *Burnout: The Cost of Caring*. Englewood Cliffs, NJ: Prentice-Hall.

Maslach, C., and Jackson, S. E. (1981). The measurement of experienced burnout. *J. Organ. Behav.* 2, 99–113. doi: 10.1002/job.4030020205

Maslach, C., Jackson, S. E., and Leiter, M. P. (1996). *Maslach Burnout Inventory Manual, 3rd Edn*. Mountain View, CA: CPP, Inc.

Maslach, C., Jackson, S. E., and Leiter, M. P. (1997). "Maslach burnout inventory," in *Evaluating Stress: A Book of Resources*, *3rd Edn*, eds C. P. Zalaquett, and R. J. Wood (Scarecrow Education), 191–218.

Maslach, C., and Leiter, M. P. (2008). Early predictors of job burnout and engagement. *J. Appl. Psychol.* 93, 498–512. doi: 10.1037/0021-9010.93.3.498

Mauss, M. (1967). *A General Theory of Magic. 2 nd Edn*. London; New York: Routledge.

Moesby-Jensen, C. K., and Nielsen, H. S. (2015). Emotional labor in social workers' practice. *Eur. J. Soc. Work* 18, 690–702. doi: 10.1080/13691457.2014.981148

Morris, J. A., and Feldman, D. C. (1996). The dimensions, antecedents, and consequences of emotional labor. *Acad. Manag. Rev.* 21, 986. doi: 10.2307/259161

Namitcheishvili, S., and Rogers, J. (2018). *Georgia Case Study Report*. Oxport Policy Management Limitied.

Park, H., O'Rourke, E., and O'Brien, K. E. (2014). Extending conservation of resources theory: the interaction between emotional labor and interpersonal influence. *Int. J. Stress Manag.* 21, 384. doi: 10.1037/a0038109

Partskhalaladze, N., Sadzaglishvili, S.h., and Gigineishvili, K. (2020). Role of the Georgian association of social workers in supporting the Covid-19 response in Georgia. *Scott. J. Resident. Child Care*. 1–7. Available online at: https://www.celcis.org/application/files/2116/2401/1107/Role_of_the_Georgian_Association_of_Social_Workers_in_Supporting_the_Covid-19_Response_in_Georgia-3.pdf

Pennebaker, J. W., Colder, M., and Sharp, L. K. (1990). Accelerating the coping process. *J. Pers. Soc. Psychol.* 58, 528–537. doi: 10.1037/0022-3514.58.3.528

Rogers, C. R. (1961). *On Becoming a Person: A Psychotherapists View of Psychotherapy*. Houghton Mifflin.

Ryan, R. M., and Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 55, 68–78. doi: 10.1037/0003-066X.55.1.68

Sadzaglishvili, S. (2017). Reconstructing social welfare institutions and building a professional social work workforce in post-Soviet Georgia: an ecological systems framework. *Int. Soc. Work* 61, 1198–1208. doi: 10.1177/0020872816674790

Schaufeli, W. B., Maslach, C., and Marek, T. (1993). *Professional Burnout: Recent Developments in Theory and Research, 1st Edn*. Routledge.

Schneider, B., and Bowen, D. E. (1985). Employee and customer perceptions of service in banks: replication and extension. *J. Appl. Psychol.* 70, 423–433. doi: 10.1037/0021-9010.70.3.423

Sisley, R., and Smollan, R. (2012). Emotional labor and self-determination theory: a continuum of extrinsic and intrinsic causes of emotional expression and control. *New Zeal. J. Employ. Relat.* 37, 41–57.

Smollan, R. K. (2006). Minds, hearts and deeds: cognitive, affective and behavioural responses to change. *J. Change Manag.* 6, 143–158. doi: 10.1080/14697010600725400

Steptoe, A. (1993). "Stress and the cardiovascular system: a psychosocial perspective," in *Stress: From Synapse to Syndrome*, eds S. C. Stanford, and P. Salmon (Academic Press), 119–141.

Thisera, T. J. R. (2017). *The Impact of Emotional Labor on Emotional Exhaustion of Female Nurses in Sri Lanka*. Available from: https://www.researchgate.net/publication/315683277_The_impact_of_emotional_labor_on_emotional_labor_on_emotional_exhaustion_of_female_nurses_in_Sri_Lanka (accessed September 29, 2019).

Turtiainen, J., Anttila, E., *and* Väänänen, A. (2020). Social work, emotion management and the transformation of the welfare state. *J. Soc. Work* 22, 68–86 doi: 10.1177/1468017320973586

Yang, C., and Chen, A. (2021). A comprehensive literature review. *Hum. Syst. Manag.* 40, 479–501. doi: 10.3233/HSM-200937

Zapf, D., and Holz, M. (2006). On the positive and negative effects of emotion work in organizations. *Eur. J. Work Org. Psychol.* 15, 1–28. doi: 10.1080/13594320500412199

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Between suffering and coping: burnout in female medical doctors in South Africa

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Burnout is described as emotional and physical exhaustion, reduced accomplishment, together with an outlook of inadequacy and cynicism related to job stress. It has a harmful impact globally, especially in developing countries, such as South Africa. This study is a phenomenological collective case study focusing on burnout experience in a sample of female medical doctors working in a South African public hospital. Based on ongoing explorations of burnout themes, empirically based intervention strategies are needed to be developed and presented for the South African public health sector to prevent stress-related burnout. The findings support the trend in literature that burnout is an overwhelming experience for female medical doctors in South Africa. The study presents voices of female medical doctors, their concerns, the causes for burnout and their coping mechanisms. It provides a strong contribution to exploring and presenting women's experiences in working in the medical field in South Africa from a positive psychology perspective. The findings indicate the struggles and the coping mechanisms of female medical doctors working in the field.

KEYWORDS

burnout, female medical doctors, South African public hospital, developing countries, coping

1. Introduction

Occupational stress is one of the biggest well-being and safety challenges, with a rapidly increasing incident rate (Bährer-Kohler, 2013; Sorenson et al., 2016; Werneburg et al., 2018; Marcatto et al., 2022) and if not addressed, it often leads to burnout affecting individuals, organizations, professionals and society (Carod-Artal and Vázquez-Cabrera, 2013; Sorenson et al., 2016). Burnout is classified as an occupational phenomenon in the World Health Organizations' International Disease Classification (ICD-11) (World Health Organization [WHO], 2019) and is described as emotional and physical exhaustion, reduced accomplishment or performance together with an outlook of inadequacy and depersonalization or cynicism related to job stress (Maslach and Jackson, 1986; Houkes et al., 2011; Edú-Valsania et al., 2022).

Burnout syndrome has a high incidence globally and in developing countries like South Africa, it is associated with long-term consequences and disadvantages due to unprioritized intervention strategies (Davhana-Maselesele and Igumbor, 2008; Panagioti et al., 2016; Mathias and Wentzel, 2017). There is an ongoing health dilemma in South Africa due to the overwhelmed health structures in the public sector and a higher occurrence

of severe chronic untreatable diseases (Davhana-Maselesele and Igumbor, 2008; Panagioti et al., 2016; Mathias and Wentzel, 2017; Hodkinson et al., 2022). The poor public healthcare systems cause heavy workloads, often leading to severe cases of burnout within employed medical doctors (Peltzer et al., 2003; Thomas and Valli, 2006; Carod-Artal and Vázquez-Cabrera, 2013; Panagioti et al., 2016; Mathias and Wentzel, 2017). Besides this, COVID-19 has pressured the overwhelmed South African public health care system even more, affecting the medical doctors and setting them at a growing higher burnout risk (Mbunge, 2020). The sample for the current study included female medical doctors in South Africa aged between 25 and 35 years (Generation Project, 2018; Kane, 2018).

The study focuses especially on female medical doctors, due to the following reasons: firstly, there is a large gap between male and female medical doctors, showing that there is no equate to equitable representation of women within the medical field in South Africa, due to gender discrimination and inequality in the health workforce (Tiwari et al., 2021; Alam et al., 2022), which might impact on burnout levels in female doctors. Secondly, a recent study showed the high levels of burnout, anxiety and depression in female medical doctors in South Africa, but did not explore female doctors' mental health and well-being as such (Naidoo et al., 2020; Meier and Kim, 2022). This study, therefore, particularly focuses on female medical doctors, to explore gender-specific implications. Additionally, other studies highlighted that being female is a risk factor in the medical health care system (Discovery Health, 2018; Rajvinder, 2018), but female voices have hardly been heard commenting on this topic.

The aim of the study was to explore the burnout experiences of a sample of female medical doctors from a positive psychology perspective, to understand their unique lived experiences. Only based on in-depth burnout research, can specific contextual intervention strategies be developed to address burnout effectively in the described context, thereby taking the negative and positive aspects into account.

2. Management of burnout and stress

Burnout should be treated as an organization-wide problem incorporating individual, group and organizational interventions (Panagioti et al., 2016; Lemaire and Wallace, 2017; Murthy, 2022); implying that all South African public sector stakeholders need to be involved in its prevention and management. Individual interventions aim to enable development of personal and social resistance to occupational stress and beneficial coping strategies, reducing burnout risk (Ruiz, 2019).

Studies stated the following as high risk factors for burnout in South Africa: working in a public hospital as a medical doctor; being in a hospital ward rotation that requires being on call overnight; having ward responsibilities; high patient load; working in the mental health profession; being female, white or of a younger age; working in rural areas (Peltzer et al., 2003; Erasmus, 2012; Viehl et al., 2017; Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019) and women overall (Roth et al., 2011), especially in multi-functional roles (Innstrand et al., 2011). Emotional exhaustion, the core component of burnout, was found more in female medical doctors, as they reportedly show more empathy (Howick, 2017); an indication that they might be at greater risk for burnout (Rajvinder, 2018; HaGani et al., 2022). Compassion fatigue and burnout are consequent of elevated empathy causing emotional arousal and distress, which can lead to reduced empathy as a survival mechanism for the increased exposure to extreme emotional stress (Rajvinder, 2018). Burnout might present differently in females and, ideally, differentiated interventions should be developed to add value.

Organizational interventions aim to improve working conditions while minimizing external stressors and promoting social support (Karl and Fischer, 2013; Panagioti et al., 2016; Jun et al., 2021). The reasons for emphasis on individual interventions vary according to literature and these include the assumption that individual intervention is easier, cheaper, and the underlying individual causality and responsibility view is associated with long-lasting outcomes (Maslach et al., 2001; Sorenson et al., 2016; Werneburg et al., 2018). There are limitations to intervention strategies. For individual strategies, application in the workplace is often limited; new ways of coping might be learnt but the workplace does not always allow their practice, as there needs to be some form of agreement to allow such interventions (Maslach et al., 2001; Gregory et al., 2018). Additionally, limitations include lack of a control group and lack of longitudinal assessment for severe burnout (Ahola et al., 2017).

Studies reported reduced emotional exhaustion, but limited change in depersonalization/cynicism and a reduced accomplishment/personal inefficiency post individual intervention (Maslach et al., 2001; Ahola et al., 2017). However, because emotional exhaustion is a critical dimension of burnout (Milićević-Kalašić, 2013), its reduction is important. Although there is limited evidence, research does indicate that group or collective case study interventions offer an opportunity for participants to see the progression of burnout in themselves and in others (Yalom, 1995; Sorenson et al., 2016; Werneburg et al., 2018; Edú-Valsania et al., 2022), thus creating a platform for debrief and discussion of coping strategies in a supportive and hopeful environment (Yalom, 1995; Centre for Substance Abuse Treatment [CSAT], 1999). Research suggested that improvement, resulting from group intervention, occurs within a brief duration of time, typically 2 or 3 months. This indicates that short-term group interventions can be as fruitful as long-term group interventions (Garvin et al., 2004) and the cost-benefit ratio could increase, since the facilitator can meet the needs of 8–12 clients in the same amount of time as individual sessions, especially when there are more directive approaches such as cognitive-behavioral or psycho-educational groups (Centre for Substance Abuse Treatment [CSAT], 1999). Burnout is postulated to occur due to a disconnection between the organization and individual's six areas of work life: values, fairness, community, reward, control and workload (Maslach et al., 2001).

Organizational interventions should ideally focus on all six areas. Research found that organizational interventions focusing on workload, fairness and equity mismatches significantly decreases emotional exhaustion between 6 months and a year after intervention, but the other two dimensions of burnout remained unchanged (Gregory et al., 2018; HaGani et al., 2022). Organizational intervention with an educational approach focusing on managers and employees has advantages and adds value by building engagement between the individuals and work,

while working toward a closer alliance with the mission of the organization (Van Dierendonck et al., 1998; Rothmann, 2003; Panagioti et al., 2016). Unfortunately, organizational interventions are complex and costly, requiring investment in terms of money, time and effort; collaboration is essential for such an integrated intervention, which is not always achieved in developing countries (Maslach et al., 2001). To prevent, manage and treat burnout, decision-makers at provincial and national levels in the South African public sector need ongoing involvement, to create awareness and build intervention systems (Thomas and Valli, 2006; Erasmus, 2012; Panagioti et al., 2016; Sirsawy et al., 2016; Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019).

3. Context of the South African public health sector

The South African public health sector is based on the history of apartheid and faces ongoing challenges, such as deficiencies and misdistribution of resources, which have led to contradictory healthcare in the private and public sectors (Kotzee and Couper, 2006; Stoyanov and Cloninger, 2011; Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019; Marutha, 2022). The public sector in South Africa is in a concerning state, impacting its functionality, the caregiver's overall functioning and the quality of services for beneficiaries (Kotzee and Couper, 2006; Erasmus, 2012; Phalime, 2014; Mathias and Wentzel, 2017). Its current state places female medical doctors at risk to emigrate to greener pastures in developed countries, risking a high staff turnover (Kotzee and Couper, 2006; Erasmus, 2012; Sirsawy et al., 2016; Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019). Female medical doctors, working as interns or serving their community service year, have no choice but to study and work in ailing public hospitals, in order to qualify and practise medicine in South Africa (Erasmus, 2012; Discovery Health, 2018). A study that emphasized the severe and unfair conditions in the public hospital, suggested that the female medical doctors who are starting their careers in South African public hospitals are "slaves of the state" (Erasmus, 2012). Their working conditions breach labor laws, making it a case for the Human Rights Commission (Erasmus, 2012). There is still a long way to go to bring change to this sector (Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019). Challenges include the lack or mismanagement of resources in South African public hospitals, with the 36-h mandatory shifts (Discovery Health, 2018). Burnout has negative consequences and is alarmingly high in South African medical doctors, with females at higher risk (Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019; Banda Chitsamatanga and Malinga, 2021). Fears of humiliation, being labeled weak, incapable and unprofessional or a failure are some of the reasons preventing the affected from seeking help (Discovery Health, 2018). There is a need to empower female medical doctors experiencing burnout and the managers who have to manage them, to promote coping though use of internal resources and, ideally, adjust the working environment by improving conditions (Panagioti et al., 2016; Liebenberg et al., 2018).

4. Methodology

The study examines in-depth experiences of burnout amongst female medical doctors in a public hospital in South Africa (Giorgi, 1985, 1997, 2009; Mason, 2002; Finlay, 2008; Creswell and Creswell, 2018), using a qualitative, descriptive and phenomenological perspective. Participants were selected based on their Maslach Burnout Inventory-General Survey (MBI-GS) (Maslach et al., 1996). A focus group was used as data collection and interpretation method for this exploratory case study, with the benefit that it was contextualized within the phenomenon of burnout (Dudovskiy, 2022). The researcher consistently examined and bracketed experiences throughout research (Patton, 1990).

4.1. Sample

In this study, the researcher used a purposive sampling method (Babbie and Mouton, 2010), which focused on female medical doctors born between 1981 and 2000 (Generation Project, 2018; Kane, 2018). The age range was extended to 25–35 years to allow for a larger sample size. The following criteria were used for sampling:

- Females aged 25–35.
- Degree in medicine (MBChB).
- Hospital employment in the public hospital of South Africa for more than a year.
- MBI-GS indicates high levels of burnout.

In two focus groups, 18 interested female medical doctors, who met the criteria and consented to participate, were expected. One focus group had only seven participants attending due to other participant drop-out, sickness, exhaustion from being on call, emergency travel home, being on a shift for a colleague, attending an unexpected event, etc. The participants that were included was in the age group 25–27 years, six black and one white, five single, and two married participants.

4.2. Data collection and research process

The head of clinical training in the hospital called the interested female medical doctors to a meeting, after the researcher requested it. The research study was ethically approved by all stakeholders. An introduction was given by the researcher. There was no participation from the head of the unit in the meeting. After explaining the study, non-interested participants (10) were permitted to leave. A further discussion of the study process was held with 18 keen participants. A number of questions were asked by the group. A copy of the informed consent and the Maslach Burnout Inventory-GS (MBI-GS) were provided for completion, with the intent to determine if they met the last requirement of participation (high levels of burnout). All 18 participants who were interested in the MBI-GS met the final participation criterion, according to the facilitator. Two focus groups of nine participants were planned by the researcher. Based on their random allocation, participants were requested to participate in

focus groups at a specific time and date. Several participants canceled their participation a few days before the date. Reminders were sent a few days before the date. Among the reasons were sickness, a family emergency, extra shifts for a sick colleague and another had a sudden event at home that required their presence. With only eight participants remaining, it was decided to have one focus group. Only seven participants attended the session as one participant dropped out due to exhaustion, after taking up an unexpected shift on the day of the session, for a sick colleague.

To understand and describe their experiences of burnout, an interpretative and idiographic approach (Scotland, 2012; Beck and Jackson, 2020) was taken. In this study, seven female medical doctors employed in a South African public hospital were interviewed about their experiences of burnout (Yin, 2018). The focus group lasted 4.5 h. As per the informed consent form, participants were reminded that participation was voluntary, an audio recording was taking place and ethical considerations were applied. It was reiterated that open communication, anonymity, pseudonyms and notes were all part of the focus group rules. Following the icebreaker, a discussion of the purpose and format of the session was conducted. A break for tea followed. During the session, they shared their experiences of working in a public hospital as female medical doctors. For the first time, participants were asked to mention their pseudonym before speaking. Participants lowered their guard as the session progressed, possibly due to the platform fitting their needs for debriefing and their comfort with the approach taken (Turner and Hagstrom-Schmidt, 2022).

In terms of their personal experiences, the following guiding questions/statements were used:

- Please share your experiences of working at the public hospital.

Definition of burnout and its manifestation, were discussed, followed by the following sub-questions.

- What is your understanding of burnout? How did you find completing the questionnaire?
- How has burnout affected you?
- What are the risk factors for burnout, in your opinion?
- Based on your personal experiences at work, what have you learned about burnout?
- What are your coping mechanisms?

4.3. Analysis and interpretation

Using Tesch's (1990) descriptive analysis technique, verbatim transcriptions of recorded audio were made. A literature search was conducted to establish similarities and differences between the study and other studies, and to re-contextualize the data (Creswell, 2016). By using the descriptive analysis technique, the researcher was able to identify participant experiences, actual views and feelings of burnout (Creswell, 2003, 2013).

4.4. Ethical considerations and quality criteria

At the hospital where the research took place, ethical clearance was obtained. There was a low psychological risk associated with the study. A network of private and public mental health professionals within the province was created by the researcher, which would be able to provide assistance if long-term interventions were needed or psychological issues triggered by the research process. Participants could choose to use private professionals at their own expense (or using medical aid) or take advantage of free services offered by public sector professionals. According to the South African ethical code of psychology (Health Professions Council of South Africa, n.d.), the research was conducted as expected. Anonymity was maintained and mutual consent was obtained to ensure that no one was forced into participating. Authentic inquiry was employed as a validation strategy in the study (Creswell and Miller, 2000; Creswell, 2013). As a result, the following methods were used: ongoing bracketing by the one researcher, who was the facilitator throughout the entire process, to ensure personal biases were put aside to allow participants' perspectives to be heard, member-checking was carried out during analysis in order to establish credibility (Lincoln and Guba, 1985; Armond et al., 2021), and participants independently verified and scrutinized the data to ensure that it accurately reflected their experiences.

For enhanced reliability, detailed observation and reflection notes were kept, as well as a detailed description of the setting, participants and methods, and constant peer review. Verbal statements, crucial pauses and overlaps were transcribed. The study was coded according to phenomenological standards in order to ensure reliability and quality (Creswell, 2013). Based on established theories and methods, the findings were discussed in intersubjective validation processes (Yin, 2018). By describing the process in detail and making it visible, firmness was maintained. This study provides in-depth insight into findings, but does not suggest generalization (Lincoln and Guba, 1985; Creswell, 2013).

5. Findings

The following themes emerged from the female medical doctors.

5.1. Burnout experienced by the female medical doctors

The first theme is the actual experience of burnout dimensions by female medical doctors.

5.1.1. Depersonalization

During the session, cynicism was present in the participants, evident in how they reported the expectation to adopt poor coping mechanisms in order to handle "unlawful working conditions" in the public hospital. These maladapted coping strategies were seen in senior medical doctors who, in the participants' view, were not

coping and had no assistance from stakeholders. The participants reiterated that in order to cope, they were continually directed to "learn how to depersonalize and normalize the daily trauma and ethical dilemmas," which is difficult for the participants to accept. Participant 1 highlighted,

> *"Trauma and death are made to seem normal and we are exposed to this right from university level."*

The senior medical doctors are trained from the same malfunctioning system and the participants stated that the cycle of poor coping mechanisms continues and is expected of them as juniors entering the system. They felt it is unfair to be mandated to work in the South African public health system that is not functional and has the potential to change a person for the worse. The environment perpetuates a sense of overall "learned helplessness" that leads to an "autopilot mode," risking development of depersonalization and increased frustration, together with feelings of being stuck. Here is a statement made by Participant 2:

> *"The senior doctors deal with death like nothing happened, and we are expected to do the same and move on quickly to other patients as if "death" is normal. The units like (oncology) where there was a lot of trauma and death were difficult for me to handle; especially the children's deaths. Yet I had to face it like I was okay."*

Additionally, Participant 7 stated,

> *"It is difficult to see and work with colleagues that do not care anymore."*

Participant 4 added,

> *"I struggle to certify people as dead so often as if it is "normal.""*

Lastly, Participant 2 said,

> *"I had an ethical dilemma whereby I was expected to perform termination of pregnancies (TOPs) so often and yet it is the norm, and I had no one to talk to about it. I had to do it because if I didn't I would have to deal with a complicated backstreet termination which the patient would end up doing because they feel they have no other choice."*

The participants are of view that they are expected to develop certain maladjusted coping strategies like "depersonalize," as their seniors do or stop investing in the patients emotionally in order to survive the daily strain. Some participants stated that they had actually begun doing so, because of the difficult conditions in various hospitals they rotate in.

5.1.2. Emotional exhaustion

According to Leiter and Maslach (1998), emotional exhaustion is the core component of burnout. Certain participants' descriptions indicated emotional and physical exhaustion, leading to an increased risk of mistakes at work and negative impact regarding their cognitive functioning. Additionally, negative emotions due to the daily challenges in the South African public hospital were noted. The participants noticed how the poor working conditions and increased pressure had a negative impact, which was evident in their own "personality" changes and behaviors. These changes affect interpersonal relationships with colleagues and significant others (family and social), even self-functioning. They also noted to have feelings of hopelessness, being unappreciated, fatigue, diminished interest in work and being constantly overwhelmed. Participant 1 states:

> *"I try to relax; I have been burnt out for so long and functioning now on autopilot. I have ideas to do other things but cannot do anything. I am physically and emotionally tired. I believe it is not how life is meant to be, yet I have been doing it for 2 years now. I took time off – sick leave – per rotation, it is hard and still it is not enough."*

They collectively reported to have "reduced empathy, constant exhaustion, poor concentration, increased irritability and elevated emotionality" affecting their personal lives. The female medical doctors mentioned that they felt that, generally, "the work takes a little a bit of them daily and they are watching as they go deeper into the sense of being overwhelmed; consumed by work and struggling to cope." They mentioned that, overall, they do not have coping mechanisms to handle the difficult cases, workload, pressurized environment, working conditions or expectations. Certain situations or ethical dilemmas (child neglect by mothers, termination of pregnancy, children dying, etc.) cause more frustration, touching on their human element.

5.1.3. Reduced personal competence

The participants mentioned that they lost confidence in themselves as people and medical doctors. Participant 1 highlighted,

> *"Continually feel like I am not competent in doing this work and I feel devalued constantly because of this work."*

Their expectations and ideal ideas of the medical field were not met by the reality of the working conditions, which led to further statements, such as in Participant 2:

> *"I lack confidence and doubt my own competence."*

Most had entered the medical field for certain reasons, which they deem are not being met or are diminishing quickly, because of the reality. Participant 6 even mentions failure:

> *"I feel I failed as a doctor and that the system failed me. It is difficult to see any positive impact I make now in these working conditions."*

The reality of the working environment has led to feelings of incompetence and eroded their passion, which was present upon entering the medical field. They feel let down by the public hospital, which as an employer, from their view, was meant to appreciate

them for wanting to save lives, to care for them and equip them with more knowledge. The female medical doctors all viewed themselves as experiencing burnout, which affected the self, home life and work. Participant 1 pointed out, for example,

> *"I experience of fatigue and increased need for sleep, always feeling tired,"*

while Participant 2 rather referred to her overwhelming feelings at work:

> *"I am constantly irritable; I am always feeling sad (crying before every call and at home)."*

Participant 6 reports a similar experience:

> *"I have not being able to work effectively; I have become moody and impatient,"*

while Participant 7 has lost her focus and is thoughtless:

> *"I am very forgetful."*

Finally, Participant 4 provides a good example of the fact that the work never ends for the female doctors and that they cannot manage to switch off:

> *"I find myself dreaming and thinking about patients constantly, not being able to switch off work; I find it difficult to wake up to prepare for work."*

5.2. Coping strategies in female medical doctors

Female medical doctors highlighted feelings of being overwhelmed and having limited coping strategies. Some participants stated that they chose certain support measures, which included seeking spiritual support or help from experienced health caregivers, but the impact was always limited. In an attempt to cope, some participants took time-outs and engaged in self-care. Some attempted to reframe the challenges, in order to cope and there were some indications of self-stimulation by some participants; adjustment of their lifestyles to accommodate work demands. Some accepted the situation as beyond their control, though remained feeling frustrated, which led to adoption of a learned helplessness stance. Some admitted to having a limited or absent coping ability. Participant 1 stated,

> *"I try cope by going to gym, but it is not helping at all because the trauma is constant and I am too tired to go to gym."*

> P8 added, *"I would remind myself that I will be ending a difficult rotation soon. So, I just need to wait it out, told myself it will be over."*

The participants seemed concerned that there are few mentors who are still committed and they fear that the working conditions might affect the few remaining, negatively. The situation and perception thereof makes it difficult for the participants to aspire to be like some seniors, who they view as overburdened, because of the public hospital system in South Africa. They seem to discern that the senior medical doctors, the consultants/specialists and even the medical officers' are negatively affected by the public hospital system in South Africa. The same affected staff are expected to mentor them as juniors, which is counterproductive. Female medical doctors indicated a perceived lack of leadership and organizational guidance, causing poor psychological and team support.

The participants continually emphasized unsatisfactory coordination of the programme and poor departmental support, which led to them feeling unheard, isolated, not part of a team and unsupported. The participants felt that their personal pleas and challenges were never heard, even when verbalized, or even aspects that they were raising in the current focus group would not be heard, especially because they were merely female medical doctors. They reiterated the lack of psychological (emotional) support and a sense of being overwhelmed with no one to notice or assist them. They were overwhelmed by the workload and the type of medical cases they need to cope with.

All participants stated the hours, inflexibility, lack of support, isolation, dealing with challenging cases alone and increased workload as contributors to a lack of enjoyment. They reported a shared experience of an overall lack of support by all stakeholders, poor management support and overall neglect of responsibility by clinical managers, regarding the actual work. Participant 2 emphasized,

> *"We work long hours, with no breaks and limited staff."*

The participants felt, generally, unsupported by most senior staff members they work with, and lack of support seems to lead to feelings of a lack of cohesion, poor sense of belonging, helplessness, frustration and a perception that their views or inputs do not matter, and that they are not valued or taken seriously as professionals. The participants were concerned that the system and poor working conditions affecting senior medical doctors negatively, reduces their own level of commitment and drive as female medical doctors. The participants seemed to feel voiceless and, yet, they are expected to deliver in spite of the challenging conditions they encounter daily. However, the very process they are coerced into is destroying them and they feel that they cannot do anything about it.

Further, they seem to feel as if they have insufficient skills on how to get family, in-group and organizational support. They felt hopeless and frustrated in the failing public hospital system in South Africa; they were aware that the system was affecting them negatively, like with their seniors. They noticed that the negative effect cascaded to their families too, who do not know how to help and need to deal with certain changed behaviors within participants. They, seemingly, tend not to communicate some challenges, especially regarding ethical dilemmas due to a lack of platforms for such concerns; lack of trust in the system/senior staff members to assist them and fear of victimization, which they

thought might negatively affect their completion of the programme to become independent practitioners.

5.2.1. Lack of support and system inherent challenges

The female medical doctors seemed to feel unsupported and devalued, just because they were juniors. They were of the collective view that medical training in South Africa is militarized. Participant 3 highlighted,

> *". . . we are not expected to suggest better systems to the seniors because we are juniors but are expected to just follow on what the seniors are doing in a failing system."*

They felt that they have been given a raw deal in that their trainers and mentors are from the same system of militarized training, so they themselves do not know any different and can only offer what they know. They experienced the system as hierarchal, therefore, they should just follow orders from the top. They additionally felt that their seniors were also struggling but needed to survive, so they continued giving the same treatment to juniors that they received, maintaining the cycle of destruction. The participants felt coerced to always be healthy, because the system cannot afford to have them off sick; therefore, they are constantly working under pressure.

There was a perception that there are broader challenges in South Africa that affect the public health sector, impacting newly qualified medical doctors. There was a sense from the group of participants that the inadequate management of referral system leads to an overload of patients in the public hospitals. The group suggested a need to review the referral system, instead of carrying on overburdening the public health system and the caregivers. They experienced the workload as abnormally high and that the cases are often overwhelming for the limited number of staff members, infrastructure and resources available. As female medical doctors, they are expected to handle complicated traumatic cases with no support and little knowledge. Participant 2 points out,

> "*Referral systems are burdened and we have too patients for the understaffed hospital with limited resources; by the time patients come to our hospital they are complicated."*

They verbalized an urgent need to increase staff members, and improve infrastructure and resources for the public hospital. There was a strong view that mismanagement of funds in the public hospital leads to poor resources (staff, medicines, etc.) and infrastructure (equipment, on-call rooms, accommodation, hospitals and primary healthcare clinics) or a lack thereof.

5.2.2. Mismanagement and infrastructural problems

Mismanagement compromises the level of care given, even for patients who have minor curable diseases. They were of the view that infrastructure and resource challenges will never be resolved. The participants reinforced how the poor level of care, because of mismanagement and lack of resources, affects not only the lives of patients, but also them personally. Female medical doctors have to attend mandatory teaching tutorials in various places. The patient overload leads to compromised teaching time and they were of the view that all professionals were overwhelmed by the high patient volumes, most of whom have traumatic and chronic conditions. From their point of view, it seemed that consulting day to day to get through the high number of patients is the priority of the South African public hospital, not increased learning and offering improved service for the beneficiaries. The beneficiaries are reportedly offered poor services in unfortunate conditions and are put at risk, because the employer does not care for the caregivers who are meant to offer the services. Participant 6 points out,

> *"We sometimes run out of basic medicines needed and therefore are unable to help for basic illness. It is really frustrating. We are expected to perform miracles with no resources, because we are doctors."*

Participant 6 further mentioned that,

> *"there are too many patients, we as health professionals are expected to see in the public health sector, yet we are understaffed."*

Participant 2 states,

> *"We as juniors are expected to suck it up and not complain. The seniors say they pushed through we should learn the same."*

Participant 1 also commented that,

> *"Patients die, from things that could have been treated, but no one seems to care in leadership."*

Participants indicated a yearning for learning and noticed some gaps in their knowledge where they need assistance from seniors. However, because of the system, they do not get adequate learning and teaching opportunities, which are part of their training and that they still hope to receive before becoming independent medical practitioners. The participants felt they were given responsibilities that were not meant for junior doctors and, at times, without senior supervision. South Africa is facing certain challenges as a developing country, emanating from a difficult history of imbalance and apartheid. The participants felt that government has not stabilized, yet, and does not have adjusted solutions for the many challenges. Some participants believed solutions would never be found in future, because the root causes are not tackled. Instead, there is a significant amount of maladministration, corruption and wasteful expenditure, which is distracting the development of a functional public hospital. The participants felt that visible problems, such as corruption and the South African leadership crisis of government, have led to many challenges in the public systems that need to function properly, in order to cater for the high population. One such dysfunctional department is the overwhelmed mismanaged public hospital. Another issue that is affecting the public healthcare system is the South African government's inadequacy

to handle illegal immigrants. For example, Participant 4 points out,

> *"We are thrown into the deep end as juniors, with no support from seniors, no tutorials, but working with severe illnesses sometimes life threatening."*

Participant 3 states,

> *"We want to specialize but what we seeing now makes it difficult for one to continue with the dream."*

Participant 7 stated that,

> *"South African government is not spending money where needed in health, yet there is a budget allocated. There is so much corruption and wasteful expenditure; so we do not get basics like medication, hiring of staff, or proper call rooms to do our work in the public health sector hospitals and clinics as medical doctors.'*

Participant 2 added,

> *"The ratio of doctor to patient in the public health sector is inhumane. Added to the problem is the load of illegal immigrants that we are coerced to serve. There is a crisis with illegal immigrants and we see in how they overload an already malfunctioning health system at the expense of the patients who are meant to receive the care. The care we offer is limited and compromised; impacting us as medical doctors negatively. The government seem not to care about the crisis and impact and only expect us to be patriotic."*

Participant 5 stated,

> *"Long lines are the order of the day with complicating patients, limited resources, limited staff members and working conditions where we cannot even take lunch breaks."*

The participants were of the view that the current system is inadequate for the many South Africans who cannot afford private healthcare. As insufficient as it is, it is severely overloaded by the many illegal immigrants, who also cannot afford private healthcare. There was a sense that the participants need to force themselves to be patriotic, so they could be motivated to work in the difficult conditions and give back to South Africa. Participants agreed that their work expectations in reality, in the public hospital, are above their own scope of competence. They were of the view that they are taking responsibility and making decisions that female medical doctors should not be making.

6. Discussion

Female medical doctors reportedly tend to show more empathy at the cost of their mental well-being (Alam et al., 2022) than other genders, causing greater emotional arousal and distress. This might lead to the contradictory reduction in empathy as a survival mechanism to cope (Rajvinder, 2018), as evident in the current study. To rid these feelings, one might avoid emotional involvement by reducing time and personal involvement with patients, colleagues and, in the extreme, people in their personal lives. Isolating has its own challenges, as humans are made to care, therefore, the person becomes task-oriented, emotionally blunted, normalizes what is abnormal, becomes rule focused and genuinely does not cope, leading to development of the second depersonalization construct in burnout (Gitto and Trimarchi, 2016).

High empathy has been linked with a negative impact on health professionals' mental health and increased risk for compassion fatigue and burnout (Wagaman et al., 2015; Tiwari et al., 2021). There is a view that compassion and empathy are motivators for most entrants into the medical field and an adequate reward for the long hours and training (Gitto and Trimarchi, 2016). However, once the newly qualified enter the field and have to work in a public hospital, there is a realization that compassion and empathy are not enough; in fact, they are likely to cause more harm, which presents in the form of burnout. The motivation to join the medical field is influenced by many factors: economic factors together with personal motivations and skills, and a strong need to help others. Thus, the choice and character of the person entering the medical field can predispose them to developing burnout, in conditions such as the South African public sector. Caring, especially in difficult working environments such as in public hospitals, comes at an extremely high personal price. The passion to help others can be fulfilling and at the same time, come at a cost (Gitto and Trimarchi, 2016; Panagioti et al., 2016; Lemaire and Wallace, 2017). It can lead to drained emotional reserves, feelings of overwhelming exhaustion, depersonalization or cynicism and a sense of professional inefficiency, which all constitute burnout.

The collective experience of participants indicates that they mostly feel depleted of physical and emotional resources. They also feel let down by their seniors and the stakeholders of the public hospital system, as there seems to be no solution. The combination of excessive workload, imbalance between job demands and skills, lack of job control (conflict situations or role ambiguity), insufficient gratification, collapsed sense of belonging (lacking teamwork, lack of respect) and prolonged stress have contributed to the burnout experience (Edú-Valsania et al., 2022). The participants admit that the experience leads to medical errors, reduced quality of care, which affects patient satisfaction, and poor coping strategies. The modeled coping strategies, which include normalizing of trauma (depersonalization), having reduced empathy, isolating themselves and developing a "do not care attitude," goes against their beliefs and thereby causing a struggle. They are presented with emotions that need attention – feelings of isolation, identity crisis, confusion, pessimism regarding future, frustration, hopelessness, helplessness, sadness, emotional depletion, emotional stress and overall compassion fatigue. Burnout involves attitudes, self-appraisal and appraisal of others within a certain context (Maslach, 1976, 1978).

Burnout has also been linked to Lazarus and Folkman's (1984) appraisal theory, which proposed an appraisal of the situation, an appraisal of the available resources and ways to respond, which determine the individual response. The female medical doctors have developed a sense of helplessness and a negative view, evident in their verbalized distrust of management, pessimism, blaming and the feeling of not being appreciated, all of which are typical cognitive symptoms prominent at an individual level of burnout

(Schaufeli and Enzmann, 1998; Ohue et al., 2011). Risk factors for burnout include high work expectations, high levels of occupational stress, role conflict, low levels of participation in decision-making, and a lack of resources and feedback from the organization (Maslach et al., 2001; Tiwari et al., 2021). These seem to be some of the risk factors that the female medical doctors are exposed to daily, which seemingly led to their current negative experience of their workplace.

The participants seem to be oscillating between two contrasting messages that they are juniors on the one hand, yet, on the other, expected to handle severe chronic traumatic cases with no guidance, which seemingly creates a constant dilemma within promoting the development of burnout and typically cognitive distortions regarding their abilities and workplace; which can hamper them from developing adjusted coping strategies (Schaufeli and Enzmann, 1998; Ohue et al., 2011; Lemaire and Wallace, 2017; Mathias and Wentzel, 2017). Certain work-related incidents such as feeling like one has little or no control over work, lack of recognition for good work, unclear or overly demanding job expectations, or working in a chaotic or high pressure environment (Maslach et al., 2001), which is the participant's daily experience, increases a person's likelihood to gradually develop burnout. They had a shared view that work overload, due to poor referral systems, unfair working conditions (lack of sufficient rest, long hours), increased number of traumatic chronic cases with lack of support (such as supervision, debriefing), lack of support for their own emotional needs, and limited infrastructure and resources (such as staff members, equipment, medicines, primary healthcare facilities), deprive them of the pleasure that could be derived from working as medical doctors fulfilling their passion (HaGani et al., 2022). They felt that their working experience in the South African public hospital has taken an opportunity away from them to learn and grow in the field of medicine. They held the collective view that they are expected to deliver in very poor working conditions, where they are severely understaffed. The participants verbalized a need for ongoing debriefing and psychological support to develop adjusted coping strategies. At the same time, they feel hopeless about any potential change, because the seniors meant to implement changes are mostly trained to the same dysfunctional South African public health sector; therefore, the participants were of view that the seniors have developed poor coping strategies and suffer from burnout symptoms themselves.

Caregivers commonly develop intense emotions toward those they care for, often prioritizing the recipient's needs over their own. While helping and caring for others can be extremely fulfilling, it can also drain a person's emotional reserves (Lemaire and Wallace, 2017; HaGani et al., 2022). The health system and society, in general, almost expects caregivers such as medical doctors to prioritize others at their own expense and work in poor conditions, such as the public hospital with severe limitations, without protecting or supporting them. Doctors mostly enter the profession expecting to reap rewards for helping and saving lives. Yet, the very care they provide in these challenging conditions, of the South African public sector, subjects them to the risk of severe burnout. The reality they face in their working conditions is not what they expected, which came as a shock for most of them; the system does not offer processes to help them with the shocking reality.

Participants know their limitations in terms of knowledge and skill, yet, in the overburdened public hospital in South Africa, they are given responsibilities beyond their ability and are constantly dealing with traumatic cases (Peltzer et al., 2003; Thomas and Valli, 2006; Phalime, 2014; Discovery Health, 2018; Hlatshaneni, 2019). They are responsible for people's lives, but do not feel equipped. The public hospital in South Africa does not offer the opportunity to equip them and comes across as being unconcerned. They are coerced into working in a failing public hospital system and expected to manage. It is as if they are set up to fail and not treated like the professionals that they are. The situation affects their professional identity that they are developing as medical doctors (Goldie, 2012; Meier and Kim, 2022), developing all sorts of negative feelings that put them at risk for burnout. Their passion for saving lives and their desire to help others were met with numerous frustrations in the public health systems leading to apathy, loss of enthusiasm, frustration and drained emotional reserves (Gitto and Trimarchi, 2016; Lemaire and Wallace, 2017; Mathias and Wentzel, 2017). Participants are left to find their own solutions in the absence of empathetic advisors in the public health system. This exacerbates their negative experience, leading to feelings of isolation, development of poor coping strategies and increased risk for development of consequences such as burnout and severe mental health issues.

Developing countries have challenges in their systems, such as the South African public health sector (Peltzer et al., 2003; Thomas and Valli, 2006; Davhana-Maselesele and Igumbor, 2008; Phalime, 2014). South African health caregivers in the public hospital often find themselves working in appalling conditions and caring for the caregiver is usually not a priority to government. Health and wellness of public hospital workers are not prioritized and, yet, they are expected to render proper services to many people in understaffed and under resourced infrastructure, under unlawful labor conditions, without being affected negatively (Erasmus, 2012; Sirsawy et al., 2016; Discovery Health, 2018; Liebenberg et al., 2018; Hlatshaneni, 2019). Should they fall ill or go on leave, there is no provision for a stand-in, as the hospitals are understaffed (Erasmus, 2012). This implies that participants are constantly working under pressure and often making decisions that they would not ordinarily have to make under ideal conditions with enough senior staff members (Erasmus, 2012; Discovery Health, 2018; Hlatshaneni, 2019). This affects the female medical doctors, their beneficiaries, the public hospital itself and other stakeholders. Furthermore, consequences such as diminished trust in the public sector, decreased interest in the field of medicine, compromised patient and self-care, and overwhelmed coping strategies were highlighted by female medical doctors.

Overall, for the female medical doctors, there is a disconnect between what was expected and the actual experience of working in the public hospital. This disconnect puts them at risk for burnout. Although burnout can be associated with stress, stress is about too much demand, whereas burnout is having nothing left to give at a psychological level (Helkavaara, 2013; Milićević-Kalašić, 2013; Banda Chitsamatanga and Malinga, 2021). There is an underlying sense of helplessness in coping or facing the working environment, as seen with the participants' collective experience. The participants describe their seniors as going through such an experience. They are frustrated because they feel they are expected to depersonalize in a similar manner and develop maladjusted coping mechanisms. This leads to negative feelings such as helplessness, hopelessness and isolation. They want to change, yet they are not assisted to achieve this change (Maslach, 1982; Marcatto et al., 2022).

If not understood, burnout can be debilitating and cause negative consequences that compromise the level of care and the caregiver, as seen in the female medical doctors working in the public hospital. It is further complicated by possible multiple roles, because this is their first working experience, therefore, there are no previously gained coping skills (Maslach, 2003; Marutha, 2022) and this is exacerbated by lack of support structures to learn from. Female medical doctors are left to find their own way in dealing with the challenges and this can be incredibly frustrating, as seen in the collective experience. The expectations of their work are constantly contradicted by their reality and there is a hypothesized loss of power and of a professional identity. This is seen in how they question who they really are and the battle they have in attempting to deal with it.

7. Conclusion and recommendation

The study responds to the question of how female medical doctors experience the workplace and burnout. It provides deep insights into how participants suffer in their work situation and how they cope with the challenges within daily work interactions. They have developed mechanisms of coping that help them to carry on in the challenging situation and find themselves in a constant negotiation of suffering and coping.

It is recommended that future research should focus on a larger sample to create a better understanding of burnout in female medical doctors working in South African public hospitals. It is anticipated that from a larger study, specific contextual intervention strategies can be developed to address burnout and reduce it effectively in the described context.

Regarding practical interventions, specific interventions and tools should be researched and implemented in South Africa and other developing country's public health sectors. Larger samples with other female health professionals, outside of medical doctors, could increase understanding of the at-risk female health professional's way of functioning, in order to know how to support them and prevent burnout.

Data availability statement

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

Ethics statement

The studies involving human participants were reviewed and approved by the Department of Industrial and Organizational Psychology Research Ethics Committee, UNISA. The patients/participants provided their written informed consent to participate in this study.

Author contributions

RO and C-HM wrote and edited the manuscript. KM conducted the research and wrote the manuscript. All authors contributed to the article and approved the submitted version.

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.

Publisher's note

References

Ahola, K., Toppinen-Tanner, S., and Seppänen, J. (2017). Interventions to alleviate burnout symptoms and to support return to work among employees with burnout: Systematic review and meta-analysis. *Burn. Res.* 4, 1–11. doi: 10.1016/j.burn.2017.02.001

Alam, M. Z., Alam, M. M. D., Uddin, M. A., and Mohd Noor, N. A. (2022). Do mobile health (mHealth) services ensure the quality of health life? An integrated approach from a developing country context. *J. Market. Commun.* 28, 152–182. doi: 10.1080/13527266.2020.1848900

Armond, A. C. V., Gordijn, B., Lewis, J., Hosseini, M., Bodnár, J. K., Holm, S., et al. (2021). A scoping review of the literature featuring research ethics and research integrity cases. *BMC Med. Ethics* 22:50. doi: 10.1186/s12910-021-00620-8

Babbie, E., and Mouton, J. (2010). *The practice of social research*. Cape Town: Oxford University Press.

Bährer-Kohler, S. (2013). "Introduction," in *Burnout for experts: Prevention in the context of living and working*, ed. S. Bährer-Kohler (New York, NY: Springer), 1–13. doi: 10.1007/978-1-4614-4391-9_1

Banda Chitsamatanga, B., and Malinga, W. (2021). 'A tale of two paradoxes in response to COVID-19': Public health system and socio-economic implications of the pandemic in South Africa and Zimbabwe. *Cogent. Soc. Sci.* 7:1869368. doi: 10.1080/23311886.2020.1869368

Beck, E. D., and Jackson, J. J. (2020). Idiographic traits: A return to Allportian approaches to personality. *Curr. Direct. Psychol. Sci.* 29, 301–308. doi: 10.1177/0963721420915860

Carod-Artal, F. J., and Vázquez-Cabrera, C. (2013). "Burnout syndrome in an international setting," in *Burnout for experts: Prevention in the context of living and working*, ed. S. Bährer-Kohler (New York, NY: Springer), 15–35. doi: 10.1007/978-1-4614-4391-9_2

Centre for Substance Abuse Treatment [CSAT] (1999). "Brief interventions and brief therapies for substance abuse," In *Chapter 9: Time-limited group therapy. Treatment Improvement Protocol (TIP) Series, No. 34* (Rockville, MD: Substance Abuse and Mental Health Services Administration (US)). Available online at: http://www.ncbi.nlm.nih.gov/books/NBK64936/

Creswell, J. W. (2003). *Research design*, 2nd Edn. Thousand Oaks, CA: Sage.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*, 3rd Edn. Thousand Oaks, CA: Sage.

Creswell, J. W. (2016). *30 essential skills for the qualitative researcher*. Thousand Oaks, CA: Sage.

Creswell, J. W., and Creswell, J. D. (2018). *Research design: Qualitative, quantitative & mixed methods approaches*, 5th Edn. Thousand Oaks, CA: Sage.

Creswell, J. W., and Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Pract.* 39, 124–130. doi: 10.1207/s15430421tip3903_2

Davhana-Maselesele, M., and Igumbor, J. O. (2008). The impact of caring for persons living with HIV and Aids on the mental health of nurses in the Limpopo Province. *Curationis* 31, 67–73. doi: 10.4102/curationis.v31i2.987

Discovery Health (2018). *Burnout alarmingly high in medical students and young doctors*. Sandton: Discovery Limited.

Dudovskiy, D. (2022). *Ultimate guide to writing a dissertation in business studies: A step-by-step assistance*, 6th Edn. Available online at: https://research-methodology.net/about-us/ebook/ (accessed September 01, 2022).

Edú-Valsania, S., Laguía, A., and Moriano, J. A. (2022). Burnout: A review of theory and measurement. *Int. J. Environ. Res. Public Health* 19:1780. doi: 10.3390/ijerph19031780

Erasmus, N. (2012). Slaves of the state: Medical internship and community service in South Africa. *S. Afr. Med. J.* 102, 655–658. doi: 10.7196/SAMJ.5987

Fink, G. (2007). *Encyclopaedia of stress*, 2nd Edn. Boston, MA: Elsevier.

Finlay, L. (2008). *Introducing phenomenological research*. doi: 10.29173/pandpr19818

Garvin, C. D., Gutierrez, L. M., and Galiinsky, M. J. (eds) (2004). *Handbook of social work with groups*. New York, NY: Guilford Press.

Generation Project (2018). *Welcome to the generation project - BBC worklife*. London: BBC.

Giorgi, A. (1985). *Phenomenology and psychological research*. Pittsburgh, PA: Duquesne University Press.

Giorgi, A. (1997). The theory, practice and evaluation of the phenomenological method as a qualitative research procedure. *J. Phenomenol. Psychol.* 28, 235–260. doi: 10.1163/156916297X00103

Giorgi, A. (2009). *The descriptive phenomenological method in psychology: A modified Husserlian approach*. Pittsburgh, PA: Duquesne University Press.

Gitto, L., and Trimarchi, E. (2016). When passion becomes a nightmare: The burnout syndrome in healthcare workers. A case study. *Mediter. J. Clin. Psychol.* 5, 2282–1619.

Goldie, J. (2012). The formulation of professional identity in medical students: Consideration for educators. *Med. Teach.* 34, 641–648. doi: 10.3109/0142159X.2012.687476

Gregory, S. T., Menser, T., and Gregory, B. T. (2018). An organizational intervention to reduce physician burnout. *J. Healthc. Manag.* 63, 338–352. doi: 10.1097/JHM-D-16-00037

HaGani, N., Yagil, D., and Cohen, M. (2022). Burnout among oncologists and oncology nurses: A systematic review and meta-analysis. *Health Psychol.* 41:53. doi: 10.1037/hea0001155

Health Professions Council of South Africa (n.d.). Available online at: https://www.hpcsa-blogs.co.za/wp-content/uploads/2017/04/2017-IN-Handbook-Annexure-E.pdf

Helkavaara, M. (2013). "Emotional exhaustion and psychosocial work factors," in *Burnout for experts: Prevention in the context of living and working*, ed. S. Bährer-Kohler (New York, NY: Springer), 159–168. doi: 10.1007/978-1-4614-4391-9_10

Hlatshaneni, S. (2019). *SA doctors burning out at less than one per 100, 000*. Hauz Khaz: The Citizen.

Hodkinson, A., Zhou, A., Johnson, J., Geraghty, K., Riley, R., Zhou, A., et al. (2022). Associations of physician burnout with career engagement and quality of patient care: Systematic review and meta-analysis. *Bus. Manag. J.* 378:e070442. doi: 10.1136/bmj-2022-070442

Houkes, I., Winants, Y., Twellaar, M., and Verdonk, P. (2011). Development of burnout over time and the causal order of the three dimensions of burnout among male and female GPs: A three-wave panel study. *BMC Public Health* 11:240. doi: 10.1186/1471-2458-11-240

Howick, J. (2017). *Female doctors show more empathy than male doctors*. Melbourne: The Conversaton.

Innstrand, S. T., Langbelle, E. M., Falkum, E., and Aasland, O. G. (2011). Exploring within- and between-gender differences in burnout: 8 different occupational groups. *Int. Arch. Occup. Environ. Health* 84, 813–824. doi: 10.1007/s00420-011-0667-y

Jun, J., Ojemeni, M. M., Kalamani, R., Tong, J., and Crecelius, M. L. (2021). Relationship between nurse burnout, patient and organizational outcomes: Systematic review. *Int. J. Nurs. Stud.* 119:103933. doi: 10.1016/j.ijnurstu.2021.103933

Kane, S. (2018). *Common characteristics of Generation Y professionals*. Available online at: https://www.thebalancecareers.com/common-characteristics-of-generation-y-professionals-2164683 (accessed January 10, 2019).

Karl, D., and Fischer, M. (2013). "Prevention and communication: A most effective tailored treatment strategies for burnout," in *Burnout for experts: Prevention in the context of living and working*, ed. S. Bährer-Kohler (New York, NY: Springer), 185–200. doi: 10.1007/978-1-4614-4391-9_12

Kotzee, T. J., and Couper, I. D. (2006). What interventions do South African qualified doctors think will retain them in rural hospitals of the Limpopo Province of South Africa? *Rural Remote Health* 6:581. doi: 10.22605/RRH581

Lazarus, R. S., and Folkman, S. (1984). *Stress, appraisal and coping*. New York, NY: Springer.

Leiter, M. P., and Maslach, C. (1998). The impact of interpersonal environment of burnout and organizational commitment. *J. Appl. Psychol.* 81, 123–133.

Lemaire, J. B., and Wallace, J. E. (2017). Burnout amongst doctors. *Br. Med. J.* 358:j3360. doi: 10.1136/bmj.j3360

Liebenberg, A. R., Coetzee, J. F., Conradie, H. H., and Coetzee, J. F. (2018). Burnout among rural hospital doctors in the Western Cape: Comparison with previous South African studies. *Afr. J. Primary Health Care Fam. Med.* 10:a1568. doi: 10.4102/phcfm.v10i1.1568

Lincoln, Y. S., and Guba, E. G. (1985). *Naturalistic inquiry*. London: Sage.

Marcatto, F., Di Blas, L., Luis, O., Festa, S., and Ferrante, D. (2022). The Perceived Occupational Stress Scale: A brief tool for measuring workers' perceptions of stress at work. *Eur. J. Psychol. Assess.* 38:293. doi: 10.1027/1015-5759/a000677

Marutha, N. S. (2022). "Studying medical records management in the public healthcare sector of South Africa using multi-method," in *Research anthology on innovative research methodologies and utilization across multiple disciplines*, eds M. Khosrow-Pour, S. Clarke, M. E. Jennex, A. V. Anttiroiko, S. Kamel I, J. Lee, et al. (Pennsylvania, PA: IGI Global), 114–134. doi: 10.4018/978-1-6684-3881-7.ch007

Maslach, C. (1976). Burned-out. *Hum. Behav.* 5, 16–22.

Maslach, C. (1978). The client role in staff burnout. *J. Soc. Issues* 34, 111–124. doi: 10.1111/j.1540-4560.1978.tb00778.x

Maslach, C. (1982). *Burnout: The cost of caring*. Englewood Cliffs, NJ: Prentice-Hall.

Maslach, C. (2003). Job burnout: New directions in research and intervention. *Curr. Direct. Psychol. Sci.* 12, 189–192. doi: 10.1111/1467-8721.01258

Maslach, C., and Jackson, S. E. (1986). *Maslach burnout inventory*. Palo Alto, CA: Consulting Psychologists Press.

Maslach, C., Jackson, S. E., and Leiter, M. P. (1996). *Maslach burnout inventory manual*, 3rd Edn. Palo Alto, CA: Consulting Psychologists Press.

Maslach, C., Schaufeli, W. B., and Leiter, M. P. (2001). Job burnout. *Annu. Rev. Psychol.* 52, 397–422. doi: 10.1146/annurev.psych.52.1.397

Mason, J. (2002). *Qualitative researching*, 2nd Edn. London: Sage.

Mathias, C. T., and Wentzel, D. L. (2017). Descriptive study of burnout, compassion fatigue and compassion satisfaction in undergraduate nursing students at a tertiary education institution in KwaZulu-Natal. *Curationis* 40:a1784. doi: 10.4102/curationis.v40i1.1784

Mbunge, E. (2020). Effects of COVID-19 in South African health system and society: An exploratory study, diabetes & metabolic syndrome. *Clin. Res. Rev.* 14, 1809–1814. doi: 10.1016/j.dsx.2020.09.016

Meier, S. T., and Kim, S. (2022). Meta-regression analyses of relationships between burnout and depression with sampling and measurement methodological moderators. *J. Occup. Health Psychol.* 27:195. doi: 10.1037/ocp0000273

Milićević-Kalašić, A. (2013). "Burnout examination," in *Burnout for experts: Prevention in the context of living and working*, ed. S. Bährer-Kohler (New York, NY: Springer), 169–183. doi: 10.1007/978-1-4614-4391-9_11

Murthy, V. H. (2022). Confronting health worker burnout and well-being. *N. Engl. J. Med.* 387, 577–579. doi: 10.1056/NEJMp2207252

Naidoo, T., Tomita, A., and Paruk, S. (2020). Burnout, anxiety and depression risk in medical doctors working in KwaZulu-Natal Province, South Africa: Evidence from a multi-site study of resource-constrained government hospitals in a generalised HIV epidemic setting. *PLoS One* 15:e0239753. doi: 10.1371/journal.pone.0239753

Ohue, T., Moriyama, M., and Nakaya, T. (2011). Examination of cognitive model of stress, burnout, and intention to resign for Japanese nurses. *Japan J. Nurs. Sci.* 8, 76–86. doi: 10.1111/j.1742-7924.2010.00161.x

Panagioti, M., Panagopoulou, E., Bower, P., Lewith, G., Kontopantelis, E., and Esmail, A. (2016). Controlled interventions to reduce burnout in physicians: A systematic review and meta-analysis. *JAMA Internal Med.* 177, 195–205. doi: 10.1001/jamainternmed.2016.7674

Patton, M. Q. (1990). *Qualitative evaluation and research methods*, 2nd Edn. Newbury Park, CA: Sage.

Peltzer, K., Mashego, T.-A., and Mabeba, M. (2003). Short communication: Occupational stress and burnout among South African medical practitioners. *Stress Health* 19, 275–280. doi: 10.1002/smi.982

Phalime, M. (2014). *Post mortem: The doctor who walked away*. Cape Town: Tafelberg.

Rajvinder, S. (2018). *Female doctors show more empathy, but at a cost to their mental well-being*. Victoria: The Conversation.

Roth, M., Morrone, K., Moody, K., Kim, M., Wang, D., Moadel, A., et al. (2011). Career burnout among pediatric oncologists. *Pediatr. Blood Cancer* 57, 1168–1173. doi: 10.1002/pbc.23121

Rothmann, S. (2003). Burnout and engagement: A South African perspective. *SA J. Ind. Psychol.* 29, 16–25. doi: 10.4102/sajip.v29i4.121

Ruiz, R. (2019). *Our best bet against burnout is self care, just not the kind you think*. New York, NY: Mashable.

Schaufeli, W. B., and Enzmann, D. (1998). *The burnout companion to study and practice: A critical analysis*. London: Taylor & Francis.

Scotland, J. (2012). Exploring the physiological underpinnings of research: Relating ontology and epistemology to the methodological and methods of the scientific, interpretive, and critical research paradigms. *English Lang. Teach.* 5, 9–16. doi: 10.5539/elt.v5n9p9

Sirsawy, U., Steinberg, W. J., and Raubenheimer, J. E. (2016). Levels of burnout among registrars and medical officers working at Bloemfontein public health care facilities in 2013. *S. Afr. Fam. Pract.* 58, 1–6. doi: 10.1080/20786190.2016.1198088

Sorenson, C., Wright, K., and Hamilton, R. (2016). Understanding compassion fatigue in healthcare providers: A review of current literature. *J. Nurs. Scholarsh.* 48, 456–465. doi: 10.1111/jnu.12229

Stoyanov, D. S., and Cloninger, C. R. (2011). Relation of people centered public health to person centered health care management. *Int. J. Person Center. Med.* 2, 90–95.

Tesch, R. (1990). *Qualitative Research: Analysis types and software tools*. Hamsphire: Falmer Press.

Thomas, L. S., and Valli, A. (2006). Levels of occupational stress in doctors working in a South African public sector hospital. *S. Afr. Med. J. Forum* 96, 1162–1168.

Tiwari, R., Wildschut-February, A., and Nkonki, L. (2021). Reflecting on the current scenario and forecasting the future demand for medical doctors in South Africa up to 2030: Towards equal representation of women. *Hum. Resour. Health* 19:27. doi: 10.1186/s12960-021-00567-2

Turner, I., and Hagstrom-Schmidt, N. (2022). *Qualitative interview design. Howdy or Hello? Technical and Professional Communication*. Montréal: PressBooks.

Van Dierendonck, D., Schaufeli, W. B., and Buunk, B. P. (1998). The evaluation of an individual burnout intervention program: The role of inequity and social support. *J. Appl. Psychol.* 83, 392–407. doi: 10.1037/0021-9010.83.3.392

Viehl, C., Dispenza, F., McCullough, R., and Guvensel, K. (2017). Burnout among sexual minority mental health practitioners: Investigating correlates and predictors. *Psychol. Sex. Orient. Gender Divers.* 4, 354–361. doi: 10.1037/sgd0000236

Wagaman, M. A., Geiger, J. M., Shockely, C., and Segal, E. (2015). The role of empathy in burnout, compassion satisfaction, and secondary traumatic stress among social workers. *Social Work* 60:3. doi: 10.1093/sw/swv014

Werneburg, B. L., Jenkins, S. M., Friend, J. L., Berkland, B. E., Clark, M. M., Rosedahl, J. K., et al. (2018). Improving resilience in healthcare employees. *Am. J. Health Behav.* 42, 39–50. doi: 10.5993/AJHB.42.1.4

World Health Organization [WHO] (2019). *Burn-out an "occupational phenomenon": International classification of diseases*. Available online at: https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases

Yalom, I. D. (1995). *The theory and practice of group psychotherapy*, 4th Edn. New York, NY: Basic Books.

Yin, R. K. (2018). *Applications of case study research*. Thousand Oaks, CA: SAGE Publications.

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Effects of infection prevention and control measures on patient and visitor violence against health workers in China during COVID-19 pandemic

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Objective: To examine trends in patient and visitor violence (PVV) among large public hospitals from 2016 to 2020 in China, and investigate the effects of infection prevention and control (IPC) measures on PVV during the COVID-19 pandemic.

Methods: The hospital-level data of PVV used in this study from 2016 to 2020 in three cities in northern China were extracted from the database of the Medical Quality and Safety Notification System from 41 public hospitals. The difference-in-difference (DID) method was used to estimate the effects of IPC measures on PVV. The empirical strategy was to compare changes in the incidence rate of PVV in public hospitals where IPC measures were stricter to relatively weaker hospitals.

Results: From 2019 to 2020, the incidence rate of PVV decreases from 4.59 to 2.15% for high-IPC measure level hospitals and increases from 4.42 to 4.56% for medium-IPC measure level hospitals. The results from the DID models showed that as the IPC measure level increased, the incidence rate of PVV (β=−3.12, 95% CI=−5.74~−0.50) decreased more significantly based on controlling for hospital fixed effects and time trends.

Conclusion: The multi-dimensional and comprehensive IPC measures throughout the pandemic in China have not only controlled the pandemic, but also directly or indirectly reduced the incidence rate of PVV by alleviating the stress of health workers and the crowded working environment, creating a good order of admission, and reducing patient waiting time.

KEYWORDS

infection prevention and control measures, COVID-19, health workers, patient and visitor violence, workplace violence, DID

Instruction

Incidents of violence and harassment against health workers (HWs) have been increasing during the COVID-19 pandemic (1, 2). Evidence shows that a number of occupational risks were exacerbated by the COVID-19 pandemic (3). Due to highly stressful and overcrowded work environments, heavy workloads, limited communication among multidisciplinary team

members, inadequate knowledge of the epidemic, and a lack of personal protective equipment (PPE) and guidelines on the diagnosis and treatment for patients in the early stage of the COVID-19 pandemic, clinicians were exposed to an elevated risk of infection, burnout, mental health problems, and even workplace violence (WPV) (4, 5). Comprehensive studies in the Americas, Asia, and Egypt show that almost half (47%) [95% CI: (34, 61)] of HWs experienced at least one manifestation of WPV during COVID-19 (6). HWs in the USA reported a 49.4% prevalence of WPV in a 5-month period during the COVID-19 pandemic in 2020 (7). Brazil nurses reported a 51.1% prevalence (8-month period) in 2020 (8). In Egypt, the 6-month incidence of physical WPV was 9.6% and psychological WPV was 42.6% among HWs in 2020 (9). Some recent investigation studies have estimated the 2-month prevalence of WPV among HWs during the COVID-19 pandemic in China to be between 17.9 and 19.3% (10). Chinese emergency department clinicians reported a 29.2% [95% CI: (26.5, 31.9)] prevalence (1-month period) in 2020 (5). Violence is identified as one of the occupational risks amplified by COVID-19 among HWs. Numerous studies have shown that the main perpetrators of WPV in hospitals are the patients and visitors (11). We should pay more attention to the occupational health of HWs during the COVID-19 pandemic, risk assessment, and introduction of appropriate measures, especially for protection against patient and visitor violence (PVV).

The World Health Organization (WHO) and International Labour Organization (ILO) issued the guideline *COVID-19: Occupational health and safety for HWs* in February 2021, which introduced the primary prevention of COVID-19 among HWs based on risk assessments and the introduction of appropriate measures (Table 1). According to the guideline, workplace risk levels are classified as lower, medium, high, and very high risk, and infection prevention and control (IPC) measures are recommended for the different risk levels. In China, a joint prevention and control mechanism was also launched (12) and the most comprehensive and rigorous prevention and control strategy against the pandemic was enforced in areas of the COVID-19 pandemic for HWs, which was based on the *Occupational Safety and Health in Public Health Emergencies: A Manual for Protecting Health Workers and Emergency Responders published by the ILO and WHO in formulating its decisions*. Based on the local epidemiological situation, the specificity of the work setting, and work tasks, different IPC measure levels were enforced in public hospitals (1). The IPC measure levels did a good job of risk communication with HWs involved in the pandemic, provided adequate PPE in sufficient quantity and quality and regular IPC training, maintained a one-meter social distance, staggered pickup, established flexible sick leave policies, and implemented engineering, environmental and administrative controls for IPC. Administrative controls are the most important components of IPC strategies, contributing to IPC by providing policies and standard operating procedures (13, 14). Although these measures effectively protect HWs from infection, the change in the treatment process and visit regulation for patients could have increased the risk of clinician-patient conflicts. Whether the IPC measures increased the incidence rate of PVV was still unknown.

Over the years, researchers around the world have been studying the risk factors of WPV against HWs. Previous studies have analyzed HWs and their workplace characteristics, and risk factors have been identified for gender, experiences at the present workplace, education, age, department, whether to work in a tertiary hospital, marital status, and work experience (10, 15). The regional differences observed in the prevalence of WPV may be attributed to broader social (eg., cultural attitudes to HWs, work setting, work environment, and healthcare system) and individual factors (eg., age, gender, education level, marital status, professional level, and work tenure) (16). Other studies analyzed the effect of measures on WPV and PVV. Liu et al. (17) showed that the implementation of measures can contribute to the prevention and control of WPV, and security measures were the most recognized measures (81.03%), followed by improved surroundings in second place (52.33%). The study's findings suggest that prevention strategies are urgently needed, particularly in emergency departments, mental health, and prehospital settings, to reduce violence towards healthcare professionals in the workplace to maintain the healthcare system (16). Al-Azzam et al. (18) showed that anti-violence policies and training in dealing with violence were important predictors of WPV for mental health department nurses. However, these studies were mainly cross-sectional studies and lacked sound study design to evaluate the intervention measures and could not analyze the causal relationship between the measures and WPV or PVV (17). In addition, COVID-19 is one of the most severe global health crises that humanity has ever faced (19). Relevant studies have focused on

TABLE 1 Workplace risk levels and job tasks for primary prevention and mitigation of occupational exposure to SARS-CoV-2 among HWs.

Risk level	Examples of job tasks	Prevention and mitigation measures
Lower risk (caution)	Administrative tasks that do not involve contact with patients and visitors or close contact with other co-workers	• do personal protection and avoid gathering; • observe hand and respiratory hygiene; • use fabric masks
Medium risk	Jobs or tasks with close frequent contact with patients, visitors, suppliers, and co-workers but that do not require contact with people known or suspected of being infected with SARS-CoV-2	• wear medical masks and other PPE according to their tasks; • do not leave the area, staggered pickup; • maintain a one-meter social distance
High risk	Exposure to patients with known or suspected COVID-19 and their respiratory samples; entering sites occupied by patients with known or suspected COVID-19	• implement engineering, environmental and administrative controls for IPC, and provide adequate PPE in sufficient quantity and quality
Very high risk	Work with COVID-19 patients where aerosol-generating procedures are frequently performed; work with infected people in indoor, crowded places without adequate ventilation	• provide regular IPC training, including on the use of PPE; • establish flexible sick leave policies

PPE, personal protective equipment. IPC, infection prevention and control.

the impact of the IPC measures on occupational infections in HWs, psychological distress, and WPV (20), but fewer studies have specifically examined PVV and its trends.

The COVID-19 pandemic has caused a large number of deaths, with a global cumulative total of 655,689,115 confirmed cases of COVID-19 pneumonia and 6,671,624 cumulative deaths as of 00:07 on January 5, 2023 (21) posing a serious threat to public health. Thus, IPC measures can be expected and the health status of HWs should be valued. In this study, the number of PVV incidents and the incidence rate of PVV during the COVID-19 pandemic in China, from 2016 to 2020 were described, and the effects of IPC measures on PVV were examined using the difference-in-difference (DID) models. The findings may inform public health policy all over the world to protect the health and safety of HWs to control the global pandemic of COVID-19 more efficiently.

Methods

Data sources

In total, 5 years of hospital-level data, from 2016 to 2020, from three cities, Beijing, Shijiazhuang, and Tongliao, in northern China were used in this study. The hospital-level PVV data used in this study were extracted from the database of the Medical Quality and Safety Notification System (hereafter referred to as "the Notification System") from 41 public hospitals in these cities (22), which had been developed by the local health authority, including the number of PVV incidents and the characteristics of the hospitals and services provided. The participating hospitals are all large public hospitals.

Sample

According to the workplace risk level table given by the WHO (Table 1), we assessed the workplace risk level of each hospital by investigating whether there were known or suspected SARS-CoV-2 infected people entering the hospital during the pandemic. During the pandemic, localities have strengthened the construction of fever, respiratory and intestinal clinics in some hospitals above the secondary level according to specific conditions, mainly including general hospitals, infectious disease hospitals (including COVID-19 designated treatment hospitals), and children's hospitals. These hospitals were exposed to patients with known or suspected COVID-19 and their respiratory samples, therefore, HWs from these hospitals were at high risk of occupational exposure to SARS-CoV-2. Based on the definitions in Table 1, we defined the above hospitals as high risk. While for other hospitals, HWs were often in close contact with patients and visitors not exposed to SARS-CoV-2. According to the explanation in Table 1, we defined these hospitals as medium risk of occupational exposure to SARS-CoV-2. The medium-risk level hospitals include kidney hospitals, dental hospitals, psychiatric hospitals, plastic surgery hospitals, rehabilitation hospitals, and ophthalmic hospitals. In total, 23 hospitals were at the high-risk level and 18 hospitals were at the medium-risk level. The description of the characteristics of the high-risk and medium-risk hospitals is presented in Table 2. All personal identifiers (e.g., name, employer, and contact) were removed. The Notification System of the health care institutions gives a comprehensive and detailed account of PVV, which provided the required data for our study.

Identifying the impact of IPC measures

Prior to the outbreak of COVID-19, the IPC measures were mainly for common communicable diseases, and the comprehensive COVID-19-specific IPC measures for all hospitals in China were practically nonexistent. After the outbreak of COVID-19 in 2020, different COVID-19-specific IPC measures levels were mainly implemented in different types of public hospitals, based on the local epidemiological situation, the specificity of the work setting, and work tasks. Through a document and literature review, we obtained the requirements on IPC measures for the hospitals set by the Municipal Health Commission of the cities. Broadly speaking, risk levels and IPC measure levels were determined based on the likelihood of HWs being exposed to known or suspected COVID-19 patients. The hospitals with a high IPC measures level were able to treat COVID-19 patients with high workplace risk levels and implemented the strictest engineering, environmental and administrative controls for IPC. The hospitals with a medium IPC measures level had a medium workplace risk and introduced measures to wear medical masks and other PPE according to their tasks and maintained a one-meter social distance.

Statistical analysis

In this study, the generalized DID method was used to evaluate the effects of IPC measures on PVV during the epidemic. A DID model is mainly used in research to estimate the causal effect of an intervention by comparing changes over time in an outcome variable

TABLE 2 Description of hospital characteristics.

Risk level	IPC measures level	No. of hospitals, *n* (%)		
		Type		Total
		General	Specialized	
High risk	High	19 (46.3)	4 (9.8)	23 (56.1)
Medium risk	Medium	0 (0.0)	18 (43.9)	18 (43.9)
Total		19 (46.3)	22 (53.7)	41 (100.0)

HWs, health workers. General, general hospital. Specialized, specialized hospital.

between a treatment group and a control group, and it is a simple and well-developed approach that is gradually being used in a wide range of fields (23). The empirical strategy is to compare changes in PVV incidence in hospitals where IPC measures were stricter to institutions that had weaker measures. The difference between our estimates and a standard DID strategy is that we use continuous measures of the intensity of treatment and thereby capture more variation in the data (24). Since this approach does not require capturing any effect of IPC measures on blank control groups compared to the traditional DID method, it will underestimate the full impact of anti-pandemic measures less. Of course, different IPC measure levels are not randomly assigned. Documents of prevention and control strategy indicate that type and scale status can explain a substantial share of this variation. Therefore, the empirical approach is to look at whether there is a break in any pre-existing differences in the level or trend of PVV outcomes around the time of IPC measures being implemented in 2020. The estimating equation is

$$y_{it} = \alpha_i + \beta \text{Impact}_i \times \text{year}_t + \lambda_i + \gamma_t + \varepsilon_{it} \quad (1)$$

y_{it} is the result variable, indicating the number or incidence of PVV in year t at hospital i. Impact_i is the dummy variable of the measure group, indicating the IPC measure with which the hospital was affected, year_t is the dummy variable of measure time, and $\text{Impact}_i \times \text{year}_t$ is the interaction term of the two. λ_i is a series of a hospital's individual fixed effects, γ_t represents a vector of year dummies, and ε_{it} is the random error term. The analysis centers on two hospital-level outcomes: the number of PVV incidents and the incidence rate of PVV. These were calculated by hospital level as follows: where i is the ith institution, and $i = 1, 2 \ldots 41$, t is the tth year, and $t = 2016, 2017 \ldots 2020$. The coefficient of interest in Equation (1) is β, which is the estimated impact of IPC measures on the incidence rate of PVV.

$$\text{Incidence rate of PVV}_{it} = \frac{\sum \text{Number of PVV incidents}_{it}}{\sum \text{Number of HWs}_{it}} \times 100\% \quad (2)$$

The annual total number of outpatient visits and inpatient admissions was used to estimate the HWs workload. Therefore, the indicators of outpatient workload (the average number of daily outpatient visits per doctor) and inpatient workload (the average daily inpatient admissions per doctor) were calculated. The workloads of HWs were calculated as follows: where i is the ith institution, and $i = 1, 2, \ldots, N$ (N = total sample size), j is the jth group (eg, IPC measures level and type), and $j = 0, 1, 2 \ldots j$ (j = the number of institution groups). The workloads of HWs were calculated when j was 0 and 249 is the number of working days for the same period for doctors and 365 is the total number of days in a year (22)

$$\text{Outpatient workload}_j = \frac{\sum \text{Number of outpatient visits}_{ij}}{\sum \text{Number of doctors}_{ij} \times 249} \quad (3)$$

$$\text{Intpatient workload}_j = \frac{\sum \text{Number of patient admissions}_{ij}}{\sum \text{Number of doctors}_{ij} \times 365} \quad (4)$$

The associations between categorical variables were tested with chi-square tests, and $p < 0.05$ (two-tailed) was considered statistically significant.

Results

Distribution and prevalence of PVV

A total of 41 hospitals participated, 23 of them are in the high-risk level and 18 hospitals are in the medium-risk level. Among them, there were 19 general hospitals, and 22 specialist hospitals. The total HWs in high-risk level hospitals increased from 26,037 in 2016 to 31,996 in 2020, and the total HWs in medium-risk level hospitals increased from 8,461 in 2016 to 10,501 in 2020.

Table 3 reports the mean hospital outcomes from 2016 to 2020. Overall, the total incidence rate of PVV in the surveyed hospitals increased from 3.62% in 2016 to 4.52% in 2019 and decreased to 3.21% in 2020. Specifically, the incidence rate of PVV was higher in high-risk hospitals than in medium-risk hospitals from 2016 to 2019 and was reduced in high-risk hospitals and significantly lower than in medium-risk hospitals in 2020.

Figure 1 shows the five-year hospital time series patterns for two PVV outcomes by IPC measures. From 2016 to 2019, the incidence rate of PVV in high-risk hospitals trended upward from 3.91 to 4.59% and declined dramatically to 2.15% in 2020. However, the incidence rate of PVV in medium-risk hospitals largely trended upward from 2016 to 2019, rising from 3.26 to 4.42%, and slightly increased to 4.56% in 2020.

DID models of PVV

To ensure that the variables had a common trend in each IPC measure level hospital before the measures were implemented, a parallel trend test was done for each of the two variables, and its results showed that there were indeed common trends before the measures were implemented (Figure 2). We find no evidence of a differential relationship between the prevalence of COVID-19 on the number of PVV incidents and the incidence rate of PVV in the pre-2020 period.

Row 1 of Table 4 shows the results of the respective DID model regression of the effects of IPC measures. We found that the DID model results for the baseline specification were that the number of PVV ($\beta = -15.45$, $p = 0.006$) and the incidence rate of PVV in hospitals ($\beta = -3.12$, $p = 0.021$) tended to decrease more significantly with the higher IPC measures level on the basis of controlling for hospital fixed effects and time trends. This means that as the hospital's IPC measures improved, the incidence rate of PVV decreased.

Robustness

We investigated the robustness of the preceding results (rows 2 and 3 in Table 4). Workload is positively associated with PVV (22), and a decrease in workload in Chinese public hospitals during the pandemic will affect the incidence rate of PVV, which is also associated with the IPC measure levels, thus creating a confounding

TABLE 3 Description of the hospital-level prevalence of PVV.

Hospital basic information		No. of hospitals	2016	2017	2018	2019	2020	Adjusted 2020
Violence episodes, *n*	High	23	632	706	827	1,115	566	632
	Medium	18	236	244	230	309	334	351
	Total	41	868	950	1,057	1,424	900	–
HWs, *n*	High	23	26,037	26,930	29,023	31,434	31,996	–
	Medium	18	8,461	8,848	9,466	9,776	10,501	–
	Total	41	34,498	35,778	38,489	41,210	42,497	–
PVV rate (%)	High	23	3.91	3.79	3.25	4.59	2.15	2.40
	Medium	18	3.26	2.38	2.67	4.42	4.56	4.78
	Total	41	3.62	3.17	2.99	4.52	3.21	–

PVV, patient and visitor violence; HWs, health workers. PVV rate, Incidence rate of PVV. High: high-IPC measures level hospitals. Medium: medium-IPC measures level hospitals. IPC, infection prevention and control. Adjusted 2020, the number and incidence rate of PVV in 2020 was calculated by assuming that the HWs workload in 2020 was the same as that in 2019.

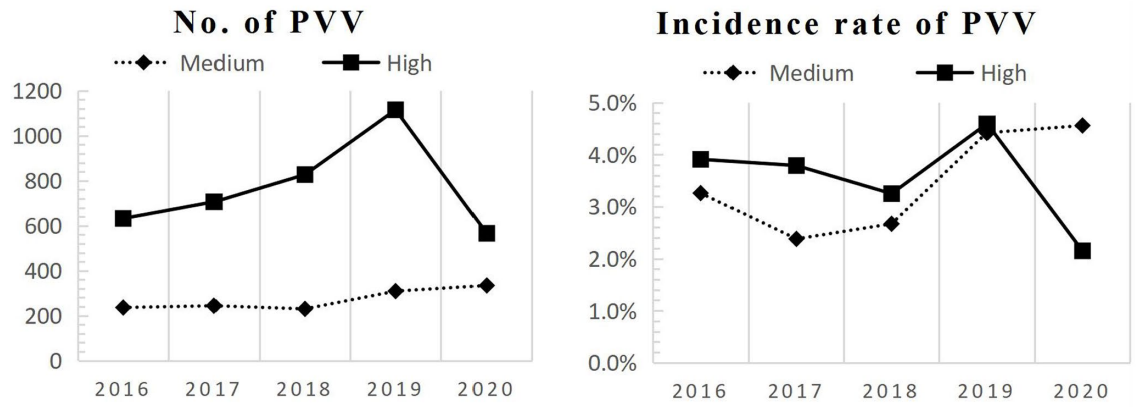

FIGURE 1
Five-year hospital time series patterns of PVV. PVV, patient and visitor violence; High, High-IPC measure level hospitals; Medium, Medium-IPC measure level hospitals; IPC, infection prevention and control.

effect. Therefore, we adjusted the 2020 PVV data (Table 3) based on the multivariate linear model results that the incidence rate of PVV increased by 0.236% for each unit increase in the outpatient workload of HWs, as found in a previous study (22). The number and incidence rate of PVV in 2020 was calculated after excluding the impact of workload by assuming that the HWs workload in 2020 was the same as that in 2019. The adjusted baseline specification, which is row 2 of Table 4, is the revised data obtained by adjusting the 2020 data. The incidence rate of PVV ($\beta = -4.20$, $p = 0.014$) of the adjusted baseline specification showed a downward trend, and the test result was statistically significant, which indicates that IPC measures still had a decreasing effect on the incidence rate of PVV in hospitals to some extent after excluding the effect of decreasing workload.

Row 3 of Table 4 shows that the result of the incidence rate of PVV was robust by excluding the Shijiazhuang and Tongliao surveyed hospitals with a low incidence rate of PVV from the sample. By analyzing the hospitals in Beijing, we found that the incidence rate of PVV ($\beta = -5.23$, $p = 0.042$) showed a decreasing trend, and the results were statistically significant, indicating that the IPC measures still had a certain degree of decreasing effect on the incidence rate of PVV in hospitals after excluding the effect of regional differences. Overall the results were quite robust.

However, even if the trends in the treatment and control groups were common prior to the implementation of the measures, there is still a concern about whether other policies that may have influenced the change in trend occurred at the same time, that is, the change in the trend in the treatment and control groups after the point of measures intervention may not be caused by the measures, but by other policies in the same period. Thus, row 4 shows the placebo test results. The study interval was set as 2016–2018 and the year of implementation of the measure was assumed to be 2017, and regressions were performed on the DID models (Table 4). The results showed that $\beta = 0.77$ ($p > 0.05$) and the difference was not statistically significant, indicating that the change in trend between the treatment and control groups after the intervention time point of the measure was indeed caused by the measures. This means there were positive effects of prevention and control measures for PVV in public hospitals during the COVID-19 pandemic.

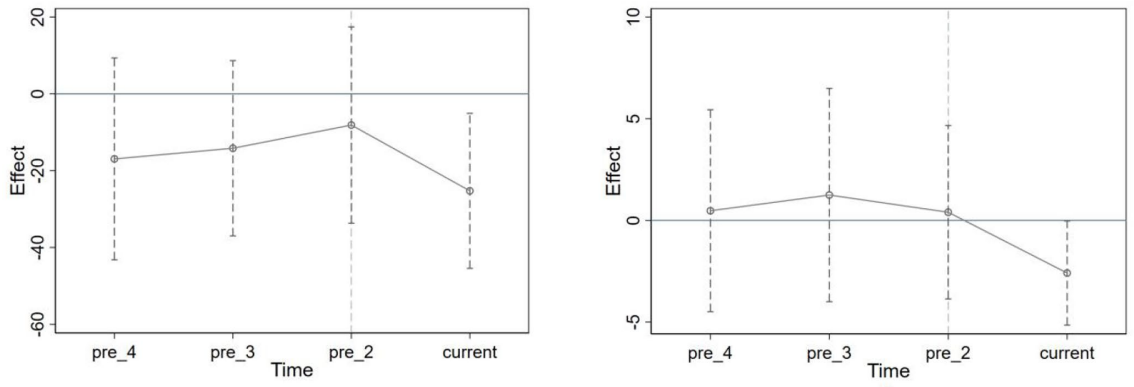

FIGURE 2
Parallel trend test of PVV. The left figure shows the parallel trend test for the number of PVV incidents, and the right figure shows the parallel trend test for the incidence rate of PVV. The 95% CI before the implementation of the measures in 2020 contains 0, which indicates that there is no significant difference between the treatment and control groups before the measures' time point. Current=2020. pre_2=2018; pre_3=2017; pre_4=2016.

TABLE 4 DID model results of PVV.

	No. of PVV			PVV rate		
	B	95% CI	*p*	*B*	95% CI	*p*
1. Baseline specification	−15.45	(−26.28, −4.61)	0.006	−3.12	(−5.74, −0.50)	0.021
2. Adjusted baseline specification	−13.89	(−28.86, 1.08)	0.068	−4.20	(−7.51, −0.88)	0.014
3. Beijing surveyed hospitals	−19.35	(−39.44, 0.74)	0.058	−5.23	(−10.24, −0.22)	0.042
4. Placebo test	2.77	(−4.74, 10.29)	0.126	0.77	(−1.08, 2.62)	0.414

PVV, patient and visitor violence. CI, confidence interval. Row 1: use the valid data collected for outcome assessment. Row 2: row 1 with adjusted data for 2020. Row 3: row 1 without Tongliao surveyed hospitals. Row 4: the interval is set as 2016–2018 and the year of implementation of the measure is assumed to be 2017.

Discussion

To the best of our knowledge, this study is the first panel data analysis of PVV in multiple hospitals during the 2020 COVID-19 pandemic in China and PVV among HWs in the previous 4 years to examine the impact of implementing measures on the number of PVV incidents and the incidence rate of PVV. The data set was drawn from a sample of multiple hospitals and is surveillance data. The incidence rate of PVV from 2016 to 2019 was fluctuating upward and sees a rapid decline in 2020, which could be attributed to various IPC measures during the pandemic.

The increase in the incidence rate of PVV from 2016 to 2019

The incidence rate of PVV from 2016 to 2019 was fluctuating upward, which is in line with previous studies (25). Over the years, China has made great efforts to reduce PVV in the health sector. In 2015, the Ministry of Public Security issued *Six Articles on Public Security Organs' Maintenance of Public Order in Medical Institutions Measures*; "medical disturbance" was incorporated into the criminal law and classified as a "crime of disturbing public order" (26). The *Regulations on the Prevention and Handling of Medical Disputes* were implemented on 1 October 2018 (27), and the National Development and Reform Commission (NDRC) issued the *Memorandum of Cooperation on the Implementation of Joint Punishment for Persons Responsible for Breach of Trust that Seriously Endangers the Normal Medical Order* on 16 October 2018 (28). However, due to the uneven distribution of medical resources, most of the quality resources are concentrated in urban tertiary hospitals, and individuals who fall ill are bound to flock to tertiary hospitals in large cities (29). As a result, the workload of HWs in China's tertiary hospitals has increased year by year. According to the local Health Statistical Yearbook from 2016–2019, the daily inpatient per doctor in tertiary hospitals in Beijing, Shijiazhuang, and Tongliao rose from 0.12 to 0.14, 0.21 to 0.22, and 0.24 to 0.30, respectively. Previous studies showed that workload is positively related to the incidence rate of PVV (22). Therefore, even though some prevention measures for PVV in health sectors were implemented, the incidence rate of PVV in hospitals shows an increasing trend from 2016–2019 as the workload continues to rise. The increased workload of HWs led to inadequate communication with patients and their visitors, more waiting time, and a lower quality of service than expected, which could have increased the risk of PVV towards HWs (25).

The effects of IPC measures on the incidence rate of PVV

Of interest, we found that the IPC measures did not lead to an increase in the incidence rate of PVV after controlling for workload and the effects of the pandemic, despite empirical evidence that the IPC measures can lead to increased tension and violence during

outbreaks (30). Accordingly, the WHO and ILO also noted that HWs may be at higher risk of PVV in the context of the COVID-19 pandemic response and that well-coordinated and comprehensive measures are needed to reduce or prevent PVV and protect the health and safety of HWs (1). These have prevented the occurrence of violence among patients and their visitors to a certain extent and safeguarded the HWs. At the same time, we found that implementing IPC measures will indeed provide more protection for HWs than not implementing IPC measures. Evidence suggests that risk factors for HWs experiencing PVV include high workload, crowded work environment, high stress, and mental health problems such as burnout and the lack of PPE (4, 5). However, IPC measures provided adequate PPE in sufficient quantity and quality and regular IPC training and established flexible sick leave policies to relieve the stress of HWs and safeguard their mental health. Administrative controls implemented in China prevented exposure to, and transmission of, infectious agents to a susceptible person, performed staggered consultation periods, limited the number of patients' companions or visitors, alleviated crowded work environments and stress on HWs, among other things. Engineering and environmental controls increased ventilation and installed physical barriers and hand-washing facilities to prevent infection. Hospitals used electronic means to effectively relieve the work pressure of flow transfer staff, improved the efficiency of pre-screening and triage, reasonably triaged febrile patients from general patients, ensured orderly consultation, and avoided gatherings that cause cross-infection (31).

In order to provide occupational safety for HWs during the pandemic, the Chinese government has not only implemented comprehensive IPC measures, but also improved laws and regulations to protect health workers from psychological factors such as discrimination, violence, depression, anxiety, and burnout (3). For example, the Civil Code enacted in 2020 provided a clearer and more detailed delineation of the legal rights and responsibilities of healthcare providers, healthcare workers, and patients (32). The law recognizes medical institutions as public places and strengthened the public security authorities' obligation to maintain order (33). *The Basic Medical Care and Health Promotion Law*, which came into effect in 2020, clearly prohibits any organization or individual from threatening or endangering the personal safety of medical and healthcare personnel or violating their human dignity (33). On 10 March 2020, the Supreme People's Court released *the first batch of 10 typical cases of punishing crimes against pandemic prevention and control in accordance with the law* (34), which served as a warning to the public. The Beijing Municipal Public Security Bureau, together with the Municipal Health and Health Commission, jointly issued *the Regulations on the Management of Hospital Safety and Order* in Beijing, the results of which showed that more than 75% of medical staff believed that the phenomenon of "medical trouble" had been significantly reduced and 89% of medical staff believed that they felt more secure than before (35).

In addition, during the pandemic, more than 42,000 HWs rushed to Hubei and disregarded their personal lives (36). Medical experts played a central role as authoritative guides in the fight against the pandemic, and HWs became a trustworthy and dependent media image in the minds of the people, creating a good doctor-patient atmosphere, which, together with positive media coverage, somewhat eased the previously tense doctor-patient relationship (37). Therefore, the doctor-patient relationship was much improved during the pandemic, which could reduce the risk of clinician-patient conflicts, and protect HWs from PVV.

Recommendations for the protection of HWs' occupational health

The following recommendations based on this study should be considered. First, during the pandemic, the workplace risk assessment should be updated regularly for each specific setting, as well as for each role, task, or set of tasks to determine the level of risk for potential occupational exposure related to different jobs, work tasks, and work settings, and to plan and implement adequate IPC measures for risk prevention and mitigation (1). Second, during outbreaks of epidemics, measures to strengthen the occupational protection of HWs should be taken, especially to ensure a reasonable workload for HWs, reasonably arrange shifts and compensatory leave for medical staff, establish a long-term mechanism to protect medical staff, and create a good atmosphere of respect for medical care (38). Third, when adopting IPC measures, hospitals should reduce aggregation, relieve HWs' work pressure, and carry out patient-centered medical services by improving the consultation system (39), promoting online treatment on the Internet, and reasonably coordinating outpatient clinic resources.

Limitation and strength

First, the PVV data set was drawn from the Notification system and is surveillance data, recording the more severe PVV, which is somewhat different from the PVV obtained from general cross-sectional studies. Second, while the DID model requires data for at least 1 year before and after the implementation of the measures, the data for this study were collected in early 2021 and the outbreak occurred in late 2019, which corresponds to a year of change that had already occurred. Third, we have only tracked the data for 1 year after the implementation of the policy, which is only short-term data and belong to the immediate impact, not the long-term effect. We will collect longer data to observe the trend of PVV in the future. Nevertheless, this study has five consecutive years of data that can be used for DID modeling and validate the question of common trends prior to measure implementation, as well as conduct placebo tests to exclude the effects of other policies, which is relatively rarely done in PVV studies.

Conclusion

During the period of COVID-19, a series of measures were formulated and implemented in China to prevent and control infection and transmission, as well as protect the occupational health and safety of HWs. The multi-dimensional and comprehensive IPC measures throughout the pandemic in China have not only controlled the pandemic, but also directly or indirectly reduced the incidence rate of PVV by alleviating the stress of HWs and the crowded working environment, creating a good order of admission, and reducing patient waiting time.

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 Ethical Review Committee of Chinese Academy of Medical Sciences (IMICAMS/8/22/HREC). PHIs directors were informed personally about the study by the principal investigator and were supportive of the study. Written informed consent was obtained from all participants before the study. To ensure anonymity, no names or other identifiers were used.

Author contributions

JH conceived and designed the study and modified the manuscript. KS reviewed the literature, collected the data, performed the data analysis, modified the manuscript, provided important insights in response to the discussion, and drafted the final manuscript. CZ conducted the literature search, made significant contributions to the literature review and background, assisted with data analysis, interpreted the data results, and wrote the first draft. All authors contributed to the article and approved the submitted version.

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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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References

1. WHO ILO. COVID-19: Occupational health and safety for health workers. (2021), Available at: https://www.ilo.org/global/industries-and-sectors/health-services/WCMS_769309/lang--en/index.htm (accessed June 15, 2022).

2. Alsharari AF, Abu-Snieneh HM, Abuadas FH, Elsabagh NE, Althobaity A, Alshammari FF, et al. Workplace violence towards emergency nurses: a cross-sectional multicenter study. *Australas Emerg Care*. (2022) 25:48–54. doi: 10.1016/j.auec.2021.01.004

3. Zhang M, Kim R. Occupational health protection for health workers during the coronavirus disease 2019 (COVID-19) pandemic: 6P-approach in China. *Glob Health J*. (2021) 5:215–9. doi: 10.1016/j.glohj.2021.11.007

4. Karlsson U, Fraenkel CJ. Covid-19: risks to healthcare workers and their families. *BMJ*. (2020) 371:m3944. doi: 10.1136/bmj.m3944

5. Liu R, Li Y, An Y, Zhang L, An FR, Luo J, et al. Workplace violence against frontline clinicians in emergency departments during the COVID-19 pandemic. *PeerJ*. (2021) 9:e12459. doi: 10.7717/peerj.12459

6. Ramzi ZS, Fatah PW, Dalvandi A. Prevalence of workplace violence against healthcare workers during the COVID-19 pandemic: a systematic review and Meta-analysis. *Front Psychol*. (2022) 13:896156. doi: 10.3389/fpsyg.2022.896156

7. Byon HD, Sagherian K, Kim Y, Lipscomb J, Crandall M, Steege L. Nurses' experience with type II workplace violence and underreporting during the COVID-19 pandemic. *Workplace Health Saf*. (2021) 70:412–20. doi: 10.1177/21650799211031233

8. Ielapi N, Andreucci M, Bracale UM, Costa D, Bevacqua E, Giannotta N, et al. Workplace violence towards healthcare workers: an Italian cross-sectional survey. *Nurs Rep*. (2021) 11:758–64. doi: 10.3390/nursrep11040072

9. Bitencourt MR, Alarcão ACJ, Silva LL, Dutra AC, Caruzzo NM, Roszkowski I, et al. Predictors of violence against health professionals during the COVID-19 pandemic in Brazil: a cross-sectional study. *PLoS One*. (2021) 16:e0253398. doi: 10.1371/journal.pone.0253398

10. Guo YQ, Huang J, Xu NN, Ma XJ. Worker characteristics and measures associated with patient and visitor violence in the COVID-19 pandemic: a multilevel regression analysis from China. *Front Public Health*. (2022) 10:877843. doi: 10.3389/fpubh.2022.877843

11. Wang JJ, Lv H, Ren WJ. Research progress of workplace violence in hospital. *Occup Health Emerg Rescue*. (2021) 39:604–8. doi: 10.16369/j.oher.issn.1007-1326.2021.05.028

12. Wang J, Wang Z. Strengths, weaknesses, opportunities and threats (SWOT) analysis of China's prevention and control strategy for the COVID-19 epidemic. *Int J Environ Res Public Health*. (2020) 17:2235. doi: 10.3390/ijerph17072235

13. WHO. Occupational safety and health in public health emergencies: a manual for protecting health workers and responders. (2018), Available at: https://www.who.int/publications/i/item/9789241514347 (accessed September 12, 2022).

14. Liu WP, Hai YT, Yang YF, et al. Practice and thinking on prevention and control of Corona virus disease 2019 in Inner Mongolia People's hospital. *Chin J Nosocomiol*. (2020) 30:1446–51. doi: 10.11816/cnki.2020-200416

15. Kumari A, Kaur T, Ranjan P, Chopra S, Sarkar S, Baitha U. Workplace violence against doctors: characteristics, risk factors, and mitigation strategies. *J Postgrad Med*. (2020) 66:149–54. doi: 10.4103/jpgm.JPGM_96_20

16. Liu J, Gan Y, Jiang H, Li L, Dwyer R, Lu K, et al. Prevalence of workplace violence against healthcare workers: a systematic review and meta-analysis. *Occup Environ Med*. (2019) 76:927–37. doi: 10.1136/oemed-2019-105849

17. Liu Y, Zhang M, Li R, Chen N, Huang Y, Lv Y, et al. Risk assessment of workplace violence towards health workers in a Chinese hospital: a cross-sectional study. *BMJ Open*. (2020) 10:e042800. doi: 10.1136/bmjopen-2020-042800

18. Al-Azzam M, Al-Sagarat AY, Tawalbeh L, Poedel RJ. Mental health nurses' perspective of workplace violence in Jordanian mental health hospitals. *Perspect Psychiatr Care*. (2018) 54:477–87. doi: 10.1111/ppc.12250

19. Bui LM, Thi Thu Phung H, Ho Thi TT, Singh V, Maurya R, Khambhati K, et al. Recent findings and applications of biomedical engineering for COVID-19 diagnosis: a critical review. *Bioengineered*. (2021) 12:8594–613. doi: 10.1080/21655979.2021.1987821

20. Solorzano Martinez AJ, De Oliveira GC. Workplace violence training programs for nursing students: a literature review. *J Am Psychiatr Nurses Assoc*. (2021) 27:361–72. doi: 10.1177/1078390321994665

21. WHO. Coronavirus disease (COVID-19) pandemic. (2022), Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 (accessed December 30, 2022).

22. Huang J, Zhang M, Liu X. Correlation between patient and visitor violence and workload among public healthcare workers in China: a cross-sectional study. *BMJ Open*. (2020) 10:e034605. doi: 10.1136/bmjopen-2019-034605

23. Huang W, Zhang ZY, Liu AR. From difference-in-differences to event study. *Rev Indust Econ*. (2022) 49:17–36. doi: 10.19313/j.cnki.cn10-1223/f.20211227.002

24. Finkelstein A. The aggregate effects of health insurance: evidence from the introduction of Medicare. *Q J Econ*. (2007) 122:1–37. doi: 10.1162/qjec.122.1.1

25. Li J, Feng XJ. Current situation and analysis of medical staff workload. *Chin J Modern Nurs*. (2016) 22:1326–9. doi: 10.3760/cma.j.issn.1674-2907.2016.09.040

26. The National People's Congress of the People's Republic of China. Amendment to the criminal law of the People's republic of China (IX). (2015), Available at: http://www.npc.gov.cn/zgrdw/npc/xinwen/2015-08/31/content_1945587.htm (accessed September 12, 2022).

27. The state council of the People's Republic of China. Medical dispute prevention and handling regulations. (2018), Available at: http://www.gov.cn/zhengce/content/2018-08/31/content_5318057.htm (accessed September 12, 2022).

28. The Central People's Government of the People's Republic of China. 28 departments will implement disciplinary action against those responsible for acts against medical order. (2018), Available at: http://www.gov.cn/fuwu/2018-10/17/content_5331503.htm (accessed September 12, 2022).

29. Chang WJ, Han BX. Visualized analysis of research on hospital violence based on web of science and CNKI database. *Chin J Social Med*. (2022) 39:478–82. doi: 10.3969/j.issn.1673-5625.2022.04.027

30. Hu KH, Suo T, Sun Z, Liu SD, Cha XL. Analysis of the current situation of hospital 12320 health hotline complaints in the context of normalized epidemic prevention and control. *Jiangsu Health Admin*. (2022) 33:789–93. doi: 10.3969/j.issn.1005-7803.2022.06.025

31. Liu ZY, Kang H, Wang Z, et al. Practice and thinking on the new diagnosis and treatment model of outpatient department responding to major public health incidents. *China Med Herald*. (2021) 18:162–165+177. Available at: https://kns.cnki.net/kcms/detail/detail.aspx?FileName=YYCY202125038&DbName=CJFQ2021

32. Wang CF. Comparative study on the news reports of doctor-patient relationship in People's Daily before and after the outbreak of COVID-19. *Henan Uni Tech*. (2021). doi: 10.27791/d.cnki.ghegy.2021.000510

33. Xie J, Wang HR. A brief discussion on the causes of hospital workplace violence and the construction of its prevention mechanism. *Chin Health Law*. (2022) 30:20–5. doi: 10.19752/j.cnki.1004-6607.2022.02.005

34. The Supreme People's Court of the People's Republic of China. Typical cases of people's courts punishing crimes of obstructing epidemic prevention and control according to law. (2020), Available at: https://www.court.gov.cn/zixun-xiangqing-222481.html (accessed September 15, 2022).

35. Daily Xinjing. *Beijing more than 70% of the second-class hospitals set up police rooms "a key alarm" will be fully covered*. (2021), Available at: http://news.10jqka.com.cn/20210514/c629397080.shtml (accessed September 15, 2022).

36. Lu D. On the media image of medical experts in the "COVID-19" epidemic. *Jiangxi Norm Univ*. (2021). doi: 10.27178/d.cnki.gjxsu.2021.001493

37. News Sina. *Prevent "trouble" before it happens! Zero tolerance for medical malpractice, more when it happens*. (2020), Available at: http://k.sina.com.cn/article_1893892941_70e2834d02000pxsv.html (accessed October 13, 2022).

38. Ma Y, Wang L, Wang Y, Li Z, Zhang Y, Fan L, et al. Causes of hospital violence, characteristics of perpetrators, and prevention and control measures: a case analysis of 341 serious hospital violence incidents in China. *Front Public Health*. (2022) 9:783137. doi: 10.3389/fpubh.2021.783137

39. Zhu L, Zhang G. Practice and thinking of medical work carried out by hospitals under the background of normalized epidemic prevention and control. *Chinese Hosp*. (2021) 25:84–6. doi: 10.19660/j.issn.1671-0592.2021.4.27

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Compassion fatigue and compassion satisfaction among Romanian emergency medicine personnel

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Background: Contemporary scientific literature has emphasized two specific aspects of healthcare professionals: compassion satisfaction and compassion fatigue. In the context of the COVID-19 pandemic, which has placed significant strain on health systems and healthcare workers, the Russian-Ukrainian crisis appears to have a magnifying effect, particularly on mental health.

Methods: The aim of the present study was to investigate the relationship between threat perception, daily worries, and professional quality of life in a sample of Emergency Medicine Personnel during two major events mentioned above. The sample included 372 participants (56.7% nurses and 43.3% physicians) from emergency units in five county hospitals in the Eastern region of Romania.

Results: The study revealed that threats related to the pandemic were positively linked to secondary traumatic stress, and daily worries were positively linked to both secondary traumatic stress and burnout. Threats generated by the war did not manifest a direct relation with any of the indicators of professional quality of life, but daily worries generated by war positively predicted both secondary traumatic stress and burnout.

Conclusion: Both the pandemic, which involved cumulative exposure, and the war, which involved a lower and more distant level of exposure, had the potential to generate worries and predict a low quality of life. However, our results did not reveal any association between threats, worries, and compassion satisfaction. As a result, this positive indicator of quality of life remained stable despite the presence of threats and worries.

KEYWORDS

secondary traumatic stress, burnout, compassion satisfaction, threats, worries

1. Introduction

In emergency medicine, the constant high-stress environment and repeated exposure to the suffering of others make individuals more vulnerable to compassion fatigue, which has detrimental consequences for the individual, the patient, the workplace, and the healthcare system (1, 2). Compassion fatigue and compassion satisfaction represent two important

dimensions of professional quality of life (3–5). Compassion fatigue is defined as the weakening of the psychological defense mechanisms employed by workers to respond to and deal with severe work-related stress factors (6, 7). It arises from the cumulative empathic engagement with others' trauma, involving both cognitive and affective components (8, 9). This includes the risk of secondary traumatic stress (STS) and burnout. Individuals who suffer from secondary traumatic stress frequently find themselves reliving a traumatic event and display symptoms such as increased arousal, avoidance behavior, and unsettling patient thoughts (10). Burnout refers to a reaction to continuous and acute stress at work, including emotional exhaustion, depersonalization, and a decline in personal accomplishment. It is important to note that burnout is not currently classified as an independent diagnosis in either ICD-10 or ICD-11. Instead, it is included as a subtype of "problems related to employment or unemployment" in both classifications. The main differences between the definitions of burnout in ICD-10 and ICD-11 are that the latter emphasizes the role of chronic workplace stress and includes a third dimension related to reduced professional efficacy. This reflects an increased awareness that burnout is a complex phenomenon that is influenced by various individual, organizational, and societal factors (11–14).

Compassion fatigue has been reported to have an impact on both professional and personal life, making it difficult to provide relationship-based nursing care at work and maintain relationships with friends and family members at home. Inability to recognize signs of patients' symptoms, escalating violence, and an inability to be supportive are signs of compassion fatigue reported by workers in the emergency medicine departments (15). On the other hand, compassion satisfaction includes a positive feeling derived from helping others, finding a purpose in one's work, and having quality co-worker relationships (16).

Previous empirical evidence has demonstrated the coexistence of both compassion fatigue and compassion satisfaction among caregivers (17–19). It has been found that a high level of exposure to pain and suffering, indicated by an increased number of working days per week, is negatively associated with compassion satisfaction. However, it is positively associated with burnout and secondary traumatic stress (20). Furthermore, a high level of compassion satisfaction has been found to be positively related to a low level of compassion fatigue symptomatology (18, 19). Emergency healthcare workers often experience a wide range of psychological symptoms, including high levels of stress, posttraumatic stress symptoms, burnout, and secondary trauma (21). Previous traumatic experiences, overtime work, and severe occupational stressors, such as resuscitation and death, have been found to be associated with burnout and secondary traumatic stress (22, 23).

Within the category of protective factors, supportive social interactions, physical activity, and the use of meditation have been found to be positively associated with compassion satisfaction (24–28).

Cognitive models of psychopathology suggest that exposure to stressful events can lead to distorted cognitions related to threats, which in turn generate negative emotions and psychopathological reactions such as traumatic stress and depression (29).

In the context of the present study, the stressful events of the pandemic and war were examined to identify their associations with cognitive-emotional processes such as perceived threats and worries, as well as dimensions of professional quality of life including secondary traumatic stress, burnout, and compassion satisfaction.

The pandemic period has been associated with a negative correlation between compassion satisfaction and compassion fatigue among medical staff, as evidenced by Timofeiov-Tudose and Măirean's (19) research. Additionally, working in a pandemic hospital has been identified as a primary risk factor for secondary trauma among medical staff during the pandemic. Healthcare workers who were closely involved with COVID-19 patients reported higher levels of stress, burnout, and secondary trauma compared to their counterparts who worked with non-COVID-19 patients. However, they also reported higher levels of compassion satisfaction (30–35).

The COVID-19 pandemic has brought about several threats that are specific to this period, including spending time with COVID-19 patients, exposure to patients' deaths, and experiencing severe COVID-19 infection symptoms in family or friends. These threats have been found to be positively associated with secondary traumatic stress (36). The pandemic has generated concerns about personal and family health, particularly among healthcare workers who are at a higher risk of contracting and spreading the disease to their family members compared to non-healthcare workers (37, 38).

Emergency medicine workers have been particularly affected by the pandemic, experiencing higher levels of burnout compared to other medical specialties (39–41). A previous study revealed that one in two emergency workers had contemplated suicide, and almost half of all emergency medicine workers were deemed to be at high risk for compassion fatigue (42). Medical staff in Romania have also reported high levels of burnout and anxiety during the pandemic (43–46). Factors such as administrative burden, workload, caring for COVID-19 patients, and interpersonal relationships have been linked to an exacerbation of emotional exhaustion among emergency medical staff during the pandemic (47, 48).

Since the outbreak of the Russian-Ukrainian armed conflict, European nations have joined together to provide financial and material support to the Ukrainian government and NGOs operating in the region. Various humanitarian services have also been made available to Ukrainian refugees who have crossed the borders, including free basic health examinations, medical and dental services, counselling services, and free medical treatment for injured military personnel. Medical teams have also been dispatched to border checkpoints to examine travelers and their pets (49, 50).

Empirical evidence has shown that the war has had inevitable implications on the mental health of the Ukrainian people, with high levels of depression, loneliness, fear, nervousness, and anger reported among civilians (51, 52). The threats posed by the conflict in Ukraine have spread to other regions of the world, generating fear, and having a negative impact on the quality of life, particularly in countries closer to military conflicts with the potential to worsen (53, 54). Although exposure to the war was secondary, perceived subjective threat may be a similar or even stronger predictor of stress reactions compared to objective life events (37). Previous empirical evidence has shown that physical proximity to a disaster (e.g., the 2011 Oslo bombing) was related to more posttraumatic stress symptoms (e.g., 55–58). Additionally, exposure to digital content about the Russia-Ukraine war can contribute to amplifying compassion fatigue, regardless of physical proximity to the war zone (59).

The perception of threat can lead to the generation of worry (60). Worries are unpleasant thoughts about future events that imply risk

or uncertainty (61) and can generate high levels of anxiety and stress (62). According to the cognitive avoidance theory (60), worries are focused on a possible unwanted event that may happen in the future but is non-existent in the present. Thus, worries are different from threats, which are generated by present events or dangerous situations. Previous research has shown that emergency medical personnel who were exposed to the Russian-Ukrainian armed conflict reported experiencing high levels of anxiety symptoms following the start of the war (45). One source of anxiety may be the worries generated by the risk of the war expanding or the possibility of the Russian Federation using nuclear weapons against Ukraine or another NATO member state. However, to our knowledge, no previous study has assessed how the threat generated by secondary exposure to the ongoing war and worries about being directly affected by the war are associated with professional quality of life.

1.1. The present study

Given previous research findings that have highlighted the threats posed by the COVID-19 pandemic and armed conflict (e.g., 31, 45, 63), the objective of the present study is to identify the associations between these concurrent threats during a period marked by the outbreak of war and the ongoing threat of the pandemic, and indicators of professional quality of life, namely secondary traumatic stress, burnout, and compassion satisfaction. We aim to identify these relationships due to the limited literature on war-related factors in relation to compassion fatigue, and the absence of previous research on how vicarious trauma resulting from war may be associated with compassion satisfaction. While previous studies have explored the link between secondary exposure to trauma and quality of life, none have provided empirical evidence of the relationship between secondary exposure to the Russian-Ukrainian armed conflict and quality of life. Identifying both the threats generated by secondary exposure to war trauma and concerns about potential direct exposure to war conditions or consequences will help us understand factors related to quality of life. Additionally, we aim to determine whether the pandemic continues to pose a threat at the time of the study and whether it can still predict indicators of professional quality of life. Based on previous results (e.g., 31, 42, 45), we anticipate that both the threats generated by the war and the pandemic, as well as daily worries, will positively predict secondary traumatic stress and burnout, and will negatively predict compassion satisfaction.

2. Method

2.1. Participants

The study included a sample of 372 emergency medical personnel staff from the emergency units of five county hospitals, including a university center, located in the Eastern region of Romania, bordering Ukraine, and Moldova. The inclusion criteria for the study required participants to be medical personnel working in the emergency department of a hospital. Of the total sample, 56.7% were nurses and 43.3% were physicians. Most of the sample was comprised of women (77.2%). Participants' ages ranged from 22 to 66 years old (M age = 39.41; SD = 9.84), and their years of professional experience ranged from less than a year to 35 years, with an average of 10.48 (SD = 8.82). The healthcare workforce in Romania is predominantly female, with women making up 77.7% of the workforce according to Eurostat data from 2021. In specific medical professions, such as midwifery, nursing, and physician roles, women make up 96.2%, 91.1%, and 67.4% respectively, which is higher than the EU averages for these professions. Therefore, the predominance of female respondents in our study aligns with the gender distribution of medical workers in Romania (64, 65).

2.2. Measurements

The measurement of **perceived threats** was conducted using four items that assessed threats in the domains of health, economics, security, and politics (66). Each item was evaluated twice, once in relation to the Russian-Ukrainian war and once in relation to the COVID-19 pandemic. The items were rated on a 5-point Likert scale, ranging from 1 ("not threatening at all") to 5 ("threatening very much"). Two total scores were calculated for war threats ($\alpha = 0.82$) and pandemic threats ($\alpha = 0.84$) by summing the responses. Higher scores indicated higher levels of perceived threat.

The study aimed to measure **the daily worries arising from war** using a five-item questionnaire that assessed concerns related to financial instability, personal safety, family safety, and job security in the context of the war outbreak. Participants rated each item on a 5-point Likert scale ranging from 1 (not at all worried) to 5 (extremely worried). A composite score was computed by summing the responses, with a high internal consistency ($\alpha = 0.92$), indicating that the items reliably measured a single construct. Higher scores on the composite score indicated greater levels of war-related worries.

The Professional Quality of Life Scale, ProQOL (7), Romanian version (18, 19), was used to measure the professional quality of life. The scale consists of 30 items that assess three domains: compassion satisfaction ($\alpha = 0.80$), burnout ($\alpha = 0.67$), and secondary traumatic stress ($\alpha = 0.78$). Participants rated each item on a 5-point Likert scale ranging from 1 (not at all) to 5 (always). Total scores were calculated by summing the responses, with higher scores indicating higher levels of secondary traumatic stress, burnout, and compassion satisfaction.

In addition, a **demographic questionnaire** was administered to collect information on age, gender, number of years of professional experience, and professional category (e.g., nurses and physicians).

2.3. Procedure

The study invitation was distributed via email to all medical workers in the emergency departments of northeastern cities in Romania. In the first step, the invitation was sent to the section heads, who then contacted their team members and invited them to participate in the study on a voluntary basis. The main objective of the study was to assess the perceptions of daily workplace challenges and quality of life among emergency department workers. Participants were informed that their participation was voluntary and that their answers would be kept confidential. After providing informed consent, participants completed an online survey that took approximately 15 min. Data were collected in early March 2022, shortly after the

TABLE 1 Differences between physicians and nurses concerning the study variables.

Variables	Professional category				*t*	*d*
	Physicians (*N* = 161)		Nurses (*N* = 211)			
	Mean	SD	Mean	SD		
1. Threat pandemic	8.75	3.08	7.60	3.42	3.35**	0.35
2. Threat war	12.72	2.49	11.26	3.32	4.84***	0.50
3. Daily worries	19.11	4.62	16.98	5.40	4.01***	0.41
4. Secondary trauma	25.95	6.70	22.50	6.63	4.89***	0.51
5. Burnout	24.59	5.50	22.40	5.06	3.95***	0.41
6. Compassion satisfaction	41.26	6.72	43.66	5.58	−3.67***	0.38
7. Age	38.08	9.65	40.42	9.90	−2.27*	0.23
8. Professional experience	8.35	7.58	12.22	9.61	−4.16***	0.43

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. $N = 372$.

TABLE 2 Zero-order correlations between the main study variables.

Variables	1	2	3	4	5	6	7
1. Threat pandemic							
2. Threat war	0.56***						
3. Daily worries	0.53***	0.82***					
4. Secondary trauma	0.35***	0.37***	0.43***				
5. Burnout	0.27***	0.35***	0.37***	0.71***			
6. Compassion satisfaction	−0.08	−0.19***	−0.18***	−0.33***	−0.70***		
7. Experience	−0.04	−0.09	−0.06	−0.09	−0.09	0.04	
8. Age	−0.04	−0.10*	−0.08	−0.10*	−0.18***	−0.15**	0.70***
Mean	8.10	11.89	17.90	24.02	23.34	42.62	10.48
SD	3.32	3.07	5.18	6.87	5.36	6.22	8.82
Range	3–15	4–15	5–24	12–50	12–38	20–50	0–35

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. $N = 372$.

outbreak of the Russian-Ukrainian armed conflict. Participation was not remunerated.

3. Results

3.1. Preliminary analysis

The independent samples t-test revealed non-significant gender differences in secondary traumatic stress (STS), burnout, and compassion satisfaction, all $p > 0.05$. However, there were significant differences between professional categories (i.e., nurses, physicians) in STS, $t(360) = 4.89$, $p < 0.001$, burnout, $t(364) = 3.95$, $p < 0.001$, and compassion satisfaction, $t(358) = -3.67$, $p < 0.001$. Nurses reported lower levels of STS ($M = 22.50$, SD = 6.63) and burnout ($M = 22.40$, SD = 5.06), and higher levels of compassion satisfaction ($M = 43.66$, SD = 5.58), compared to physicians ($M = 25.95$, SD = 6.70; $M = 24.59$, SD = 5.50; $M = 41.26$, SD = 6.75, respectively). These results are presented in Table 1.

Age was negatively related to perceived threat related to war, STS, and burnout, and positively related to compassion satisfaction.

3.2. Associations among the main study variables

Pearson correlations revealed that both secondary traumatic stress (STS) and burnout were positively associated with perceived threats related to the pandemic and war, as well as daily worries. In contrast, compassion satisfaction was negatively associated with perceived threats related to war and daily worries. Compassion satisfaction was not significantly related to perceived threats related to the pandemic. These findings are presented in Table 2.

3.3. Regression analyses for the predictors of compassion fatigue and compassion satisfaction

To examine the extent to which perceived threats and daily worries explained variance in participants' secondary traumatic stress (STS), burnout, and compassion satisfaction, three hierarchical multiple regression analyses were conducted. In each analysis, STS (regression 1), burnout (regression 2), and compassion satisfaction (regression 3) were the dependent variables. Demographic variables, including age

TABLE 3 Hierarchical linear regression analysis for compassion fatigue and compassion satisfaction.

	Compassion fatigue						Compassion satisfaction		
	Secondary traumatic stress			Burnout					
	B	SE	*β*	*B*	SE	*β*	*B*	SE	*β*
Step 1: Demographics									
Age	−0.09	0.03	−0.13*	−0.11	0.02	−0.20***	0.10	0.03	0.16**
Profession	1.04	0.32	0.16**	0.62	0.25	0.12*	−0.64	0.29	−0.11*
R^2	0.034**			0.045***			0.031**		
ΔR^2	0.040***			0.050***			0.036***		
Step 2									
Age	−0.06	0.03	−0.09*	−0.08	0.02	−0.16**	0.09	0.03	0.14**
Profession	0.064	0.29	0.10*	0.31	0.24	0.06	−0.47	0.29	−0.08
Threats pandemic	0.36	0.12	0.17**	0.14	0.09	0.08	0.07	0.11	0.04
Threats war	−0.11	0.19	−0.05	0.16	0.15	0.09	−0.21	0.19	−0.10
Daily worries	0.48	0.11	0.36***	0.22	0.09	0.22*	−0.11	0.11	−0.09
R^2	0.215***			0.165***			0.052***		
ΔR^2	0.186***			0.126***			0.030*		

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

and profession, were entered in Step 1. Perceived threats related to the pandemic and war, as well as daily worries, were entered in Step 2.

Results indicated that STS was positively predicted by perceived threats related to the pandemic and daily worries. The final model explained 21.5% of the variance in STS. Burnout was positively predicted only by daily worries, and the model with all predictors explained 16.5% of the variance. Finally, compassion satisfaction was not predicted by the variables entered in the analysis. The results are presented in Table 3.

4. Discussion

The aim of the present study was to investigate the relationship between threats generated by the pandemic and the outbreak of the Russian-Ukrainian war, as well as daily worries, with dimensions of professional quality of life, including secondary traumatic stress, burnout, and compassion satisfaction. The study sample consisted of emergency medicine personnel, and data were collected soon after the outbreak of the Russian-Ukrainian conflict.

Contrary to our expectations based on previous literature (37, 54, 58), our results indicated that war threats did not predict any dimension of professional quality of life. However, in accordance with previous empirical findings (39, 40, 42), perceived threats related to the pandemic positively predicted secondary traumatic stress. Therefore, consistent with the definition of compassion fatigue (8, 9), our results suggest that cumulative exposure during a prolonged period, such as the pandemic period, may increase the risk of secondary traumatic stress. Although many of the restrictions imposed by the pandemic were no longer in place when the present study was conducted, threats generated by the pandemic still showed associations with unwanted psychological outcomes, such as secondary traumatic stress. Threats generated by the war did not demonstrate a direct relationship with any of the indicators of professional quality of life, but daily worries generated by the war positively predicted both secondary traumatic stress and burnout. Some previous evidence [e.g., (45)] has shown that high anxiety experienced after the outbreak of war was related to poor general health. These results may be explained by the cognitive avoidance theory of worry (60), which suggests that threats predict worries. Thus, anticipated risk of being directly affected by the war, rather than perceived threats of secondary exposure in the present, is a more proximal predictor of professional quality of life. Future longitudinal studies could further explore the mediating role of worries about being directly affected by a trauma in the relation between secondary trauma and future outcomes, including positive and negative indicators of quality of life.

Regarding these results, two important aspects should be noted. First, both the pandemic, which involved cumulative exposure, and the war, which involved a low and more distant level of exposure, had the potential to generate worries and predict low quality of life. These results highlight the increased risks for this professional category and the need to raise awareness about the risks in order to prevent a decrease in professional quality of life. Second, our results did not identify any relationship between threats, worries, and compassion satisfaction. Thus, this positive indicator of quality of life remained constant despite threats and worries.

Given the strong negative associations between compassion satisfaction and secondary traumatic stress and burnout, as shown by our results, compassion satisfaction can be considered a valuable resource for attenuating the negative implications of professional challenges. Improving the ability to recognize satisfaction from using personal abilities and expertise in saving lives could prevent traumatic stress and burnout in the long term.

From a practical standpoint, the results could contribute to raising awareness about the potential implications of different consecutive and concurrent challenges, such as the war and the pandemic. As many studies have documented, compassion fatigue affects both professional and personal quality of life, and medical field employers are vulnerable to high levels of burnout and secondary trauma, the two components of compassion fatigue. A first step in preventing the development of high levels of symptomatology is to be aware of the

phenomenon and its implications. Thus, psychoeducation about self-recognition of early signs of compassion fatigue is necessary and could be both a personal and organizational responsibility. Along with awareness, professional boundaries, self-care practices (e.g., hobbies, healthy sleep patterns, healthy eating, physical activity, breathing exercises, etc.), and education on the subject at the individual and organizational levels could help prevent compassion fatigue (67–69). Supervision may be particularly beneficial for employers with low levels of professional experience to prevent exhaustion and secondary trauma (8). Formal debriefing and social support could also be useful coping mechanisms against secondary traumatic stress (70). Interventions such as Mindful Self-Compassion (MSC) training enhance coping strategies like mindfulness and compassion satisfaction, and they also reduce secondary traumatic stress and burnout in trauma personnel (71).

Several limitations should be noted. First, the cross-sectional design of the study does not allow us to draw conclusions in terms of causal relations between variables. Thus, we cannot be sure that threats and worries lead to low professional quality of life. However, the results collected soon after the war outbreak offer us a picture of the potential impact on people's lives, who were secondary exposed to others' traumas. Second, the sample is highly comprised of women, and the possibility to generalize the results is limited. Third, the present study did not identify specific worries generated by the war. Analyzing which type of worries (e.g., related to personal health, family health, safety, and financial difficulties) better explains STS and burnout would be more informative from a practical standpoint. Both scientists and practitioners could benefit from knowing what specific worries create vulnerability to secondary traumatic stress and burnout.

Despite these limitations, the present study has important implications for understanding professional quality of life during very challenging life events. One of the most important results is that, although the risks are lower, an event with direct involvement (i.e., pandemic) is associated with detrimental outcomes compared with a riskier event but with indirect exposure. Furthermore, this is one of the few studies that documented the implications of the Russian-Ukrainian war on mental health and, as far as we know, the first one that concurrently assessed two important sources of burnout and stress (i.e., pandemic and war) among medical staff. Another strength of the present study is that it examined both positive (i.e., compassion satisfaction) and negative (i.e., compassion fatigue) dimensions of professional quality of life, contributing to a deeper understanding of the phenomenon.

In conclusion, the present study highlighted the associations of pandemic threats and daily worries generated by the war with professional quality of life in a sample of emergency medicine practitioners. The results found positive associations between threats, worries, and negative dimensions of quality of life (i.e., secondary traumatic stress, and burnout). The relations of threats and worries with compassion satisfaction were non-significant. Future studies could explore personal and organizational factors that increase vulnerability to secondary traumatic stress and burnout.

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 at: https://doi.org/10.5281/zenodo.7840114.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of Saint Spiridon County Hospital Iasi (approval code: 23, approval date: March 11, 2022). The patients/participants provided their written informed consent to participate in this study.

Author contributions

AH, CM, and DC contributed to the conception and design of the study and wrote the first draft. SH wrote the first draft of the manuscript. M-OP organized the database and wrote the first draft. CM performed the statistical analysis. SV, MH, and CK wrote sections of the manuscript. All authors contributed to the article and approved the submitted version.

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.

Publisher's note

References

1. Cîrstoveanu C, Oprea B, Burtăverde V, Dimitriu M, Stoian PA, Ionescu AC, et al. Emotional intelligence and the perception of stressors at work among healthcare employees in neonatology and paediatrics. *Mediterr J Clin Psychol*. (2020) 8:1–14. doi: 10.6092/2282-1619/mjcp-2678

2. Petrino R, Riesgo LG, Yilmaz B. Burnout in emergency medicine professionals after 2 years of the COVID-19 pandemic: a threat to the healthcare system? *Eur J Emerg Med*. (2022) 29:279–84. doi: 10.1097/MEJ.0000000000000952

3. Adelman RD, Tmanova LL, Delgado D, Dion S, Lachs MS. Caregiver burden: a clinical review. *JAMA*. (2014) 311:1052–60. doi: 10.1001/jama.2014.304

4. Bevans M, Sternberg EM. Caregiving burden, stress, and health effects among family caregivers of adult cancer patients. *JAMA*. (2012) 25:398–403. doi: 10.1001/jama.2012.29

5. Merlo EM, Stoian AP, Motofei IG, Settineri S. Clinical psychological figures in healthcare professionals: resilience and maladjustment as the "cost of care". *Front Psychol*. (2020) 1:607783. doi: 10.3389/fpsyg.2020.607783

6. Moeller SD. *Compassion fatigue: How the media sell disease, famine, war and death*. *1st* ed. New York: Routledge (1999).

7. Stamm BH. *The concise pro QOL manual*. Pocatello: (2010) ID: TheProQOL.org.

8. Boublil E. Compassion fatigue: assessing the psychological and moral boundaries of empathy In: *Phenomenology of bioethics: technoethics and lived-experience* Springer (2021). 61–72. Available at: https://philpapers.org/rec/FERPOB-4.

9. Figley CR. Compassion fatigue as secondary traumatic stress disorder: an overview In: CR Figley, editor. *Compassion fatigue: Coping with secondary traumatic stress disorder*. New York, New York: Brunner/Mazel (1995)

10. Figley CR In: BH Stamm, editor. *Secondary traumatic stress: self-care issues for clinicians, researchers*: The Sidran Press (1995)

11. ICD-10 Version: (2019). Available at: https://icd.who.int/browse10/2019/en#/Z73.0 (Accessed June 14, 2023)

12. World Health Organization ICD-11. Available at: https://www.who.int/standards/classifications/classification-of-diseases (Accessed June 14, 2023)

13. AMA. WHO adds burnout to ICD-11.What it means for physicians. Available at: https://www.ama-assn.org/practice-management/physician-health/who-adds-burnout-icd-11-what-it-means-physicians (Accessed June 14, 2023)

14. Maslach C, Jackson SE. The measurement of experienced burnout. *J Organ Behav*. (1981) 2:99–113. doi: 10.1002/job.4030020205

15. Wolf LA, Delao AM, Perhats C, Clark PR, Edwards C, Frankenberger WD. Traumatic stress in emergency nurses: does your work environment feel like a war zone? *Int Emerg Nurs*. (2020) 52:100895. doi: 10.1016/j.ienj.2020.100895

16. Sodeke-Gregson EA, Holttum S, Billings J. Compassion satisfaction, burnout, and secondary traumatic stress in UK therapists who work with adult trauma clients. *Eur J Psychotraumatol*. (2013) 4:21869. doi: 10.3402/ejpt.v4i0.21869

17. Owen RP, Wanzer L. Compassion fatigue in military healthcare teams. *Arch Psychiatr Nurs*. (2014) 28:2–9. doi: 10.1016/j.apnu.2013.09.007

18. Măirean C. Emotion regulation strategies, secondary traumatic stress, and compassion satisfaction in healthcare providers. *J Psychol*. (2016) 16:961–75. doi: 10.1080/00223980.2016.1225659

19. Timofeiov-Tudose IG, Măirean C. Workplace humour, compassion, and professional quality of life among medical staff. *Eur J Psychotraumatol*. (2023) 14:2158533. doi: 10.1080/20008066.2022.2158533

20. Merlo EM, McNabney SM, Frisone F, Sicari F, Paunica M, Motofei C, et al. Compassion and suppression in caregivers: twin masks of tragedy and joy of caring. *J Mind Med Sci*. (2020) 7:1. doi: 10.22543/7674.71.P6168

21. Alanazi TNM, McKenna L, Buck M, Alharbi RJ. Reported effects of the COVID-19 pandemic on the psychological status of emergency healthcare workers: a scoping review. *Australas Emerg Care*. (2022) 25:197–212. doi: 10.1016/j.auec.2021.10.002

22. Hinderer KA, VonRueden KT, Friedmann E, McQuillan KA, Gilmore R, Kramer B, et al. Burnout, compassion fatigue, compassion satisfaction, and secondary traumatic stress in trauma nurses. *J Trauma Nurs*. (2014) 21:160–9. doi: 10.1097/JTN.0000000000000055

23. Roden-Foreman JW, Bennett MM, Rainey EE, Garrett JS, Powers MB, Warren AM. Secondary traumatic stress in emergency medicine clinicians. *Cogn Behav Ther*. (2017) 46:522–32. doi: 10.1080/16506073.2017.1315612

24. Hunsaker S, Chen H-C, Maughan D, Heaston S. Factors that influence the development of compassion fatigue, burnout, and compassion satisfaction in emergency department nurses: compassion fatigue, satisfaction, and burnout. *J Nurs Scholarsh*. (2015) 47:186–94. doi: 10.1111/jnu.12122

25. Zhang Y-Y, Zhang C, Han X-R, Li W, Wang Y-L. Determinants of compassion satisfaction, compassion fatigue and burn out in nursing: a correlative meta-analysis. *Medicine (Baltimore)*. (2018) 97:e11086. doi: 10.1097/MD.0000000000011086

26. Hundall Stamm B. (2009). Professional quality of life measure: Compassion, satisfaction, and fatigue version 5. Pro QOL. Available at: https://proqol.org/ProQol_Test.html

27. Makic MBF. Taking Care of the Caregiver: compassion satisfaction and compassion fatigue. *J Perianesth Nurs*. (2015) 30:546–7. doi: 10.1016/j.jopan.2015.09.006

28. Velutti L, Pavesi C, Poggio C, Carettoni B, Saetta A, Arcanà C, et al. Caregiver stress: clinical evaluation and intervention strategies for caregiver burden prevention. *J Clin Oncol*. (2017) 35:22. doi: 10.1200/JCO.2017.35.31_suppl.22

29. Dobson KS, Poole JC, Beck JS. The fundamental cognitive model In: RL Leahy, editor. *Science and practice in cognitive therapy: foundations, mechanisms, and applications*. New York: Guilford Press (2018). 29–47.

30. Giusti EM, Pedroli E, D'Aniello GE, Stramba Badiale C, Pietrabissa G, Manna C, et al. The psychological impact of the COVID-19 outbreak on health professionals: a cross-sectional study. *Front Psychol*. (2020) 10:1684. doi: 10.3389/fpsyg.2020.01684

31. Trumello C, Bramanti SM, Ballarotto G, Candelori C, Cerniglia L, Cimino S, et al. Psychological adjustment of healthcare workers in Italy during the COVID-19 pandemic: differences in stress, anxiety, depression, burnout, secondary trauma, and compassion satisfaction between frontline and non-frontline professionals. *Int J Environ Res Public Health*. (2020) 17:8358. doi: 10.3390/ijerph17228358

32. Almeida M. Burnout and the mental health impact of COVID-19 in anesthesiologists: a call to action. *J Clin Anesth*. (2021) 68:110084. doi: 10.1016/j.jclinane.2020.110084

33. Blekas A, Voitsidis P, Athanasiadou M, Parlapani E, Chatzigeorgiou AF, Skoupra M, et al. COVID-19: PTSD symptoms in Greek health care professionals. *Psychol Trauma*. (2020) 12:812–9. doi: 10.1037/tra0000914

34. Bria M, Baban A, Dumitrascu D. Systematic review of burnout risk factors among European healthcare professionals. *Cogn Brain Behav Interdiscip J*. (2012) 16:423–52.

35. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry*. (2020) 7:e15–6. doi: 10.1016/S2215-0366(20)30078-X

36. Orrù G, Marzetti F, Conversano C, Vagheggini G, Miccoli M, Ciacchini R, et al. Secondary traumatic stress and burnout in healthcare workers during COVID-19 outbreak. *Int J Environ Res Public Health*. (2021) 18:337. doi: 10.3390/ijerph18010337

37. Ozen G, Zanfardino A, Ozen G, Acan B, Piscopo A, Casaburo F, et al. Comparison of emotional approaches of medical doctors against COVID-19 pandemic: eastern and Western Mediterranean countries. *Int J Clin Pract*. (2021) 75:e14973. doi: 10.1111/ijcp.14973

38. Di Giuseppe M, Nepa G, Prout TA, Albertini F, Marcelli S, Orrù G, et al. Stress, Burnout, and resilience among healthcare workers during the COVID-19 emergency: the role of defense mechanisms. *Int J Environ Res Public Health*. (2021) 14:5258. doi: 10.3390/ijerph18105258

39. Lopez J, Bindler RJ, Lee J. Cross-sectional analysis of burnout, secondary traumatic stress, and compassion satisfaction among emergency nurses in Southern California working through the COVID-19 pandemic. *J Emerg Nurs*. (2022) 48:366–375.e2. doi: 10.1016/j.jen.2022.03.008

40. McKinley N, McCain RS, Convie L, Clarke M, Dempster M, Campbell WJ, et al. Resilience, burnout and coping mechanisms in UK doctors: a cross-sectional study. *BMJ Open*. (2020) 10:e031765. doi: 10.1136/bmjopen-2019-031765

41. Di Trani M, Mariani R, Ferri R, De Berardinis D, Frigo MG. From resilience to burnout in healthcare workers during the COVID-19 emergency: the role of the ability to tolerate uncertainty. *Front Psychol*. (2021) 16:646435. doi: 10.3389/fpsyg.2021.646435

42. Renkiewicz GK, Hubble MW. Secondary traumatic stress in emergency services systems (STRESS) project: quantifying and predicting compassion fatigue in emergency medical services personnel. *Prehosp Emerg Care*. (2022) 26:652–63. doi: 10.1080/10903127.2021.1943578

43. Corlade-Andrei M, Măirean C, Nedelea P, Grigoraşi G, Cimpoeşu D. Burnout syndrome among staff at an emergency department during the COVID-19 pandemic. *Healthcare (Basel)*. (2022) 10:258. doi: 10.3390/healthcare10020258

44. Dimitriu MCT, Pantea-Stoian A, Smaranda AC, Nica AA, Carap AC, Constantin VD, et al. Burnout syndrome in Romanian medical residents in time of the COVID-19 pandemic. *Med Hypotheses*. (2020) 144:109972. doi: 10.1016/j.mehy.2020.109972

45. Hăisan A, Măirean C, Lupuşoru SI, Tărniceriu C, Cimpoeşu D. General health among eastern Romanian emergency medicine personnel during the Russian-Ukrainian armed conflict. *Healthcare (Basel)*. (2022) 10:1976. doi: 10.3390/healthcare10101976

46. Sima R-M, Olaru O-G, Cazaceanu A, Scheau C, Dimitriu M-T, Popescu M, et al. Stress and anxiety among physicians and nurses in Romania during the COVID-19 pandemic. *J Mind Med Sci*. (2021) 8:252–8. doi: 10.22543/7674.82.P252258

47. Moscu C-A, Anghele M, Dragomir L, Munteanu S, Anghele A, Nechita A, et al. Emotional exhaustion and professional satisfaction during covid-19 pandemic at the level of emergency department staff. *Brain (Bacau)*. (2021) 12:265–78. doi: 10.18662/brain/12.2/205

48. Tarchi L, Crescenzo P, Talamonti K. Prevalence and predictors of mental distress among Italian red cross auxiliary corps: a cross-sectional evaluation after deployment in anti-COVID-19 operations. *Mil Psychol*. (2022):1–14. doi: 10.1080/08995605.2022.2069983

49. World Health Organization, Ukraine Crisis. (1970). Public Health Situation Analysis: Refugee-Hosting Countries, 17 March 2022. World Health Organization. Retrieved, January 1. from, Available at: https://apps.who.int/iris/handle/10665/352494. (Accessed April 29, 2022).

50. Jain N, Prasad S, Bordeniuc A, Tanasov A, Shirinskaya AV, Béla B, et al. European countries step-up humanitarian and medical assistance to Ukraine as the conflict continues. *J Prim Care Community Health*. (2022) 13:21501319221095360. doi: 10.1177/21501319221095358

51. Chaaya C, Devi Thambi V, Sabuncu Ö, Abedi R, Osman Ahmed Osman A, Uwishema O, et al. Ukraine-Russia crisis and its impacts on the mental health of Ukrainian young people during the COVID-19 pandemic. *Ann Med Surg (Lond)*. (2022) 79:104033. doi: 10.1016/j.amsu.2022.104033

52. Kurapov A, Pavlenko V, Drozdov A, Bezliudna V, Reznik A, Isralowitz R, et al. Toward an understanding of the Russian-Ukrainian war impact on university students and personnel. *J Loss Trauma*. (2022) 1–8. doi: 10.1080/15325024.2022.2084838

53. Tyson J. Compassion fatigue in the treatment of combat-related trauma during wartime. *Clin Soc Work J*. (2007) 35:183–92. doi: 10.1007/s10615-007-0095-3

54. Mărcău FC, Peptan C, Gorun HT, Băleanu VD, Gheorman V. Analysis of the impact of the armed conflict in Ukraine on the population of Romania. *Front Public Health*. (2022) 10:964576. doi: 10.3389/fpubh.2022.964576

55. Abu Suhaiban H, Grasser LR, Javanbakht A. Mental health of refugees and torture survivors: a critical review of prevalence, predictors, and integrated care. *Int J Environ Res Public Health*. (2019) 28:2309. doi: 10.3390/ijerph16132309

56. Hynes H. On the battlefield of women's bodies: an overview of the harm of war to women. *Women's Stud Int Forum*. (2004) 27:431–45. doi: 10.1016/j.wsif.2004.09.001

57. Yehuda R, Lehrner A. Intergenerational transmission of trauma effects: putative role of epigenetic mechanisms. *World Psychiatry*. (2018) 17:243–57. doi: 10.1002/wps.20568

58. Heir T, Blix I, Knatten CK. Thinking that one's life was in danger: perceived life threat in individuals directly or indirectly exposed to terror. *Br J Psychiatry*. (2016) 209:306–10. doi: 10.1192/bjp.bp.115.170167

59. Zhan J. (2022). The relevance of compassion fatigue in social media discourse on the Russia-Ukraine crisis. In 2022 5th international conference on humanities education and social sciences (ICHESS 2022) Atlantis Press. pp. 298–311. Available at: https://www.atlantis-press.com/proceedings/ichess-22/125983072.

60. Sibrava NJ, Borkovec TD. The cognitive avoidance theory of worry In: G. C. L. Davey & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment*. Willey (2006). 239–56. doi: 10.1002/9780470713143.ch14

61. Mantzios M. Exploring the relationship between worry and impulsivity in military recruits: the role of mindfulness and self-compassion as potential mediators: worry, impulsivity, mindfulness, self-compassion. *Stress Health*. (2014) 30:397–404. doi: 10.1002/smi.2617

62. Zysberg L, Zisberg A. Days of worry: emotional intelligence and social support mediate worry in the COVID-19 pandemic. *J Health Psychol*. (2022) 27:268–77. doi: 10.1177/1359105320949935

63. Head M., (2022). Ukraine: Disease control is a casualty of war – So a surge in COVID cases is likely, the conversation. Retrieved April 17, 2022, Available at: https://theconversation.com/amp/kraine-disease-control-is-a-casualty-of-war-so-a-surge-in-covid-cases-is-likely-179218. (Accessed June 14, 2023)

64. Eurostat. (2021). Physicians by sex, age and specialty. Available at: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=hlth_rs_spec&lang=en (Accessed June 14, 2023)

65. National Institute of Statistics. (2021). Women and men in Romania. Available at: https://insse.ro/cms/ro/content/femei-si-barbati-in-romania-0 (Accessed June 14, 2023)

66. Marciano H, Eshel Y, Kimhi S, Adini B. Hope and fear of threats as predictors of coping with two major adversities, the COVID-19 pandemic and an armed conflict. *Int J Environ Res Public Health*. (2022) 19:1123. doi: 10.3390/ijerph19031123

67. İlhan B, Küpeli İ. Secondary traumatic stress, anxiety, and depression among emergency healthcare workers in the middle of the COVID-19 outbreak: a cross-sectional study. *Am J Emerg Med*. (2022) 52:99–104. doi: 10.1016/j.ajem.2021.11.051

68. Peters E. Compassion fatigue in nursing: a concept analysis. *Nurs Forum*. (2018) 53:466–80. doi: 10.1111/nuf.12274

69. Xu HG, Kynoch K, Tuckett A, Eley R. Effectiveness of interventions to reduce emergency department staff occupational stress and/or burnout: a systematic review: a systematic review. *JBI Evid Synth*. (2020) 18:1156–88. doi: 10.11124/JBISRIR-D-19-00252

70. Morrison LE, Joy JP. Secondary traumatic stress in the emergency department. *J Adv Nurs*. (2016) 72:2894–906. doi: 10.1111/jan.13030

71. Delaney MC. Caring for the caregivers: evaluation of the effect of an eight-week pilot mindful self-compassion (MSC) training program on nurses' compassion fatigue and resilience. *PLoS One*. (2018) 13:e0207261. doi: 10.1371/journal.pone.0207261

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Factors influencing nurse fatigue during COVID-19: regression vs. fuzzy-set qualitative comparative analysis

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Background: Nurses during COVID-19 who face significant stress and high infection risk are prone to fatigue, affecting their health and quality of patient care. A cross- sectional study of 270 nurses who went to epidemic area to support anti-epidemic was carried out *via* online survey during the COVID-19 pandemic on November 2021.

Methods: A web-based cross-sectional survey of 270 nurses in China who traveled to Heihe City in Heilongjiang Province to combat the novel coronavirus epidemic. The researchers collected information on sociodemographic variables, anxiety, transition shock, professionalism, collaboration, hours of work per day, and fatigue. Regression and fuzzy-set Quality Comparative Analysis (*fsQCA*) evaluated the factors' impact on the nurses' fatigue.

Results: Regression analysis showed that the psychological variables significant for fatigue, transition shock ($\beta = 0.687$, $p < 0.001$) and anxiety ($\beta = 0.757$, $p < 0.001$) were positively associated with fatigue, professionalism ($\beta = -0.216$, $p < 0.001$) was negatively associated with fatigue, and among the work-related variables, cooperation ($\beta = -0.262$, $p < 0.001$) was negatively related to fatigue. FsQCA analysis showed that combined effects of work hours, anxiety, and nurses' educational status caused most of the fatigue (raw coverage = 0.482, consistency = 0.896).

Conclusion: This study provides two main findings, the one is the greater transition shock experienced during COVID-19 in a new environment, low levels of professionalism, anxiety, and poor nursing teamwork situations lead anti-epidemic nurses to increased fatigue. Second, the fsQCA results showed that anxiety is sufficient for fatigue and that nurses' educational status, daily working hours, and anxiety are the most effective combination of factors.

KEYWORDS

fatigue, nurses, COVID-19, fsQCA, anxiety

1. Introduction

The novel coronavirus (COVID-19) is a highly transmissible and rapidly mutating virus that has spread worldwide since late 2019. Some people with the disease present with influenza-like symptoms, whereas others develop severe complications such as pneumonia, respiratory disorders, and even death (1). COVID-19 disrupts lives, impairs health, and creates stress, especially for healthcare workers, who face infection risk and the enormous workload of caring for patients. Among healthcare workers, nurses experience the most stress (2), including high workload, direct contact with infectious patients, uncertainty about treatment options and outcomes, dealing with patients' families, and caring for critically ill and dying patients (3). In addition, high stress levels lead to many chronic physical illnesses and mental disorders, including severe fatigue.

Fatigue is a subjective discomfort that is not only a response to normal physiological conditions but also a clinical manifestation of certain diseases and is the primary cause of subfertility (4). Fatigue in nurses is a complex response to personal, unit, and health system demands (5). Although experiencing some fatigue while working is normal, excessive fatigue produces an overwhelming sense of exhaustion and decreased energy, which impairs physical and cognitive functioning (6), affecting the quality of life and well-being and leading to burnout and illness (7). In addition to adverse effects on the individual, fatigue affects work performance (6, 8), reduces productivity (9) and readiness to perform assigned duties (10), and increases medical errors (11). Nurses have a considerable impact on defusing a pandemic crisis. Their health status affects the provision of continuous and comprehensive care to patients and significantly affects how they respond to public health crises.

Studies show that many factors affect nurses' fatigue. During the non-epidemic period, the effects of nurses' sociodemographic characteristics were confirmed. Specifically, age and education affect nurses' fatigue, with older workers likely to experience more severe fatigue processes because physical strength is limited by age. Furthermore, the higher their education level, the less frequently nurse fatigue occurs (6). In addition, certain psychological factors in nurses are conducive to fatigue. Nurses in a new and unfamiliar work environment can experience a lack of control over their work and feelings of insecurity (12). In particular, nurses engage in fast-paced, highly technically demanding work, long working hours, and many night shifts. These work conditions often entail life-threatening health risks and can produce and exacerbate fatigue (13). Some studies show that nurses given insufficient time to rest and recover, confronting longer working hours and irregular shift rules (6), have a higher risk of fatigue (14). They exhibit significantly increased error rates and injuries when their shifts exceed 12 consecutive hours (15). In particular, during the pandemic, nurses face elevated infection risk. In addition, the COVID-19 patient care workload is substantial. Nurses lack sufficient time to rest. The pressure they bear is likely to lead to fatigue (16). In contrast, professional collaboration not only improves nursing competence and maintains an environmental work atmosphere but also allows nurses to feel psychologically safe, receive higher levels of collegial support, and avoid excessive emotionality. Collaboration can help them to manage problems that arise in clinical work more effectively through collaboration and alleviate fatigue (17).

Many studies have been conducted on nurses' fatigue in daily life (18, 19), but studies analyzing the combined effects of factors influencing nurses' fatigue during COVID-19 are lacking. In addition, few studies have been conducted to determine which combined factors could contribute to fatigue. Studying the combined effects of different influencing factors can provide a new and integrated perspective on nursing practice. Therefore, it is essential to assess the combined effect of factors influencing fatigue in nurses during COVID-19. This study focused on assessing how various factors (socio-demographic variables, anxiety, transition shock, professionalism, teamwork situation, and daily work hours) influenced nurses' fatigue using two different methods: regression modeling and fuzzy set qualitative comparative analysis (fsQCA). The results of this study may provide evidence and ideas to help nurses better deal with fatigue by identifying single and combined effects, with implications for policymakers, managers, medical staff, and researchers to develop and implement strategies.

2. Methods

2.1. Study design, setting, and sample

The study design was quantitative and cross-sectional, using an online survey. The study administered a questionnaire in November 2021 to nurses who supported anti-epidemic work in Heihe City, Heilongjiang Province, China, which included basic information and eight sections, including teamwork, fatigue, anxiety, and professionalism. The exclusion criteria were nurses working in different hospital departments where COVID-19 patients were admitted. Among these were those working directly with COVID-19 patients and nurses dealing with administrative matters.

2.2. Data collection

With consent, the researcher commissioned a nurse to release the questionnaire content of this study to the we-chat groups of approximately 500 nurses. All the we-chat groups were working groups of anti-epidemic nurses. Nurses from multiple hospitals and departments answered the questionnaire through an online questionnaire webpage. Data were collected through an online survey conducted in November 2021. During the survey, 270 responses were received and analyzed.

2.3. Measures

2.3.1. Dependent variable

2.3.1.1. Fatigue

Fatigue was assessed using the Chinese version of the Multidimensional Fatigue Inventory-20 (MFI-20) (20). The MFI-20 is a 20-item scale with five dimensions, namely, *General Fatigue (GF), Physical Fatigue (PF), Mental Fatigue (MF), Reduced Motivation (RM),* and *Reduced Activity (RA)*. Each dimension contains two positive (e.g., "I feel very active") and two negative items (e.g., "I tire easily"), scored using a 5-point Likert scale with a total score of 20–100, with higher scores representing higher levels of fatigue. The scale contains four common factors: physical fatigue, mental fatigue, decreased motivation, and decreased activity. The Chinese version of the MFI-20 scale has good validity and reliability (21). The four factors explained

56.852% of the variance cumulatively, and the 20-item discrimination index ranged from 0.262 to 0.750. The internal consistency of the overall scale was 0.882, and the internal consistency coefficients of the four factors (*physical fatigue, mental fatigue, decreased motivation,* and *decreased activity*) were 0.867, 0.776, 0.476, and 0.687, respectively.

2.3.2. Independent variable

2.3.2.1. Professionalism

Professionalism was assessed using the Chinese version of the Professionalism Attitude Inventory (22, 23). The original scale was developed by Professor Hall and revised by Snizek. The scale asks respondents about their perceptions of their current occupations, such as "I like my current job more than other things." The scale includes 12 items. The same 5-point Likert scale is used as the original scale, with "1" representing *strongly disagree* and "5" representing *strongly agree*. The scale's internal consistency was good (Cronbach's $\alpha = 0.946$), and a common factor was extracted using principal component analysis. In addition, the factor loadings of each item on the corresponding factor were greater than 0.4, and the cumulative contribution rate was 64.9%, indicating that the validity of the questionnaire was good.

2.3.2.2. Transition shock

Transition shock was assessed using an adaptation of the Transition Shock Scale (24). You-ru Xue developed the scale. In this study, some irrelevant questions were removed to leave five questions, such as "I am too tired to do anything after work" and "It is difficult to predict what will happen at work." The same 5-point Likert scale as the original scale was used, 1–5 representing *strongly disagree* to *strongly agree*. The total score ranged from 5 to 25, with higher scores indicating greater transition shock. The questionnaire's reliability was good (Cronbach's $\alpha = 0.811$) with a Kaiser-Meyer-Olkin value of 0.835. A common factor was extracted using principal component analysis. The loadings for each question on the corresponding factor were greater than 0.4, with a cumulative contribution of 60.3%, indicating good validity of the questionnaire.

2.3.2.3. Anxiety

The Generalized Anxiety Disorder Scale (GAD-7) was used to assess anxiety. Seven items on a scale of 0 to 3 are used to assess symptoms in the last 2 weeks, corresponding to not at all, a few days (*mild symptoms*), more than half of the time (*moderate symptoms*), and almost every day (*severe symptoms*). The overall score ranges from 7 to 28; higher scores indicate increased anxiety (25). The scale has good reliability and validity. Cronbach's alpha was 0.898, indicating good internal consistency. The sensitivity, specificity, and kappa values of the GAD-7 were 86.2, 95.5%, and 0.825, respectively, suggesting that the GAD-7 has good validity.

2.3.2.4. Cooperation

Cooperation was assessed with the Chinese version of the Assessment of Interprofessional Team Collaboration Scale (26, 27), which has three dimensions: partnership (8 items), teamwork (8 items), and team coordination (7 items), with a total of 23 items. Items are scored on a 5-point Likert scale, with 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = always, with a total score ranging from 23 to 115. The internal consistency of the total scale was good (Cronbach's $\alpha = 0.88$). Cronbach's alpha coefficients for each dimension ranged from 0.88 to 0.90, indicating good reliability.

2.3.2.5. Sociodemographic variables

This study measured the person-specific factors of age and education level. Age was coded as a continuous variable. Education level was assessed as follows: "Associate's degree and below," and "Bachelor degree or above."

2.4. Statistical analysis

Two methodologies were applied to analyze the influence of different variables on nurses' fatigue: regression models and fsQCA. Regression models are suitable for analyzing ordered continuous variables. They can predict the relationships between independent and dependent variables. In contrast, fsQCA considers more causal conditions and combinations of paths related to the outcome variable and does not focus on the individual effects of each condition (28).

Regression models were used in the first step to identify influential variables from personal factors (age and education), psychological factors (anxiety, transition shock, and professionalism), and work-related factors (teamwork and work hours). Personal factors were entered in step 1, followed by psychological factors in step 2, and work-related variables in step 3. The regression analysis phase identified the independent variables significantly associated with fatigue. All variables were also analyzed for combined effects in the fsQCA stage to observe the combined utility of different factors on fatigue and to compare the differences between the two methods and factors influencing nurses' fatigue.

Regression concerns correlations between variables, whereas qualitative comparative analysis (QCA) concerns explaining the overall relationship between sets. Therefore, QCA is suitable for small sample populations, and fsQCA is a type of QCA that explores combinations of influencing factors rather than individual ones (29). The operation of fsQCA is to first select the calibration conditions of variables according to a specified theory or experience for calibration to make each variable in the range of 0–1 so that the original measurement has an interpretable collective meaning. An analysis of necessary and sufficient conditions to produce the outcome is performed. Necessary conditions are those that must be present for an outcome to occur, while sufficient conditions refer to those conditions that might lead to an outcome and that may not be present. Results are then simplified by constructing truth tables to produce intermediate (only including logical remainders backed by theoretical or practical knowledge), parsimonious (using both configurations with actual observed cases and incorporating all "easy" and "hard" "logical remainders"), and complex solutions (complex solutions only analyze configurations with actual observed cases), to reveal the variables complex causal relationships to the quantity (30). In the analysis result, the symbol "*" means "and" and "~" means "not." Raw coverage indicates the proportion of cases that can be explained by the combination of conditions. It is generally used to examine the strength of the explanatory power of the combination of conditions. Unique coverage indicates how many cases can be explained by the combination path only, which can also be described as the net explanatory power. In summary, the properties of fsQCA of the analysis combined effects apply to this study. Therefore this study used fsQCA to analyze the factors influencing nurses' fatigue.

Specifically, in this study, age, education, anxiety, cooperation, professionalism, daily working hours, and the dependent variable (fatigue) were selected for fsQCA. QCA only works for data ranging

from 0 to 1. Hence, it is necessary to calibrate the data collected from the field survey before conducting fsQCA. Based on suggestions proposed in previous research (31), this study calibrated the raw data of the selected variables. The calibration process is as follows: Three qualitative breakpoints (0.95, 0.5, and 0.05) were designated to calibrate the continuous variables (fatigue, cooperation, anxiety, transition shock, professionalism, and daily working hours). The higher it ranked, the closer to 1 in the calibration. Education was set to 0 or 1: "associate's degree and below" was calibrated as "0." "Bachelor's degree or above" was calibrated as "1." Considering the sample size of 270 in this study, the minimum number of cases required to extract a solution should be greater than one. Therefore, two was chosen as the minimum number of cases. In addition, the minimum consistency level threshold required for a particular solution to be meaningful was set at 0.75. Later, the relationship between these seven factors and fatigue was determined by necessity and sufficiency analysis and coverage measures (32, 33).

Means, frequencies, and standard deviations were used to present the descriptive data. Then, correlations between key variables were analyzed using Stata 17.0. Next, the effects of various variables on fatigue were examined using regression analysis. Finally, the level of fatigue significance was set at $p < 0.05$. The fsQCA was conducted using FSQCA 2.5.

2.5. Ethical considerations

The beginning of the questionnaire stated that the survey was anonymous and voluntary and that nurses could choose whether to participate. Relevant ethical approval for the original systematic review was obtained from the authors' institution.

3. Results

3.1. Sample characteristics

Table 1 presents the demographic characteristics of the sample. The sample comprised 270 nurses aged 22–53 from the Heilongjiang province in China. Roughly 91 % (91.5%) of the respondents were women, and 8.5% were men. Most respondents had a bachelor's degree or higher (89.3%). Finally, 235 (87.0%) respondents had an intermediate title. See Table 1 for detailed information.

Table 2 shows the primary variable descriptors and calibration values. The results showed that nurses had a more severe level of fatigue (mean value: 45.937). In terms of psychological factors, the level of professionalism was higher (mean value: 47.4481), anxiety was lower (mean value: 11.870), and nurses experienced a greater degree of transition shock (mean value:14.562). Regarding work factors, the level of teamwork was good (mean value: 92.088). However, large differences in teamwork scores between nurses (standard error:16.958) were found. Most nurses had to work about 5 h a day (mean value: 4.977). Table 2 shows additional details.

TABLE 1 Descriptive statistics of participants' characteristics ($N = 270$).

Characteristic	Category	*N* (%)
Age	≤30	99 (36.7)
	31–40	145 (53.7)
	>40	26 (9.6)
Gender	Male	23 (8.5)
	Female	247 (91.5)
Education level	Associate's degree and below	29 (10.7)
	Bachelor degree or above	241 (89.3)
Marital status	Unmarried	65 (24.1)
	Married	191 (70.7)
	Divorced	14 (5.2)
Title	Without titles or primary title	14 (5.2)
	Intermediate title	235 (87.0)
	Deputy high title or above	21 (7.8)

3.2. Results of regression analysis

The predictive influences of sociodemographic variables (age and education), psychological variables (anxiety, transition shock, and professionalism), and work-related variables (cooperation and hours worked per day) on fatigue were analyzed using regression. Three different steps were established: the first included sociodemographic variables (education and age), the second included psychological variables (anxiety, transition shock, and professionalism), and the last step included work-related variables (cooperation and hours worked per day).

As shown in Table 3, sociodemographic variables, namely, age and education, had a non-significant relationship with fatigue ($p > 0.05$). Of the psychological variables significant for fatigue, transition shock ($\beta = 0.687$, $p < 0.001$) and anxiety ($\beta = 0.757$, $p < 0.001$) were positively associated with fatigue, implying that the more severe the nurses' shock and anxiety about the transition to the work environment, the more severe the fatigue. Professionalism ($\beta = -0.216$, $p < 0.001$) was negatively associated with fatigue, implying that nurses who have a strong sense of professional mission and believe that what they are doing is meaningful experience less fatigue to some extent. Among the work-related variables, cooperation ($\beta = -0.262$, $p < 0.001$) was negatively related to fatigue, implying that a good atmosphere of cooperation among nurses can reduce fatigue, whereas daily working hours ($\beta = -0.007$, $p > 0.05$) were not significantly related to fatigue.

3.3. Results of fsQCA

The results (Table 4) showed no necessary conditions for fatigue because the consistency is under 0.90 in all cases. Therefore, this study looked for potential configurations of these causal conditions that lead to fatigue (34). Table 4 presents the fsQCA results for configurations that produced sufficient conditions for fatigue, consistency, and coverage (including raw, unique, and solution coverage).

Table 4 shows that anxiety is necessary for fatigue as concordance exceeds 0.9 (33). Education, cooperation, professionalism, and daily working hours are sufficient conditions for fatigue, as the concordance is approximately 0.80; however, the explanatory power is weak, and the factors that influence fatigue in nurses should be analyzed in terms of a combination of variables.

Table 5 summarizes the three paths for fatigue according to the format outlined by Peer (30). In predicting fatigue, three paths were observed that explained 58.0% of the cases (Overall

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TABLE 2 Main descriptions and calibration values ($n = 270$).

	Age	Education	Daily working hours	Anxiety	Transformation shock	Cooperation	Professionalism	Fatigue
M	32.596	1.892	4.977	11.870	14.562	92.088	47.481	45.937
SD	5.858	0.310	2.465	5.193	4.304	16.958	8.941	12.924
MIN	22	1	4	7	5	23	12	27
MAX	53	2	20	28	25	115	60	100
Calibration values								
P5	44.2	2	4	7	7	63	32	26
P50	32	3	4	10	15	92	47	46
P95	24.8	3	8	21	21	115	60	65

M, mean; DT, standard deviation; Min, minimum; Max, maximum; P10, 10th percentile; P50, 50th percentile; P90, 90th percentile.

TABLE 3 Regressions for the dimensions of sociodemographic, psychological, and work-related variables ($n = 270$).

Predictor variables	Dependent variable: fatigue					
	Step 1		Step 2		Step 3	
	β	t	β	t	β	t
Age	0.153	1.09	0.009	0.10	0.001	0.01
Education	−1.632	−0.62	−0.864	−0.46	0.105	0.01
Professionalism			−0.441***	−6.76	−0.216***	−3.16
Anxiety			0.813***	5.79	0.757***	5.46
Transition shock			0.895***	5.23	0.687***	4.25
Cooperation					−0.262***	−7.03
Daily working hours					−0.007	−0.03
Constant	42.379***	11.41	44.656***	8.26	61.325***	10.98
F test	0.523		52.96		51.70	
R-square	0.004		0.500		0.580	
$\triangle R^2$	0.004		0.496		0.080	

*means $p < 0.05$, **means $p < 0.01$, ***means $p < 0.001$; n.s. represents non-significant.

Consistency = 0.881; Overall Coverage = 0.580). This study makes the following key observations.

Among the three configurations, anxiety and daily working hours were deemed necessary conditions because they covered all configurations. This finding indicates that in the sample dataset, nurses who experienced fatigue tended to be those who had worked for a long time and experienced anxiety. Furthermore, the critical explanatory path for nurses' fatigue accounted for 48.2% of the variance (raw coverage = 0.482; consistency = 0.896). This result indicates that fatigue occurs when nurses are less educated, work longer hours, and experience severe anxiety (i.e., the presence of daily working hours, anxiety, and education: configuration 1), regardless of professionalism and cooperation (i.e., the absence of professionalism and cooperation: configuration 1).

The second explanatory path accounted for 44.2% of the variance (raw coverage = 0.442; consistency = 0.907). This result suggests that regardless of age, cooperation, and professionalism (i.e., the absence of age, cooperation, and professionalism; Configuration 2), anxiety with core conditions, combined with long working hours with edge conditions, leads to significant fatigue (i.e., education and daily working hours; Configurations 2).

The third path that explains nurses' fatigue accounted for 39.0% of the variance (raw coverage = 0.390; consistency = 0.944), indicating that regardless of the nurses' age, transition shock, and anxiety level (i.e., the absence of age, transition shock, and anxiety: Configuration 3), a good teamwork atmosphere with core conditions, a low level of professionalism, and long working hours with marginal conditions can lead to the emergence of fatigue (i.e., the presence of daily working hours, cooperation and professionalism: configurations 3).

4. Discussion

This study aimed to analyze the factors influencing nurses' fatigue during COVID-19, including sociodemographic (age and education), psychological (anxiety, transition shock, and professionalism), and work-related variables (collaboration and daily work hours). In addition, this study compared two methods, regression, and fsQCA. Regression allows comparison of the effects of different

TABLE 4 Necessity analysis for Multidimensional fatigue.

	Fatigue		~Fatigue	
	Cons*	Cov**	Cons*	Cov**
Education	0.886	0.497	0.101	0.469
~Education	0.113	0.530	0.898	0.502
Age	0.624	0.656	0.612	0.640
~Age	0.657	0.630	0.670	0.640
Anxiety	0.935	0.639	0.746	0.507
~Anxiety	0.279	0.525	0.469	0.878
Transformation shock	0.677	0.707	0.594	0.618
~Transformation shock	0.634	0.611	0.71	0.689
Professionalism	0.570	0.539	0.511	0.542
~Professionalism	0.722	0.770	0.783	0.737
Cooperation	0.488	0.475	0.793	0.768
~Cooperation	0.762	0.787	0.458	0.471
Daily working hours	0.798	0.660	0.753	0.619
~Daily working hours	0.540	0.687	0.587	0.743

* consistency; ** coverage; condition required: consistency ≥ 0.90.

TABLE 5 Solution of case.

Frequency cutoff: 2	Fatigue		
	Consistency cut-off: 0.886		
	1	2	3
Age		⊗	⊗
Education	•		•
Professionalism	⊗	⊗	
Transition shock			●
Anxiety	●	●	●
Cooperation	⊗	⊗	⊗
Daily working hours	•	•	•
Raw coverage	0.482	0.442	0.390
Unique coverage	0.103	0.063	0.024
Consistency	0.896	0.907	0.944
Solution coverage:	0.580		
Solution consistency:	0.881		

Black circles indicate the presence of a condition, and circles with "X" indicate the absence of a condition. Large circles indicate core conditions and small circles indicate peripheral conditions. Blank spaces indicate "do not care." Overall, the solution coverage is the total coverage for all configurations.

factors on fatigue, whereas fsQCA allows analysis of the combined effects of different factors on fatigue. This study extends research on factors affecting nurses' fatigue.

The regression analysis results suggest that greater transition shock, higher anxiety, and poorer teamwork lead to more severe fatigue, while higher professionalism has a mitigating effect. The fsQCA suggested that anxiety is a necessary condition for fatigue. Professionalism, transition shock, teamwork, education, and daily work hours appear to be sufficient conditions for fatigue, findings that are consistent with other studies. Hospitals admit critically ill patients. The potential for viral infection and the long working hours make nurses anxious (14, 35), especially new nurses, transitioning from caring for COVID-19 patients in their previous work department to a department caring for infectious patients. Lack of experience means new nurses lack a sense of control over their work. In addition to working long hours and lacking rest periods, nurses are more likely to experience fatigue. A good working environment has been demonstrated to reduce nurses' fatigue. Good team relationships indicate smooth communication and rapport among nurses, which helps nurses handle patients more efficiently and enables them to experience psychological support from colleagues, avoid bad feelings, and reduce fatigue. In addition, believing that caring for infectious and critically ill patients is meaningful creates a sense of sanctity and mission for work, which reduces stress and anxiety and reduces fatigue (36).

According to the results obtained from the most important pathway of the fsQCA model, the combination of anxiety, working hours, and education had the most substantial influence on nurses' fatigue, suggesting that during an epidemic, working long hours while experiencing high anxiety can lead to fatigue. In contrast, individual factors (i.e., education) can also influence fatigue. Studies have demonstrated that anxiety significantly predicts nurses' fatigue (37, 38). Piper's fatigue framework emphasizes that psychological states, such as anxiety and depression, are strongly associated with individual fatigue (39) and that nurses' anxiety leads to a lack of motivation in their lives, decreased concentration, and reduced commitment to their work, which produces fatigue (40). The panic caused by a sudden major epidemic and the lack of family and social support for nurses' life and work, the resulting anxiety in response to changes in their normal life and work environments, cause severe psychological stress. When internal psychological demands exceed the limits of their ability to cope, individual overload occurs. Nurses may experience increased consumption of personal energy resources and a lack of stress management leading to fatigue. That is, fatigue occurs when nurses cannot manage their stress effectively. Long working hours increase nurses' anxiety and fatigue, and previous studies have demonstrated that physical work is the most common factor contributing to physical fatigue (41). This finding suggests that fatigue occurs when nurses spend most of their time, energy, and effort on work for long periods, constantly being stretched and failing to take time to rest and relax physically or emotionally (42). Furthermore, a Turkish study showed that nurses' working hours had a significant influence on anxiety and fatigue (43) and that longer working hours also meant a greater chance of being infected and dealing with complex medical problems or administrative matters. Working hours increased uncertainty about the future, which increased nurses' fatigue. Thus, working hours bring physical fatigue to nurses on the one hand and exacerbate the adverse effects of anxiety on the other. However, according to Lazarus and Folkman's cognitive theory of stress, although stressful events influence personal feelings, assessment and coping processes play crucial roles (44). Nurses' work attitudes affect their perceptions of work stress. Studies show that cognitive level and psychological resilience increase with education (45). More highly educated nurses may view their work positively and have a greater ability to deal with negative emotions, such as anxiety, resulting in less fatigue.

An important feature of this study is that fatigue among epidemic-fighting nurses has rarely been studied from a combinatorial perspective. When univariate analyzes are used, the combined effect of the variables

on fatigue is easily overlooked. However, two complementary approaches, regression and fsQCA models were used in the present study. When comparing the two methods, fsQCA complements the regression model by providing multiple pathways in which predictors can be combined in different ways to explain the same outcome. Furthermore, variables that were not statistically significant predictors of fatigue according to the regression analysis (e.g., education and hours worked per day) can affect fatigue when combined with other variables in fsQCA. This finding suggests that fsQCA and regression can be used in combination with different research perspectives.

5. Conclusion

The two main findings of this study were that the regression results showed that when anti-epidemic nurses face greater transition shock in a new environment, low levels of professionalism, anxiety, and poor nursing teamwork situations lead to increased fatigue. Second, the fsQCA results showed that anxiety is sufficient for fatigue and that nurses' educational status, daily working hours, and anxiety are the most effective combination of factors. Therefore, the fsQCA model allows us to consider individual inputs and combinations or interactions between different variables that may lead to a specific outcome. Given the differences between linear relational models and fsQCA, far from prioritizing one technique over the other, the two are complementary and should be used simultaneously in other studies.

6. Limitations

One of the main limitations of this study is the limited sample representativeness, including the sampling procedure (non-probability sampling) and geographical location, as this study was based only on hospitals in Heilongjiang Province, China. Although COVID-19 is a global event, stratified probability sampling with different geographic regions could be considered in the future to improve the generalizability of the data.

Data availability statement

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

Ethics statement

This study involves human participants and was approved by the Committee on the Ethics of Harbin Medical University (HMUIRB2023017). This study was also conducted by the ethical standards of the Declaration of Helsinki (2008). Moreover, informed consent was obtained from each participant before the start of work. All voluntary participants gave their informed consent with the assurance of confidentiality and anonymity of the data, according to ethical principles for medical research involving human subjects. The database used in this study contains identification data used to protect the privacy of participants.

Author contributions

HZ, ZhiL, and YF: study design. NW, JuL, JZ, DZ, and CW: data collection. HZ, NW, and XL: data analysis. LL and JiL: study supervision. HZ, ZhaL, and YF: manuscript writing. LL, JuL, and YF: critical revisions for important intellectual content. All authors contributed to the article and approved the submitted version.

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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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References

1. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry*. (2020) 7:e15–6. doi: 10.1016/S2215-0366(20)30078-X

2. Salma J, Hajra S, Iram M. To identify the causes of stress among nurses working in intensive care unit of Ittefaq hospital Lahore. *Int J Soc Sci Manag*. (2017) 4:96–109. doi: 10.3126/ijssm.v4i2.17159

3. Mahboube L, Talebi E, Porouhan P, Orak RJ, Farahani MA. Comparing the attitude of doctors and nurses toward factor of collaborative relationships. *Fam Med Prim Care Rev*. (2019) 8:3263. doi: 10.4103/jfmpc.jfmpc_596_19

4. Aaronson LS, Teel CS, Cassmeyer V, Neuberger GB, Pallikkathayil L, Pierce J, et al. Measuring fatigue-a challenge. *Image: J Nurs Scholarsh*. (1999) 31:45–50. doi: 10.1111/j.1547-5069.1999.tb00477.x

5. Linsey MS, Jessica GD. A macroergonomic perspective on fatigue and coping in the hospital nurse work system. *Appl Ergon*. (2016) 54:19–26. doi: 10.1016/j.apergo.2015.11.006

6. Smith-Miller CA, Shaw-Kokot J, Curro B, Jones CB. An integrative review: fatigue among nurses in acute care settings. *J Nurs Adm*. (2014) 44:487–94. doi: 10.1097/NNA.0000000000000104

7. Brborović H, Daka Q, Dakaj K, Brborović O. Antecedents and associations of sickness presenteeism and sickness absenteeism in nurses: a systematic review. *Int J Nurs Pract*. (2017) 23:e12598. doi: 10.1111/ijn.12598

8. Linsey MBS, Maury AN. Dimensions of fatigue as predictors of performance: a structural equation modeling Approach among registered nurses. *IISE Trans Occup. Ergon Hum Factors*. (2013) 1:16–30. doi: 10.1080/21577323.2011.637153

9. Barker LM, Nussbaum MA. Fatigue, performance and the work environment: a survey of registered nurses. *J Adv Nurs*. (2011) 67:1370–82. doi: 10.1111/j.1365-2648.2010.05597.x

10. Caruso CC, Baldwin CM, Berger A, Chasens ER, Edmonson JC, Gobel BH, et al. Policy brief: nurse fatigue, sleep, and health, and ensuring patient and public safety. *Nurs Outlook*. (2019) 67:615–9. doi: 10.1016/j.outlook.2019.08.004

11. Sung-Heui B, Donna F. Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review. *Nurs Outlook*. (2014) 62:138–56. doi: 10.1016/j.outlook.2013.10.009

12. Mokarami H, Rahimi Pordanjani T, Mohammadzadeh Ebrahimi A, Kiani F, Faridan M. Lifestyle and shiftwork: designing and testing a model for health promotion of Iranian nurses. *J Am Psychiatr Nurses Assoc*. (2020) 26:262–8. doi: 10.1177/1078390319886658

13. Knupp AM, Patterson ES, Ford JL, Zurmehly J, Patrick T. Associations among nurse fatigue, individual nurse factors, and aspects of the nursing practice environment. *J Nurs Adm*. (2018) 48:642–8. doi: 10.1097/NNA.0000000000000693

14. Min A, Min H, Hong HC. Psychometric properties of the Korean version of the occupational fatigue exhaustion recovery scale in a nurse population. *Res Nurs Health*. (2019) 42:358–68. doi: 10.1002/nur.21980

15. Trinkoff AM, le R, Geiger-Brown J, Lipscomb J. Work schedule, needle use, and needlestick injuries among registered nurses. *Infect Control Hosp Epidemiol*. (2007) 28:156–64. doi: 10.1086/510785

16. Lee H, Choi S. Factors affecting fatigue among nurses during the COVID-19 pandemic. *Int J Environ Res Public Health*. (2022) 19:11380. doi: 10.3390/ijerph191811380

17. Hellyar M, Madani C, Yeaman S, O'Connor K, Kerr KM, Davidson JE. Case study investigation decreases burnout while improving Interprofessional teamwork, nurse satisfaction, and patient safety. *Crit Care Nurs Q*. (2019) 42:96–105. doi: 10.1097/CNQ.0000000000000243

18. Han K, Trinkoff AM, Geiger-Brown J. Factors associated with work-related fatigue and recovery in hospital nurses working 12-hour shifts. *Workplace Health Saf*. (2014) 62:409–14. doi: 10.3928/21650799-20140826-01

19. Oriyama S, Miyakoshi Y, Rahman MM. The effects of a 120-minute nap on sleepiness, fatigue, and performance during 16-hour night shifts: a pilot study. *J Occup Health*. (2019) 61:368–77. doi: 10.1002/1348-9585.12063

20. Smets EM, Garssen B, Bonke B, de Haes JCJM. The multidimensional fatigue inventory (MFI) psychometric qualities of an instrument to assess fatigue. *J Psychosom Res*. (1995) 39:315–25. doi: 10.1016/0022-3999(94)00125-O

21. Miao Y, Liu XH, Liu WZ, Xie HB, Deng GH. Preliminary revision of the Chinese version of the multidimensional fatigue scale among military primary care workers. *Chin Ment Health J*. (2008) 09:658–60.

22. Green M, Zick A, Makoul G. Defining professionalism from the perspective of patients, physicians, and nurses. *Acad Med*. (2009) 84:566–73. doi: 10.1097/ACM.0b013e31819fb7ad

23. Wu LF, Liu YB, Shi HC, Yang XX. A study of the revision and reliability of the hall professionalism attitude scale among undergraduate nursing students. *Contemporary Nurse (Next issue)*. (2021) 28:1–5.

24. Xue YR, Lin P, Gao XQ, Zhao ZJ, Li L, Liu GJ, et al. Development and reliability testing of a new nurse transition shock evaluation scale. *Chin J Nurs*. (2015) 50:674–8.

25. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. (2006) 166:1092. doi: 10.1001/archinte.166.10.1092

26. Orchard C, Pederson LL, Read E, Mahler C, Laschinger H. Assessment of Interprofessional team collaboration scale (AITCS): further testing and instrument revision. *J Contin Educ Heal Prof*. (2018) 38:11–8. doi: 10.1097/CEH.0000000000000193

27. Cui J, Chen XP, Lao YW, Zhuang YY. Chineseization and reliability analysis of a simplified version of the Interprofessional teamwork scale. *Nurs Rehabilitation*. (2019) 18:1–6.

28. Eng S, Woodside AG. Configural analysis of the drinking man: fuzzy-set qualitative comparative analyses. *Addict Behav*. (2012) 37:541–3. doi: 10.1016/j.addbeh.2011.11.034

29. Vis B, Dul J. Analyzing relationships of necessity not just in kind but also in degree: complementing fsQCA with NCA. *Sociol Methods Res*. (2018) 47:872–99. doi: 10.1177/0049124115626179

30. Peer CF. Building better causal theories: a fuzzy set APPROACH to typologies in organization research. *Acad Manag J*. (2011) 54:393–420. doi: 10.5465/amj.2011.60263120

31. Caruso T. Disentangling the factors shaping arbuscular mycorrhizal fungal communities across multiple spatial scales. *New Phytol*. (2018) 220:954–6. doi: 10.1111/nph.15212

32. Ragin CC. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press (2009).

33. Timberlake M. The comparative method: moving beyond qualitative and quantitative strategies. By Charles C. Ragin. University of California Press. 185 pp. $27.50. *Soc Forces*. (1989) 67:827–9. doi: 10.1093/sf/67.3.827

34. Young Ki P, Omar AES, Peer CF. The role of business intelligence and communication Technologies in Organizational Agility: a configurational Approach. *J Assoc Inf Syst*. (2017) 18:648–86. doi: 10.17705/1jais.00001

35. Johnston DW, Allan JL, Powell DJH, Jones MC, Farquharson B, Bell C, et al. Why does work cause fatigue? A real-time investigation of fatigue, and determinants of fatigue in nurses working 12-hour shifts. *Ann Behav Med*. (2019) 53:551–62. doi: 10.1093/abm/kay065

36. Kassam A, Cowan M, Topps M. Lessons learned to aid in developing fatigue risk management plans for resident physicians. *Teach Learn Med*. (2019) 31:136–45. doi: 10.1080/10401334.2018.1542307

37. Zhan Y, Zhao S, Yuan J, Liu H, Liu YF, Gui LL, et al. Prevalence and influencing factors on fatigue of first-line nurses combating with COVID-19 in China: a descriptive cross-sectional study. *Curr Med Sci*. (2020) 40:625–35. doi: 10.1007/s11596-020-2226-9

38. Ruggiero JS. Correlates of fatigue in critical care nurses. *Res Nurs Health*. (2003) 26:434–44. doi: 10.1002/nur.10106

39. Piper BF, Lindsey AM, Dodd MJ. Fatigue mechanisms in cancer patients: developing nursing theory. *Oncol Nurs Forum*. (1987) 14:17–23.

40. Fang J, Kunaviktikul W, Olson K, Chontawan R, Kaewthummanukul T. Factors influencing fatigue in Chinese nurses. *Nurs Health Sci*. (2008) 10:291–9. doi: 10.1111/j.1442-2018.2008.00407.x

41. Steege LM, Drake DA, Olivas M, Mazza G. Evaluation of physically and mentally fatiguing tasks and sources of fatigue as reported by registered nurses. *J Nurs Manag*. (2015) 23:179–89. doi: 10.1111/jonm.12112

42. Thorsen VC, Tharp ALT, Meguid T. High rates of burnout among maternal health staff at a referral hospital in Malawi: a cross-sectional study. *BMC Nurs*. (2011) 10:9. doi: 10.1186/1472-6955-10-9

43. Hacimusalar Y, Kahve AC, Yasar AB, Aydin MS. Anxiety and hopelessness levels in COVID-19 pandemic: a comparative study of healthcare professionals and other community sample in Turkey. *J Psychiatr Res*. (2020) 129:181–8. doi: 10.1016/j.jpsychires.2020.07.024

44. Lazarus RS, DeLongis A, Folkman S, Gruen R. Stress and adaptational outcomes. The problem of confounded measures. *Am Psychol*. (1985) 40:770–9. doi: 10.1037/0003-066X.40.7.770

45. Li YS, Liu CF, Yu WP, Mills MEC, Yang BH. Caring behaviours and stress perception among student nurses in different nursing programmes: a cross-sectional study. *Nurse Educ Pract*. (2020) 48:102856. doi: 10.1016/j.nepr.2020.102856

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Effects of COVID-19 stress, proximity, and adverse childhood experiences on healthcare workers' mental health

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Past research has shown that healthcare workers (HCWs) experience high levels of psychological distress during epidemics and pandemics, resulting in cascading effects that have led to chronically understaffed hospitals and healthcare centers. Due to the nature of their responsibilities and workplace stress, HCWs are among vulnerable groups especially during global health crises. During COVID-19 many healthcare workers reported greater symptoms of anxiety, depression, and COVID-19 related worries. Furthermore, adverse childhood experiences increase vulnerability for psychological conditions, especially during pandemics. This study sets out to (1) investigate the moderating effects of adverse childhood experiences on healthcare workers' COVID-19 related stressors and depression/anxiety symptoms, and (2) investigate the moderating effects of adverse childhood experiences on proximity to the COVID-19 virus and depression/anxiety symptoms. Participants included 438 employed HCWs recruited from academic medical centers and smaller healthcare agencies in northcentral Florida between October to December 2020. Mean age of participants was 38.23 ($SD = 11.5$) with most of the HCWs being white (72.1%), non-Hispanic (86.8%) and female (82%). Healthcare workers completed several online questionnaires, including the Adverse Childhood Experiences scale, Patient Health Questionnaire, Generalized Anxiety Disorder Scale, a COVID-19 specific worries scale, and a Social Proximity to COVID-19 scale. Healthcare workers experiencing specific COVID-19 worries reported experiencing anxiety and depressive symptoms. A significant positive interaction was seen between childhood adverse experiences globally and COVID-19 worries on anxiety symptoms. A significant positive interaction was observed between childhood maltreatment specifically and COVID-19 worries on depressive symptoms. Additionally, a positive interaction effect was seen between childhood adverse experiences and COVID-19 social proximity for both depression symptoms and anxiety symptoms. Findings from the present study indicate that adverse childhood experiences strengthen the relationship between COVID-19 worry/proximity and negative psychological symptoms. Vulnerable populations such as individuals who have experienced ACEs could benefit from targeted and specific interventions to cope with the collective trauma experienced globally due to COVID-19. As COVID-19 becomes endemic, hospital leadership and authorities should continue addressing COVID-19 worries and HCWs' psychological symptoms through mental health support and organizational interventions.

KEYWORDS

healthcare workers, COVID-19, stress, anxiety, depression, adverse childhood experiences, mental health, cross-sectional study

1. Introduction

The onset of the COVID-19 pandemic caused many individuals to experience specific COVID-19 related worries, such as infecting family members with COVID-19, or becoming seriously ill from COVID-19 (Hidaka et al., 2021). These worries were related to greater anxiety and depressive symptoms more generally (Gupta et al., 2021). The healthcare workforce was particularly at risk for developing COVID-19 related worries as well as mental health symptoms, resulting in cascading effects that have led to chronically understaffed hospitals and healthcare centers (Gupta et al., 2021; Søvold et al., 2021). Understanding the risk factors that make individuals more vulnerable to pandemic related worries and associated mental health symptoms is an important public health concern. Prior to the pandemic, adverse childhood experiences were shown to predict mental health disorders in adulthood (McKay et al., 2022; Tzouvara et al., 2023). However, little is known about the interaction effect between adverse childhood experiences and COVID-19 specific worries on healthcare workers' (HCWs) psychological symptoms. Similarly, the interaction effect between adverse childhood experiences and COVID-19 social proximity on HCWs' psychological symptoms has also not been explored. COVID-19 social proximity refers to the impact COVID-19 has had on an individual's social circle.

In the general population, the COVID-19 pandemic has negatively impacted individuals' mental well-being and coincided with increased levels of anxiety, depression, and posttraumatic stress symptoms (Prout et al., 2020; Marvaldi et al., 2021). Recent research has shown that these adverse mental health outcomes have been exacerbated in HCWs, potentially due to their proximity to COVID-19 patients, COVID-19 quarantine rules and those rules changing, and work environment (Labrague and Santos, 2020; Dobson et al., 2021; Tiete et al., 2021). Similar trends have been seen in non-clinical staff who work in healthcare settings, such as custodians and technicians (Dobson et al., 2021; Jang et al., 2021). A meta-analysis identified 38 studies that reported an increase in mental health symptoms among doctors, nurses, and allied health workers since the start of the pandemic (Saragih et al., 2021), with a pooled prevalence among these HCWs for anxiety of 40, and 37% for depression.

Psychological symptoms have been seen in the United States in both general and healthcare populations (Amsalem et al., 2021; Guastello et al., 2022). Additionally, studies have shown that nurses in particular are at higher vulnerability for psychological distress during infectious disease outbreaks (Greenberg et al., 2020; Magalhaes et al., 2021). A five-month longitudinal study of HCWs in the United States in the early stages of the COVID-19 pandemic found that anxiety and depression symptoms were related to decreased fulfilment and elevated burnout (Guastello et al., 2022).

The burden of the COVID-19 pandemic has had major impacts on HCWs and the healthcare system. This burden has impacted the physical and mental health of individuals who work in healthcare (Luo et al., 2020). At the onset of COVID-19 certain worries were prevalent such as worrying about the health of family and friends, due to the possibility of bringing the virus home, as well as an individual's own health (Hidaka et al., 2021). These COVID-19 specific worries can in turn increase other anxiety and depressive symptoms. For example, higher perceived risk has been shown to predict higher depressive symptoms (Kim et al., 2022). In particular, this is seen in HCWs due to their proximity to the illness and the uncertainty involved with medical care and precautions needed. Additionally, pandemics elicit anticipatory anxiety for both real and perceived threats which can create high stress environments in hospitals and burnout in HCWs (Denning et al., 2021). Similarly, Carmassi and colleagues found that HCWs were at a higher risk for PTSD during pandemics due to infection rates, high mortality, and the constant change of guidelines experienced during COVID-19 (Carmassi et al., 2020).

In HCWs, anxiety is commonly seen during pandemics due to the uncertainty and anticipation that comes from an unknown disease (Labrague and Santos, 2020). COVID-19 specific worries in this population can be due to fear of being infected, fear of unknowingly infecting others, lack of personal protective equipment, and lack of access to testing (Mo et al., 2020; Shanafelt et al., 2020).

Kim and colleagues found that higher perceived COVID-19 risk predicted greater depression symptoms among the general population in South Africa (Kim et al., 2022). A U.S. sample of young adults ages 18 to 25 indicated that this population reported up to a 55% increase in COVID-19 related stressors (Ballou et al., 2020). Importantly, past research has shown that among young adults COVID-19 related worry is related to negative mental health outcomes (Rogers et al., 2020; Mayorga et al., 2022). Research has also shown that proximity to an individual with the SARS-COV2 virus that causes COVID-19 can also have a psychological impact on the people around them (Su et al., 2020). Several studies have reported on the connection between social proximity to COVID-19 cases and increased anxiety and depression (Su et al., 2020; Wang et al., 2020; Shabahang et al., 2021; Vigo et al., 2021).

Another factor that can have a negative impact on mental health outcomes is adverse childhood experiences (ACEs). ACEs are identified as experiences that can negatively harm a child (0–17 years old). These experiences can be in the form of childhood maltreatment (emotional, physical, and sexual abuse), neglect (emotional and physical), familial challenges and dysfunction (caregiver separation, poor or impaired caregiver mental health, and caregiver drug abuse) (Felitti et al., 1998; LeMoult et al., 2020). It is estimated that 61% of US adults have experienced at least one ACE, and approximately 16% have experienced four or more categories (Merrick et al., 2019). These experiences are associated with an increase in psychiatric disorders (such as depression and anxiety) in adolescence and adulthood (Felitti et al., 1998; Cicchetti and Toth, 2005; Cicchetti, 2016; Iob et al., 2022). For example, a study of 1,142 participants aged 22–24 in the Chicago Longitudinal Study found that ACEs scores were related to increased depressive symptoms in early adulthood (Mersky et al., 2013). These

relationships have also been examined by some research teams during the pandemic. A cross-sectional survey of 1,399 German adults found that ACEs were a significant risk factor for an increase in depression during the first wave of the pandemic (Clemens et al., 2022). ACEs put individuals at a higher vulnerability for psychological conditions, and several studies have examined the relationship between ACEs and negative mental health symptoms during the pandemic (Castellini et al., 2022; Kim et al., 2022; Békés et al., 2023). However, this specific relationship has not been extensively examined with HCWs' to the others knowledge at the time of the study.

HCWs' mental health symptoms during pandemic times is well-documented (Labrague and Santos, 2020; Amsalem et al., 2021; Saragih et al., 2021; Guastello et al., 2022). However, less is known about the way past adverse childhood experiences can impact their worries about the pandemic and/or their own proximity to COVID-19 and their mental health and well-being. The current study aims to examine the relationships between these variables in HCWs during an early stage of the COVID-19 pandemic (from October to December 2020). The aims of this study were:

Aim 1: To examine the role that adverse childhood experiences plays in the relationship between COVID-19 specific worries and negative psychological symptoms.

> *Hypothesis 1.1*: We hypothesized an interaction between COVID-19 specific worries and adverse childhood experiences, such that the association between HCWs COVID-19 specific worries and depression/anxiety would be stronger in participants who had more adverse childhood experiences.

Aim 2: To examine the role that adverse childhood experiences plays in the relationship between proximity to COVID-19 and negative psychological symptoms.

> *Hypothesis 2.1*: We hypothesized an interaction between proximity to COVID-19 cases and adverse childhood experiences, such that the association between HCWs proximity to COVID-19 cases and depression/anxiety would be stronger in participants who had more adverse childhood experiences.

2. Methods

2.1. Procedures

All procedures in this study were approved by the University of Florida's Institutional Review Board. Participants were largely recruited from two academic medical centers in north central Florida. Announcements were posted throughout clinics, hospitals, and nursing homes in Florida via brochures emailed to relevant departments or clinical services from an administrator. Also, flyers were given to smaller medical groups and private practices in two cities near the academic medical centers. Additionally, the study was incorporated into the comprehensive Healthcare Worker Exposure Responses & Outcomes (HERO) registry of studies (heroesresearch.org). In order to maintain anonymity, the exact location of a participant's workplace was not included in their responses. Using a QR code or link provided on the brochure, participants were directed to Research Electronic Data Capture (REDCap), a secure survey service, where their responses to the survey questions were recorded. This study is part of a larger dataset which had a 5-month longitudinal data collection (Guastello et al., 2022.) Recruitment was on a rolling basis between October and December 2020. The present study focused on solely baseline findings. Lastly, participants were reimbursed with $10 Amazon gift cards for completing the baseline surveys.

2.2. Participants

Participants included 438 employed HCWs recruited from academic medical centers and smaller healthcare agencies in north central Florida. Specific workplace location was not collected to protect the participants anonymity, however based on the collection of the zip code data, the majority of the participants resided in Florida (95.3%). Mean age of participants was 38.23 ($SD = 11.5$) with most of the HCWs being white (72.1%), non-Hispanic (86.8%) and female (82%). See Table 1 for a summary of the sample characteristics.

2.3. Measures

2.3.1. Adverse childhood experiences

The Adverse and Traumatic Experiences Scale (Dale et al., 2020, 2022; Kolacz et al., 2020) was administered to assess adverse childhood experiences (ACEs). This is a 30-question instrument that asks about adversity and traumatic experiences, and covers both childhood and adulthood. This measure is comprised of items from: ACES (Felitti et al., 1998), Trauma History Questionnaire (Hooper et al., 2011), Life Events Checklist for DSM-5 (Weathers et al., 2013), and Brief Trauma Questionnaire (Schnurr et al., 1999). The participants specify the occurrence and impact of each event via a 5-point Likert scale (0 = *event did not occur*, 1 = *occurred and had no impact on my life*, 2 = *minimal*

TABLE 1 Healthcare workers demographic.

	n	%
Sex		
Female	357	81.5
Male	73	16.7
Missing	8	1.8
Racial groups		
American Indian	3	0.7
Asian	27	6.2
Black/African American	58	13.2
Multiracial	17	3.9
Native Hawaiian	1	0.2
White	316	72.1
Other	16	3.7
Missing	7	1.6
Ethnicity		
Non-Hispanic	380	86.8
Hispanic/Latinx	46	10.6
Missing	12	2.7

TABLE 2 Principal components analysis with varimax rotation for COVID-19 specific worries.

Item	Infection worries	Childcare worries	Economic worries
How worried are you that you will…			
Infect an immediate family member if you get COVID-19	0.83*	0.04	0.10
Be infected with COVID-19 in your home or community (e.g., while at grocery store or pharmacy)	0.73*	0.14	0.05
Become seriously ill because of COVID-19	0.83*	−0.00	0.12
Be infected with COVID-19 while providing medical care	0.68*	0.20	0.13
How worried are you that an immediate family member…			
Will be infected with COVID-19	0.82*	0.13	0.04
Will become seriously ill with COVID-19	0.72*	0.27	0.20
Is having trouble coping with fear of getting COVID-19	0.47*	0.44	−0.01
How worried are you about the following…			
My child's emotional wellbeing	0.33	0.76*	0.22
My child's education	0.11	0.83*	0.20
My child's behavior at home	0.05	0.74*	0.21
How worried are you that you will…			
Accessing or paying for childcare	0.06	0.21	0.75*
Lose your job	0.19	0.21	0.86*
Have trouble paying your bills	0.18	0.21	0.75*

Numbers indicate factor loadings. *Items included in the indicated factor.

impact on my life, 3 = *some impact on my life*, and 4 = *big impact on my life*). The items are grouped to form the following scales: Childhood Adverse Experiences, Childhood Maltreatment, Intimate Partner Maltreatment, Other Person Maltreatment, Life-threatening Situations, Sudden Losses, and Personal Health Situations. For the purpose of examining ACEs, the subscales Childhood Adverse Experiences and Childhood Maltreatment were used in this study. The subscale Childhood Adverse Experiences captures caregiver unavailability, caregiver separation, caregiver drug abuse, caregiver medical or mental illness, caregiver experience of emotional/physical/sexual abuse. The subscale Childhood Maltreatment captures emotional abuse, physical assault, sexual abuse of the participant by the caregiver. In our sample, the internal consistency for Childhood Adverse Experiences was 0.72, and for Childhood Maltreatment it was 0.69.

2.3.2. Depression

The Patient Health Questionnaire (PHQ-8; Kroenke et al., 2001) was administered to assess depression symptoms. On the PHQ-8 the participant is asked to rate over the last two weeks how frequently they have experienced the following symptoms of depression: low mood, anhedonia, hyper/hyposomnia, increased/decreased appetite, difficulty concentrating, self-blame, psychomotor retardation/agitation. Responses are recorded on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). The total score of the eight items of the PHQ-8 ranges from 0 to 24, with a cut point of 10 indicating clinically significant symptoms of depression (Kroenke et al., 2009). In our sample, the internal consistency of the PHQ-8 was 0.89.

2.3.3. Anxiety

The Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006) was administered to assess anxiety symptoms. On the GAD-7 the participant is asked to rate how frequently over the last two weeks they have experienced the following symptoms of anxiety: feeling nervous, anxious or on edge; difficulty controlling worry; psychomotor agitation; trouble relaxing; general worries; fear that something terrible will happen; and irritability. Responses are recorded on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). The total score of the 7 items of the GAD-7 ranges from 0 to 21, with scores exceeding 10 representing clinically significant anxiety. In our sample, the internal consistency of the GAD-7 was 0.93.

2.3.4. COVID-19 specific worries

A COVID-19 specific worries and experiences questionnaire was created by the research team which consisted of various HCWs including psychiatrists, psychologists, and emergency medicine physicians. The scale consisted of 13 items, rated on a 0 to 3 scale with the following descriptors: 0 (Not worried), 1 (A little worried), 2 (Somewhat worried), and 3 (Very worried). The principal components analysis produced 3 terms accounting for 68.12% of the variance. The items and their accompanying factor loadings are presented in Table 2, and the derivation of the subscales can be found in the paper (Guastello et al., 2022). The first component, termed Infection Worries, was comprised of seven items regarding worry about self and family members being infected and/or becoming seriously ill from COVID-19; the internal consistency of this factor was 0.89. The second component, termed Childcare Worries, was comprised of three items related to worries about emotional wellbeing, education, and behavior; the internal consistency of this factor was 0.77. Lastly, the third component, termed Economic Worry, was comprised of three items regarding financial concerns such as accessing or paying for childcare, loss of job, and having trouble paying bills; the internal consistency of this factor was 0.86. See Table 2 for full factor analysis. The Infection Worry factor, also referred to as the COVID-19 Worries subscale, was utilized in this study.

TABLE 3 Principal components analysis with varimax rotation for social proximity to COVID-19.

Item	Known infections	Household infections	Deaths
I personally know someone (not close friend or relative) diagnosed with COVID-19	0.88*	0.04	0.15
I know someone at work that was diagnosed with COVID-19	0.85*	0.02	−0.04
A close friend or relative was diagnosed with COVID-19	0.60*	0.31	0.34
I cared for a member of my household that was diagnosed with COVID-19	0.08	0.86*	0.13
I have been diagnosed with COVID-19	0.06	0.86*	−0.05
A close friend or relative passed away from COVID-19	−0.02	0.05	0.91*
I personally know someone (not close friend or relative) who passed away from COVID-19	0.47	0.01	0.64*

*Items included in the indicated factor.

TABLE 4 Descriptive statistics for predictor and outcome variables.

	n	M(SD)	Median	Range
Childhood adverse experiences	430	6.34 (5.8)	5	0–24
Childhood maltreatment	431	2.11 (2.9)	0	0–12
COVID-19 specific worries	435	10.72 (5.3)	11	0–21
Childcare worries	177	4.75 (3.41)	4	0–12
Economic worries	435	1.98 (2.23)	1	0–10
COVID-19 known infections	432	5.47 (3.1)	5	0–12
Household infections	435	0.71 (2.15)	0.00	0–20
COVID-19 deaths	435	1.31 (1.87)	0.00	0–8
Depression	434	6.08 (5.3)	5	0–24
Anxiety	434	5.55 (5.4)	4	0–21

Total sample was 438 participants.

2.3.5. Social proximity to COVID-19

A Social Proximity to COVID-19 scale was created by the research team to measure the degree to which COVID-19 was impacting an individual's social circle (Table 3). The scale originally consisted of 8 items, though one item (i.e., a member of my household passed away from COVID-19) was removed due to low endorsement. Each item was rated on a 0 to 4 scale with the following descriptors: 0 (*Did not occur*), 1 (*Occurred, and no impact on my life*), 2 (*Minimal impact on my life*), 3 (*Some impact on my life*), 4 (*Big impact on my life*). A principal components analysis for the remaining 7 items was conducted using varimax rotation. Items were considered to load on a factor if they had a factor loading of ≥0.50. Items that loaded onto more than one factor were included in all factors. The principal components analysis produced 3 factors that accounted for 72.65% of the variance. The factor loadings are presented in Table 3. The first component, termed Known Infections, contained three items regarding the social proximity to COVID-19 infections; internal consistency was 0.74. The second component, termed Household Infections, contained two items regarding members of the participant's household and they themselves being infected; internal consistency was 0.69. The third component, termed, Deaths, contained two items regarding social proximity to COVID-19 related deaths; internal consistency 0.53. See Table 3 for full factor analysis.

2.4. Overview of statistical analyses

All analyses were conducted in SPSS Statistics Version 26 [IBM Corp (SPSS Inc.), 2019], using data collected at baseline. Descriptive statistics were first used to assess the distributions, normality, missing data, and any outliers among variables. Out of 438 participants, only 177 had children and answered for the variable Childcare Worries. Therefore, this subscale was dropped due to the significant loss in sample size. Additionally, the subscale Economic worries was not used due to high cross-loading with Childcare Worries subscale. For Aims 1 and 2, four separate hierarchical linear regressions were conducted in order to examine the models with COVID-19 worries, COVID-19 social proximity, childhood adverse experiences and childhood maltreatment as predictors, and depression and anxiety as outcome variables. An interaction variable was computed for the variables of interest and added to the second block of the regression.

3. Results

3.1. Descriptive statistics and preliminary findings

The mean number of childhood adverse experiences reported in the sample was 6.35 ($SD = 5.8$), and the mean number of childhood maltreatment experiences reported in the sample was 2.11 ($SD = 2.9$). A floor effect was observed for both scales, with 21.9% of HCWs reporting no childhood adverse experiences, and 54.1% reporting no childhood maltreatment. Variability was seen across all variables. See Table 4 for a summary of the findings. Correlational analyses were used to examine the relationship between the variables of interest. See Table 5 for a summary of the findings.

TABLE 5 Correlations.

	M(SD)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Childhood adversity	6.34 (5.8)	–								
2. Childhood maltreatment	2.11(5.9)	0.62**	–							
3. COVID worry	10.72 (5.3)	0.10*	0.07	–						
4. Childcare worry	4.75 (3.41)	0.26**	0.24**	0.41**	–					
5. Economic worry	1.98 (2.23)	0.23**	0.22**	0.24**	0.51**	–				
6. Known infection	5.47 (3.1)	0.09	0.01	0.31**	0.36**	0.16**	–			
7. Household infection	0.71 (2.15)	0.07	0.05	−0.22**	0.02	0.15**	0.23**	–		
8. COVID-19 deaths	1.31 (1.87)	0.00	−0.01	0.13**	0.11	0.09	0.42**	0.07	–	
9. Depression symptoms	6.08 (5.3)	0.32**	0.33**	0.30**	0.44**	0.39**	0.17**	0.05	0.06	–
10. Anxiety symptoms	5.55 (5.4)	0.28**	0.31**	0.27**	0.38**	0.34**	0.13**	0.03	0.03	0.77**

*$p \leq 0.05$, **$p \leq 0.01$.

TABLE 6 Hierarchical linear regression of COVID-19 worry on depression.

Model		Unstandardized coefficients	Standardized coefficients		Sig.	R^2 change	Cumulative R^2
		B	*SE*	Beta			
1	(Constant)	1.52	0.56		0.007	–	0.21
	COVID Worry	0.27	0.04	0.27	<0.001		
	CAE	0.14	0.05	0.16	0.005		
	CM	0.40	0.10	0.22	<0.001		
2	(Constant)	0.83	0.45		0.063	0.29	0.50
	COVID Worry	0.19	0.04	0.19	<0.001		
	CAE	0.10	0.04	0.11	0.016		
	CM	0.41	0.08	0.23	<0.001		
	Worry X CAE	0.02	0.02	0.16	0.321		
	Worry X CM	0.06	0.02	0.40	0.012		

Dependent variable is depression as assessed by PHQ-8 total score. CAE, Childhood Adverse Experiences; CM, Childhood Maltreatment; COVID Worry, COVID-19 specific worries.

3.2. Aim 1

To investigate the effects of childhood adverse experiences and childhood maltreatment on the relationship between COVID-19 related stressors and depression, main effects were examined in step one of the linear regressions. Model 1 included childhood adverse events, childhood maltreatment, and COVID-19 worries as predictors and depression as the outcome, shows that COVID worry significantly predicted depression ($B = 0.27$, $p < 0.001$), childhood adverse experiences significantly predicted depression ($B = 0.14$, $p = 0.005$), and childhood maltreatment significantly predicted depression ($B = 0.40$, $p < 0.001$). Model 2 included all of these predictors and interaction terms between COVID-19 worry and the two childhood experiences variables. The R^2 change between model 1 and model 2 was 0.29, with a significant F change ($F = 132.01$, $p < 0.001$). Model 1 explained 20% of the variance, whereas model 2 explained 49% of the variance, indicating that the model fit improved when accounting for the interactions between childhood maltreatment and childhood adverse experiences with COVID worry. The relationship between COVID worry and depression was stronger among individuals who scored higher in childhood maltreatment ($B = 0.06$, $p = 0.01$). The same interaction was not seen for childhood adverse experiences, suggesting that the level of exposure to childhood adverse experiences did not influence the relationship between COVID worries and depression. See Table 6 for hierarchical linear regression analyses, and Figure 1 for graphical representation of the interaction.

To investigate the effects of childhood adverse experiences and childhood maltreatment on the relationship between COVID-19 related worries and anxiety main effects were examined. Model 1 shows that COVID worry significantly predicts anxiety ($B = 0.25$, $p < 0.001$), and childhood maltreatment significantly predicts anxiety ($B = 0.43$, $p < 0.001$). The R^2 change between model 1 and model 2 was 0.34, with a significant F change ($F = 128.01$, $p < 0.001$). Model one consisting of main effects explains 17% of the variance, whereas model 2 with interactions added explains 50% of the variance. This indicates that the regression model improved when accounting for the interactions between childhood maltreatment and childhood adverse experiences with COVID worry. The relationship between COVID worry and anxiety was stronger among individuals who scored higher in childhood adverse experiences ($B = 0.05$, $p = 0.03$). The same interaction was not seen for childhood maltreatment, meaning that the level of exposure to childhood maltreatment did not influence the relationship between COVID worries and anxiety. See Tables 3, 4 for

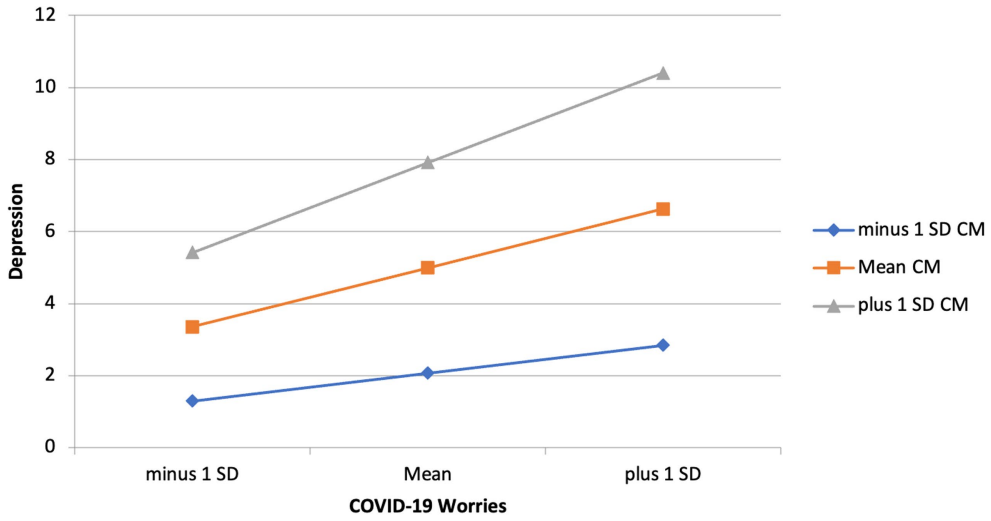

FIGURE 1
Interaction effect of childhood maltreatment and COVID-19 worries on depression.

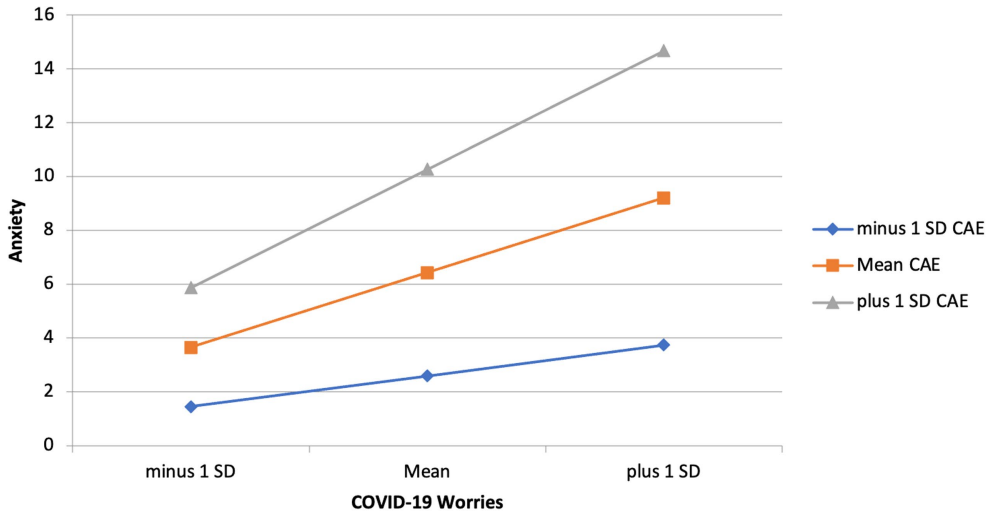

FIGURE 2
Interaction effect of childhood adverse experiences and COVID-19 worries on anxiety.

hierarchical linear regression analyses, and Figure 2 for graphical representation of the interaction.

3.3. Aim 2

To investigate the effects of childhood adverse experiences and childhood maltreatment on the relationship between Known COVID-19 Infection and depression main effects were examined. Model 1 shows that Known COVID worry significantly predicted depression ($B = 0.26$, $p = 0.003$), childhood adverse experiences significantly predicted depression ($B = 0.15$, $p = 0.005$) and childhood maltreatment significantly predicted depression ($B = 0.41$, $p < 0.001$). Household infections and COVID-19 Deaths did not significantly predict depression and therefore were not included in the subsequent interaction models. The R^2 change between model 1 and model 2 was 0.31, with a significant F change ($F = 122.00$, $p < 0.001$). Model one consisting of main effects explained 16% of the variance, whereas model 2 with interactions added explained 47% of the variance. This indicates that the regression model improved when accounting for the interactions between childhood maltreatment and childhood adverse experiences with Known COVID-19. The relationship between Known COVID-19 infection and depression was stronger among individuals who scored higher in childhood adverse experiences ($B = 0.05$, $p = 0.03$). The same interaction was not seen for childhood maltreatment, meaning that the level of exposure to childhood maltreatment did not influence the relationship between Known COVID-19 infection and depression. See Tables 3–5 for hierarchical linear regression analyses, and Figure 3 for graphical representation of the interaction.

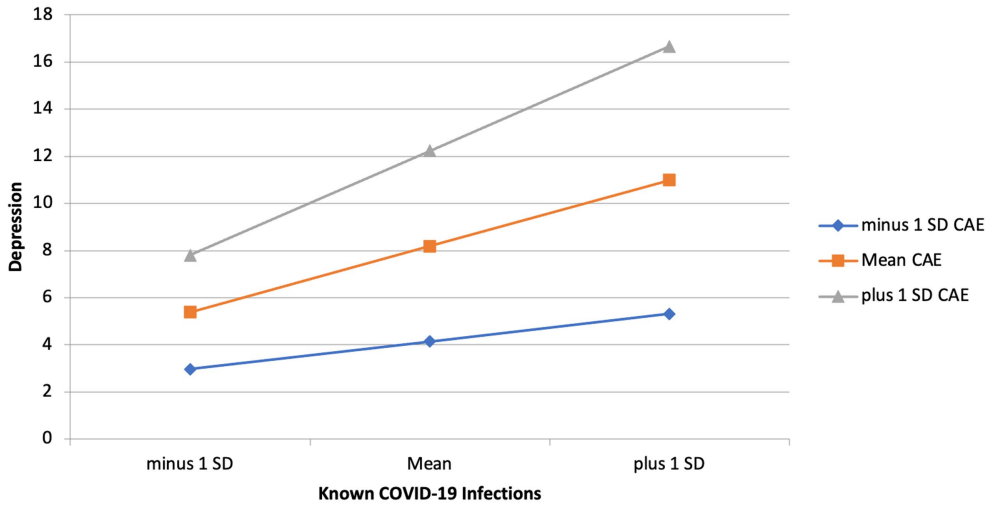

FIGURE 3
Interaction effect of childhood adverse experiences and known COVID-19 infections on depression.

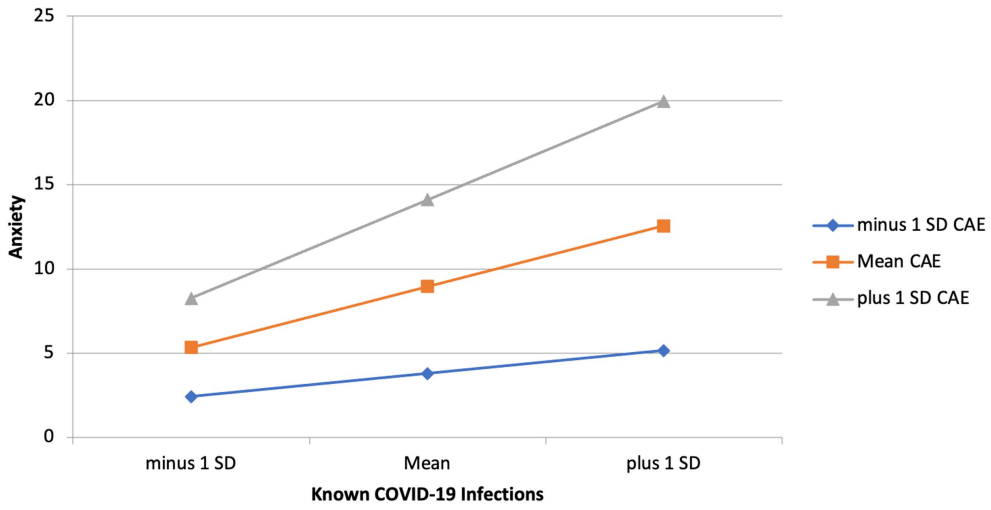

FIGURE 4
Interaction effect of childhood adverse experiences and known COVID-19 infections on anxiety.

To investigate the effects of childhood adverse experiences and childhood maltreatment on the relationship between Known COVID-19 Infection and anxiety main effects were examined. Model 1 shows that Known COVID Infection significantly predicts anxiety ($B = 0.21$, $p = 0.024$), childhood adverse experiences on anxiety is significant ($B = 0.11$, $p = 0.046$), and childhood maltreatment on anxiety is significant ($B = 0.43$, $p < 0.001$). Household infections and COVID-19 Deaths did not significantly predict depression and therefore were not included in the interactions. The R^2 change between model 1 and model 2 was 0.37, with a significant F change ($F = 149.04$, $p < 0.001$). Model one consisting of main effects explains 12% of the variance, whereas model 2 with interactions added explains 49% of the variance. This indicates that the regression model improved when accounting for the interactions between childhood maltreatment and childhood adverse experiences with Known COVID. The relationship between Known COVID-19 infection and anxiety was stronger among individuals who scored higher in childhood adverse experiences ($B = 0.07$, $p = 0.003$). The same interaction was not seen for childhood maltreatment, meaning that the level of exposure to childhood maltreatment did not influence did not influence the relationship between Known COVID-19 infection and anxiety. See Tables 3–6 for hierarchical linear regression analyses, and Figure 4 for graphical representation of the interaction.

4. Discussion

The current study aimed to examine the relationships between adverse childhood experiences, worries about the COVID-19 pandemic, proximity to COVID-19, and the mental health symptoms of HCWs during the early stage of the pandemic. The findings of this study can provide insights into the complex interplay between these variables and highlight the potential impact of childhood experiences on HCWs' psychological well-being. Consistent with previous

TABLE 7 Hierarchical linear regression of COVID-19 worry on anxiety.

Model		Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2 change	Cumulative R^2
		B	*SE*	Beta			
1	(Constant)	1.37	0.58		0.019	–	0.17
	COVID Worry	0.25	0.05	0.29	<0.001		
	CAE	0.10	0.05	0.11	0.059		
	CM	0.43	0.10	0.23	<0.001		
2	(Constant)	0.24	0.45		0.592	0.34	0.51
	COVID Worry	0.19	0.04	0.18	<0.001		
	CAE	0.09	0.04	0.10	0.023		
	CM	0.29	0.08	0.19	<0.001		
	WorryXCAE	0.05	0.02	0.37	0.028		
	WorryXCM	0.03	0.02	0.23	0.160		

Dependent Variable is Anxiety as assessed by GAD-7 total score. CAE, Childhood Adverse Experiences; CM, Childhood Maltreatment; COVID Worry, COVID-19 specific worries.

TABLE 8 Hierarchical linear regression of social Proximity to COVID-19 on depression.

Model		Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2 change	Cumulative R^2
		B	*SE*	Beta			
1	(Constant)	2.88	0.53		<0.001	–	0.16
	Known COVID	0.26	0.09	0.15	0.003		
	Household	0.20	0.15	0.06	0.184		
	Death	−0.03	0.14	−0.01	0.813		
	CAE	0.15	0.05	0.16	0.005		
	CM	0.41	0.10	0.23	<0.001		
2	(Constant)	1.69	0.43		<0.001	0.31	0.47
	Known COVID	0.19	0.07	0.11	0.006		
	Household	0.11	0.18	0.04	0.337		
	Death	−0.08	0.11	−0.03	0.464		
	CAE	0.13	0.04	0.14	0.002		
	CM	0.36	0.09	0.20	<0.001		
	KnownXCAE	0.05	0.02	0.38	0.025		
	KnownXCM	0.03	0.02	0.18	0.286		

Dependent variable is depression as assessed by PHQ-8 total score. Known COVID, Known COVID-19 infections; Household, COVID-19 Household Infections; Death, COVID-19 Deaths; CAE, Childhood Adverse Experiences; CM, Childhood Maltreatment.

research documenting the mental health challenges faced by HCWs during the pandemic (Labrague and Santos, 2020; Amsalem et al., 2021; Saragih et al., 2021; Guastello et al., 2022), the study findings show a significant association between COVID-19 worries and negative psychological symptoms, including depression and anxiety. These results highlight the substantial burden placed on HCWs due to the pandemic-related concerns they face, emphasizing the importance of addressing these worries to support their well-being (Tables 7–9).

One novel contribution of this study is the exploration of the role of adverse childhood experiences in moderating the relationship between COVID-19 worries and mental health outcomes among HCWs. The study hypotheses proposed that the association between COVID-19 worries, and depression/anxiety would be stronger for HCWs who had experienced more adverse childhood events. The results partially supported these hypotheses, as the interaction between childhood maltreatment and COVID-19 worries was found to significantly predict depression. Specifically, individuals with higher levels of childhood maltreatment demonstrated a stronger relationship between COVID-19 worries and depressive symptoms. Similar results have been seen in a study done in South Africa during the first wave of the COVID-19 pandemic which found that adults with histories of childhood trauma experience higher depressive impacts of perceived COVID-19 infection risk compared to individuals with no or minimal childhood trauma (Kim et al., 2022). These findings could imply that childhood maltreatment may amplify the impact of COVID-19 worries on HCWs' mental health. Gaining insight into this interaction can inform interventions to support HCWs with a history of childhood maltreatment and alleviate the negative psychological consequences of COVID-19 worries.

TABLE 9 Hierarchical linear regression of social proximity to COVID-19 on anxiety.

Model		Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2 change	Cumulative R^2
		B	*SE*	Beta			
1	(Constant)	2.89	0.56		<0.001	–	0.12
	Known COVID	0.21	0.09	0.12	0.024		
	Household	0.10	0.15	0.03	0.517		
	Death	−0.04	0.15	−0.01	0.779		
	CAE	0.11	0.06	0.12	0.046		
	CM	0.43	0.11	0.24	<0.001		
2	(Constant)	0.99	0.44		0.025	0.37	0.49
	Known COVID	0.22	0.07	0.11	0.001		
	Household	0.04	0.12	0.01	0.744		
	Death	−0.09	0.11	−0.03	0.445		
	CAE	0.11	0.04	0.12	0.010		
	CM	0.27	0.09	0.15	0.001		
	KnownXCAE	0.07	0.02	0.52	0.003		
	KnownXCM	0.01	0.03	0.10	0.589		

Dependent variable is anxiety as assessed by GAD-7 total score. Known COVID, Known COVID-19 infections; Household, COVID-19 Household Infections; Death, COVID-19 Deaths; CAE, Childhood Adverse Experiences; CM, Childhood Maltreatment.

Furthermore, the interaction between childhood adverse experiences and COVID-19 worries was found to significantly predict anxiety. This interaction was not seen with childhood maltreatment suggesting that individuals who have experienced childhood maltreatment will report anxiety independent of having COVID-19 specific worries. Similarly, to our findings, Békés and colleagues found that the number of reported adverse childhood experiences positively predicted reported levels of COVID-19 related fears, anxiety, and depression (2022). However, unlike our results, Castellini and colleagues found in a general population sample of 101 Italian women that individuals that experienced childhood trauma, specifically emotional abuse, had increased levels of distress at the onset of the pandemic compared to individuals that did not report emotional abuse (2022).

Moreover, the study examined the role of adverse childhood experiences in the relationship between HCWs' proximity to COVID-19 cases and negative psychological symptoms. The hypothesis proposed that the association between proximity to COVID-19 cases and depression/anxiety would be stronger for HCWs with more adverse childhood experiences. When we examined the interaction effects, the relationship between Known COVID-19 infection and depression was stronger among individuals who scored higher in childhood adverse experiences and not childhood maltreatment. This finding builds on previous research done by Wang and colleagues which found that having knowledge of COVID-19 cases in relatives and family members was associated with elevated levels of depression symptoms (2020).

Similar interaction was seen when examining this model with anxiety symptoms as the outcome variable, results show that Known COVID-19 infection, childhood adverse experiences, and childhood maltreatments all significantly predicted anxiety symptoms. These results were hypothesized given the previous research on COVID-19 proximity and anxiety symptoms. In a housing compound in Guangzhou, China, the results of 403 participants showed that higher anxiety levels were associated with residents that knew of the presence of individuals with COVID-19 in their building (Su et al., 2020). Similarly, a web-based survey of 398 university students in Iran found that individuals who personally knew of someone with COVID-19 experienced more COVID-19 anxiety than individuals who did not (Shabahang et al., 2021). A study of university students in Vancouver found that knowledge of COVID-19 cases was associated with probability of elevated anxiety symptoms (Vigo et al., 2021). When examining the interaction effects for this model, the relationship between Known COVID-19 infection and anxiety was only stronger among individuals who scored higher in childhood adverse experiences and not childhood maltreatment.

The current study has several implications in line with current literature (Greenberg et al., 2020; Amsalem et al., 2021; Magalhaes et al., 2021), for understanding and addressing the mental health needs of HCWs during pandemic times. Firstly, it emphasizes the importance of recognizing and addressing the specific worries and concerns related to the COVID-19 pandemic that HCWs experience. Interventions and support systems should be implemented to help HCWs manage these worries effectively, providing them with resources and coping strategies to mitigate the negative psychological symptoms associated with the pandemic. Secondly, the study highlights the potential long-lasting impact of childhood maltreatment on HCWs' mental health during the pandemic. Expanding on past literature, this study demonstrates how the presence of childhood adverse experiences such as caregiver unavailability, caregiver separation, caregiver drug abuse, caregiver medical or mental illness, caregiver experience of emotional/physical/sexual abuse can exacerbate the relationship between COVID-19 specific worries and anxiety, as well as proximity to COVID-19 (Known COVID-19 infection) and depression and anxiety.

Due to the nature of their responsibilities and workplace stress, HCWs are among vulnerable groups especially during global health crises. Considering the prevalence rates of ACEs in the United States, the results of this study emphasize the importance of keeping in mind

HCWs who have experienced past aversive childhood experiences as these experiences can experience more psychiatric symptoms. In addition to daily life stressors, HCWs are responding to unknown virus outbreaks and patient crises. For them to provide effective care without experiencing burnout and significant depression and or anxiety, they need to attend to their own mental health well-being first. Seeking mental health care can be intimating and may be accompanied with stigma even in medical settings. Therefore, the sole presence of resources is not enough. Creating an environment where HCWs feel encouraged to seek out mental health services is imperative for hospital leaders, policymakers, and direct supervisors. Trauma-informed approaches and evidence-based interventions for individuals with a history of childhood maltreatment should be considered to enhance their resilience and well-being during these challenging times.

4.1. Strengths and limitations

One of the strengths of this study is the inclusion of non-clinical HCWs in the sample. Many studies on HCWs focus on doctors and nurses, and as prior research has shown non-clinical HCWs face psychological distress given the environment of their work (Dobson et al., 2021; Jang et al., 2021). Another strength of this study is the sample size which allowed for better statistical power to detect relationships. One of the limitations when examining this study is its limited diversity, the majority of the sample were white American women, and the sample was drawn from one health system in Florida. Gender of the participant could impact both adverse childhood experiences and the manifestation of psychological symptoms. Diversifying the data by examining multiple different academic medical centers with different policies will provide a more comprehensive insight to HCWs mental health given that it will provide a larger variance in gender, ethnicity, and socioeconomic status.

This data was collected from October to December 2020, a time where many COVID-19 outcomes were still uncertain. It is worth emphasizing that high-risk medical workers in these health systems gained access to COVID-19 vaccines starting from December 2020. The pandemic could have affected HCWs that participated in the first month of the study differently than HCWs that participated in the last month of the study given the availability of the vaccines and more understanding of the virus. Therefore, due to the rapid change in policies at both state level and hospital level, as well as the unpredictability and unknown nature of COVID-19 at the beginning stages of the pandemic, the generalizability of this data can be a limitation. Nevertheless, this study provides an insight into the impact COVID-19 had on HCWs at the end of the first year of the pandemic. Future research could explore the long-term impact of COVID-19 stress and adverse childhood experiences on HCWs' mental health throughout different phases of the pandemic.

5. Conclusion

This study expands on previous literature regarding the impact of COVID-19 on HCWs' mental health. The current study found that adverse childhood experiences strengthen the relationship between HCWs COVID-19 worries and proximity when predicting their psychological symptoms. As COVID-19 becomes endemic, hospital leaderships and authorities need to continue addressing COVID-19 worries and HCWs' psychological symptoms through mental health support and organizational interventions. More specifically, vulnerable populations such as individuals who have ACEs will benefit from targeted and specific interventions to cope with the collective trauma experienced globally due to COVID-19.

Data availability statement

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

Ethics statement

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

Author contributions

TM conceptualized the manuscript, wrote the majority of the manuscript, and revised the manuscript. AG contributed funding for the parent study, conceptualized the manuscript, assisted with statistical analyses and write up, and revised the manuscript. LD conceptualized the parent study and inclusion of the measures of interest, and edited and revised the manuscript. NS conceptualized and secured funding for the parent study. BA and CM conceptualized the parent study and edited and revised the manuscript. CM contributed funding for the parent study. All authors contributed to the article and approved the final version.

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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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References

Amsalem, D., Lazarov, A., Markowitz, J. C., Naiman, A., Smith, T. E., Dixon, L. B., et al. (2021). Psychiatric symptoms and moral injury among US healthcare workers in the COVID-19 era. *BMC Psychiatry* 21:546. doi: 10.1186/s12888-021-03565-9

Ballou, S., Gray, S., and Palsson, O. S. (2020). Validation of the pandemic emotional impact scale. *Brain Behav. Immun. Health* 9:100161. doi: 10.1016/j.bbih.2020.100161

Békés, V., Starrs, C. J., and Perry, J. C. (2023). The COVID-19 pandemic as traumatic stressor: distress in older adults is predicted by childhood trauma and mitigated by defensive functioning. *Psychol. Trauma Theory Res. Pract. Policy* 15, 449–457. doi: 10.1037/tra0001253

Carmassi, C., Foghi, C., Dell'Oste, V., Cordone, A., Bertelloni, C. A., Bui, E., et al. (2020). PTSD symptoms in healthcare workers facing the three coronavirus outbreaks: what can we expect after the COVID-19 pandemic. *Psychiatry Res.* 292:113312. doi: 10.1016/j.psychres.2020.113312

Castellini, G., Tarchi, L., Cassioli, E., Rossi, E., Sanfilippo, G., Innocenti, M., et al. (2022). Attachment style and childhood traumatic experiences moderate the impact of initial and prolonged COVID-19 pandemic: mental health longitudinal trajectories in a sample of Italian women. *Int. J. Ment. Health Addic.* 1–20. Advance online publication. doi: 10.1007/s11469-022-00798-x

Cicchetti, D. (2016). Socioemotional, personality, and biological development: illustrations from a multilevel developmental psychopathology perspective on child maltreatment. *Annu. Rev. Psychol.* 67, 187–211. doi: 10.1146/annurev-psych-122414-033259

Cicchetti, D., and Toth, S. L. (2005). Child maltreatment. *Annu. Rev. Clin. Psychol.* 1, 409–438. doi: 10.1146/annurev.clinpsy.1.102803.144029

Clemens, V., Köhler-Dauner, F., Keller, F., Ziegenhain, U., and Fegert, J. M. (2022). Adverse childhood experiences are associated with a higher risk for increased depressive symptoms during Covid-19 pandemic – a cross-sectional study in Germany. *BMC Psychiatry* 22:540. doi: 10.1186/s12888-022-04177-7

Dale, L. P., Davidson, C., and Kolacz, J. (2020). *Adverse traumatic experiences scale*. Jacksonville, FL.

Dale, L. P., Cuffe, S. P., Kolacz, J., Leon, K. G., Bossemeyer Biernacki, N., Bhullar, A., et al. (2022). Increased autonomic reactivity and mental health difficulties in COVID-19 survivors: implications for medical providers. *Front. Psychiatry* 13:830926. doi: 10.3389/fpsyt.2022.830926

Denning, M., Goh, E. T., Tan, B., Kanneganti, A., Almonte, M., Scott, A., et al. (2021). Determinants of burnout and other aspects of psychological well-being in healthcare workers during the Covid-19 pandemic: a multinational cross-sectional study. *PLoS One* 16:e0238666. doi: 10.1371/journal.pone.0238666

Dobson, H., Malpas, C. B., Burrell, A. J., Gurvich, C., Chen, L., Kulkarni, J., et al. (2021). Burnout and psychological distress amongst Australian healthcare workers during the COVID-19 pandemic. *Australas. Psychiatry* 29, 26–30. doi: 10.1177/1039856220965045

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *Am. J. Prev. Med.* 14, 245–258. doi: 10.1016/s0749-3797(98)00017-8

Greenberg, N., Docherty, M., Gnanapragasam, S., and Wessely, S. (2020). Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *BMJ* 368. doi: 10.1136/bmj.m1211

Guastello, A. D., Brunson, J. C., Sambuco, N., Dale, L. P., Tracy, N. A., Allen, B. R., et al. (2022). Predictors of professional burnout and fulfilment in a longitudinal analysis on nurses and healthcare workers in the COVID-19 pandemic. *J. Clin. Nurs.* doi: 10.1111/jocn.16463

Gupta, N., Dhamija, S., Patil, J., and Chaudhari, B. (2021). Impact of COVID-19 pandemic on healthcare workers. *Ind. Psychiatry J.* 30, 282–S284. doi: 10.4103/0972-6748.328830

Hidaka, Y., Sasaki, N., Imamura, K., Tsuno, K., Kuroda, R., and Kawakami, N. (2021). Changes in fears and worries related to COVID-19 during the pandemic among current employees in Japan: a 5-month longitudinal study. *Public Health* 198, 69–74. doi: 10.1016/j.puhe.2021.06.017

Hooper, L., Stockton, P., Krupnick, J., and Green, B. (2011). Development, use, and psychometric properties of the Trauma History Questionnaire. *J. Loss Trauma* 16, 258–283. doi: 10.1080/15325024.2011.572035

IBM Corp (SPSS Inc.). (2019). *IBM SPSS statistics for windows (version 26.0) [computer software]*. Armonk, NY: IBM Corp.

Iob, E., Lacey, R., Giunchiglia, V., and Steptoe, A. (2022). Adverse childhood experiences and severity levels of inflammation and depression from childhood to young adulthood: a longitudinal cohort study. *Mol. Psychiatry* 27, 2255–2263. doi: 10.1038/s41380-022-01478-x

Jang, Y., You, M., Lee, H., Lee, M., Lee, Y., Han, J.-O., et al. (2021). Burnout and peritraumatic distress of healthcare workers in the COVID-19 pandemic. *BMC Public Health* 21:2075. doi: 10.1186/s12889-021-11978-0

Kim, A. W., Nyengerai, T., and Mendenhall, E. (2022). Evaluating the mental health impacts of the COVID-19 pandemic: perceived risk of COVID-19 infection and childhood trauma predict adult depressive symptoms in urban South Africa. *Psychol. Med.* 52, 1587–1599. doi: 10.1017/s0033291720003414

Kroenke, K., Spitzer, R. L., and Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *J. Gen. Intern. Med.* 16, 606–613. doi: 10.1046/j.1525-1497.2001.016009606.x

Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B., Berry, J. T., and Mokdad, A. H. (2009). The PHQ-8 as a measure of current depression in the general population. *J. Affect. Disord.* 114, 163–173. doi: 10.1016/j.jad.2008.06.026

Kolacz, J., Dale, L. P., Nix, E. J., Roath, O. K., Lewis, G. F., and Porges, S. W. (2020). Adversity history predicts self-reported autonomic reactivity and mental health in US residents during the COVID-19 pandemic. *Front. Psychiatry* 11:577728. doi: 10.3389/fpsyt.2020.577728

Labrague, L. J., and Santos, J. A. A. (2020). COVID-19 anxiety among front-line nurses: predictive role of organisational support, personal resilience and social support. *J. Nurs. Manag.* 28, 1653–1661. doi: 10.1111/jonm.13121

LeMoult, J., Humphreys, K. L., Tracy, A., Hoffmeister, J.-A., Ip, E., and Gotlib, I. H. (2020). Meta-analysis: exposure to early life stress and risk for depression in childhood and adolescence. *J. Am. Acad. Child Adolesc. Psychiatry* 59, 842–855. doi: 10.1016/j.jaac.2019.10.011

Luo, M., Guo, L., Yu, M., Jiang, W., and Wang, H. (2020). The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public – a systematic review and meta-analysis. *Psychiatry Res.* 291:113190. doi: 10.1016/j.psychres.2020.113190

Magalhaes, E., Stoner, A., Palmer, J., Schranze, R., Grandy, S., Amin, S., et al. (2021). An assessment of mental health outcomes during the COVID-19 pandemic. *Community Ment. Health J.* 57, 1267–1277. doi: 10.1007/s10597-021-00876-9

Marvaldi, M., Mallet, J., Dubertret, C., Moro, M. R., and Guessoum, S. B. (2021). Anxiety, depression, trauma-related, and sleep disorders among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Neurosci. Biobehav. Rev.* 126, 252–264. doi: 10.1016/j.neubiorev.2021.03.024

Mayorga, N. A., Smit, T., Garey, L., Gold, A. K., Otto, M. W., and Zvolensky, M. J. (2022). Evaluating the interactive effect of COVID-19 worry and loneliness on mental health among young adults. *Cogn. Ther. Res.* 46, 11–19. doi: 10.1007/s10608-021-10252-2

McKay, M. T., Kilmartin, L., Meagher, A., Cannon, M., Healy, C., and Clarke, M. C. (2022). A revised and extended systematic review and meta-analysis of the relationship between childhood adversity and adult psychiatric disorder. *J. Psychiatr. Res.* 156, 268–283. doi: 10.1016/j.jpsychires.2022.10.015

Merrick, M. T., Ford, D. C., Ports, K. A., Guinn, A. S., Chen, J., Klevens, J., et al. (2019). Vital signs: estimated proportion of adult health problems attributable to adverse childhood experiences and implications for prevention — 25 states, 2015–2017. *MMWR Morb. Mortal. Wkly Rep.* 68, 999–1005. doi: 10.15585/mmwr.mm6844e1

Mersky, J. P., Topitzes, J., and Reynolds, A. J. (2013). Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: a cohort study of an urban, minority sample in the U.S. *Child abuse & neglect* 37, 917–925. doi: 10.1016/j.chiabu.2013.07.011

Mo, Y., Deng, L., Zhang, L., Lang, Q., Liao, C., Wang, N., et al. (2020). Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J. Nurs. Manag.* 28, 1002–1009. doi: 10.1111/jonm.13014

Prout, T. A., Zilcha-Mano, S., Aafjes-van Doorn, K., Békés, V., Christman-Cohen, I., Whistler, K., et al. (2020). Identifying predictors of psychological distress during COVID-19: a machine learning approach. *Front. Psychol.* 11:586202. doi: 10.3389/fpsyg.2020.586202

Rogers, A. H., Shepherd, J. M., Garey, L., and Zvolensky, M. J. (2020). Psychological factors associated with substance use initiation during the COVID-19 pandemic. *Psychiatry Res.* 293:113407. doi: 10.1016/j.psychres.2020.113407

Saragih, I. D., Tonapa, S. I., Saragih, I. S., Advani, S., Batubara, S. O., Suarilah, I., et al. (2021). Global prevalence of mental health problems among healthcare workers during

the Covid-19 pandemic: a systematic review and meta-analysis. *Int. J. Nurs. Stud.* 121:104002. doi: 10.1016/j.ijnurstu.2021.104002

Schnurr, P., Vielhauer, M., Weathers, F., and Findler, M. (1999). Brief Trauma Questionnaire (BTQ) [Database record]. *APA PsycTests*. doi: 10.1037/t07488-000

Shabahang, R., Aruguete, M. S., Rezaei, S., and McCutcheon, L. E. (2021). Psychological determinants and consequences of COVID-19 anxiety: a web-based study in Iran. *Health Psychol. Res.* 9:24841. doi: 10.52965/001c.24841

Shanafelt, T., Ripp, J., and Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA* 323, 2133–2134. doi: 10.1001/jama.2020.5893

Søvold, L. E., Naslund, J. A., Kousoulis, A. A., Saxena, S., Qoronfleh, M. W., Grobler, C., et al. (2021). Prioritizing the mental health and well-being of healthcare workers: an urgent global public health priority. *Front. Public Health* 9:679397. doi: 10.3389/fpubh.2021.679397

Spitzer, R. L., Kroenke, K., Williams, J. B., and Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch. Intern. Med.* 166, 1092–1097. doi: 10.1001/archinte.166.10.1092

Su, J., Chen, X., Yang, N., Sun, M., and Zhou, L. (2020). Proximity to people with COVID-19 and anxiety among community residents during the epidemic in Guangzhou, China. *BJPsych Open* 6:e75. doi: 10.1192/bjo.2020.59

Tiete, J., Guatteri, M., Lachaux, A., Matossian, A., Hougardy, J.-M., Loas, G., et al. (2021). Mental health outcomes in healthcare workers in COVID-19 and non-COVID-19 care units: a cross-sectional survey in Belgium. *Front. Psychol.* 11:612241. doi: 10.3389/fpsyg.2020.612241

Tzouvara, V., Kupdere, P., Wilson, K., Matthews, L., Simpson, A., and Foye, U. (2023). Adverse childhood experiences, mental health, and social functioning: a scoping review of the literature. *Child Abuse Negl.* 139:106092. doi: 10.1016/j.chiabu.2023.106092

Vigo, D., Jones, L., Munthali, R., Pei, J., Westenberg, J., Munro, L., et al. (2021). Investigating the effect of COVID-19 dissemination on symptoms of anxiety and depression among university students. *BJPsych Open* 7:e69. doi: 10.1192/bjo.2021.24

Wang, Z.-H., Yang, H.-L., Yang, Y.-Q., Liu, D., Li, Z.-H., Zhang, X.-R., et al. (2020). Prevalence of anxiety and depression symptom, and the demands for psychological knowledge and interventions in college students during COVID-19 epidemic: a large cross-sectional study. *J. Affect. Disord.* 275, 188–193. doi: 10.1016/j.jad.2020.06.034

Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., and Keane, T. M. (2013). *The life events checklist for DSM-5 (LEC-5) - standard. [Measurement instrument]*. Available from https://www.ptsd.va.gov/

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Job burnout on subjective wellbeing among clinicians in China: the mediating role of mental health

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Background: Although job burnout and mental health difficulties are prevalent negative influences on clinicians' subjective wellbeing (SWB), there are few investigations into their relationships. This research investigates the mediating role of mental illness in the association between clinicians' SWB and job burnout in China.

Methods: This study used the data collected from a cross-sectional survey conducted in China. Using convenience sampling, we conducted a face-to-face questionnaire survey among clinicians in a tertiary hospital in Shandong Province from August to September 2019. The 22-item Maslach Burnout Inventory-Human Service Survey (Chinese version) and the Personal Wellbeing Index-Adult assessed job burnout and SWB. The Chinese short version of Depression, Anxiety and Stress Scale (DASS-C21) assessed mental health. We also collected data on participants' sociodemographic characteristics and job-related factors. Structural equation modeling (SEM) was applied to examine the associations between variables.

Results: Among the 422 participants, 80.8% of the participants reported at least one symptom of job burnout, whereas 5.7% reported all three symptoms of burnout. The prevalence rates of depression, anxiety, and stress were 40.3, 41.7, and 24.9%, respectively. Only 12.8% of the participants had high level of SWB. In mediation analysis, job burnout is positively associated with mental illness ($\beta = 0.809$, $P < 0.001$), mental illness had a significant negative association with SWB ($\beta = -0.236$, $P = 0.013$), and a negative association between job burnout and SWB was significant ($\beta = -0.377$, $P = 0.002$). Mental illness played a partially mediated role in the association between job burnout and SWB (indirect effect = −0.191, 95% CI: −0.361∼−0.017), and the mediating effect of mental illness can explain the 33.6% of the total effect of job burnout on SWB.

Conclusion: This study provides evidence that the effect of job burnout on SWB is partially mediated by mental illness among clinicians in China. Medical administration departments and hospital administrators should pay close attention to the job burnout and mental health of clinicians, so as to effectively improve the SWB of clinicians.

KEYWORDS

subjective wellbeing, job burnout, mental health, clinicians, mediating effect

Introduction

As the main provider of medical and health services, the stability of the professional team of clinicians is an important prerequisite for ensuring the quality of medical services (Fang et al., 2014). Clinicians are also the "cornerstone" of the healthy development of medical and health services. In China, clinicians in tertiary public hospitals, as the most precious power resources of hospitals, are the concentrated expression of the core competitiveness of the development of hospitals. Tertiary public hospitals in China not only undertake the treatment of difficult and complicated diseases in their region, but also undertake the clinical education work of leading the medical development and training the next generation of excellent clinicians, whose importance to the development of regional health and education is evident (Thepapernews, 2015).

Since the introduction of positive psychology, the study of individual subjective wellbeing (SWB) has become increasingly popular, especially for individuals within specific organizations. SWB is a comprehensive evaluation of the individual's emotional life quality and cognitive intelligence, reflecting the individual's social function and adaptive state (Diener et al., 2018). Human resources are fundamental to the survival and sustainable growth of modern organizations (Li et al., 2022). Clinicians are an important human capital of hospitals, and their SWB is a practical issue that medical management departments and hospital managers must pay attention to. The SWB of clinicians is especially vital in the healthcare system, affecting their own physical and mental health and career development (Goitein, 2014; Nojima et al., 2015; Zhou et al., 2018; Koch et al., 2020), and ultimately, the quality of medical services and patient satisfaction (Friedberg et al., 2014; Scheepers et al., 2015; Wang et al., 2022). However, healthcare professionals commonly experience job burnout and mental health challenges, which can detrimentally affect their SWB.

Medical professionals face significant demanding in their practice, as they are required to promptly and accurately address the needs of patients and families. In addition, night work, shift work and long working hours are prevalent in the medical profession. Compared to the general working population, many clinicians often experience job burnout as they deal with high levels of job stress and emotional demands (Prins et al., 2007a,b; Wallace et al., 2009; Dyrbye et al., 2013). Many researches have demonstrated that chronic exposure to work-related stress can lead to job burnout (Schaufeli et al., 1993; Collings and Murray, 1996). Job burnout can be defined as a psychological syndrome, which is a long-term response to long-term interpersonal stress at work (Schaufeli and Greenglass, 2001). It was initially measured by Maslach and Jackson (1981) and defined as a state of emotional exhaustion (EE), depersonalization (DP), and low personal accomplishment (LPA). EE refers to reduced energy levels, extreme fatigue, exhaustion, energy loss, depletion and weakness (Maslach and Leiter, 2016). DP, also known as cynicism, involves adopting a negative or detached attitude toward clients, including irritability, loss of idealism, and withdrawal (Maslach and Leiter, 2016). LPA is represented by a decline in personal achievement, also known as inefficiency, which is described as reduced productivity or ability, low morale and a sense of inefficiency (Maslach and Leiter, 2016). The 11th edition of the International Classification of Diseases (ICD-11), introduced in 2019, officially recognized job burnout as a multidimensional syndrome encompassing emotional exhaustion, depersonalization, and diminished feelings of personal accomplishment (Xiao et al., 2022). Job burnout is common among healthcare professionals, especially those who provide healthcare on the front lines. Previous studies have shown that the prevalence rate of job burnout symptoms among Chinese doctors, ranging from 66.5 to 87.8% (Lo et al., 2018).

It is no secret that the association between job burnout and mental illness is close (Woon and Tiong, 2020). Mental illness is a complex public health issue with extensive social and economic implications and serious consequences for physical health (Stenius, 2007). The Chinese chronic disease cohort survey has shown that the mental health of Chinese adults is not optimistic, especially anxiety and depression symptoms (Chen et al., 2017). Many studies have shown a high prevalence of mental health problems, such as depression and anxiety in the health service. Xinhua et al. (2006) and Shen et al. (2012) found that 27.7% of clinicians had mental health problems and 37.1% of clinicians had depression in general hospitals in China. Yinuo (2020) used the 21-item Depression, Anxiety and Stress Scale (DASS-21) to screen clinicians in China and reported rates of 40.98% for depression, 45.77% for anxiety, and 25.88% for stress. The Malaysian study, which also used DASS-21, found that the prevalence of depression, anxiety and stress among medical staff was 18.7, 38.6, and 12.0%, respectively (Woon and Tiong, 2020). A national database study in Korean revealed that healthcare workers had higher odds ratios for mood and anxiety disorders than the employee in other workplaces (Kim et al., 2018). At the same time, job burnout has emerged as a significant factor affecting individual SWB. A systematic review of 19 studies found that job burnout may negatively impact on the wellbeing of human service workers, including healthcare providers (Williford et al., 2018). Previous research has indicated that among medical personnel, burnout has detrimental effect on health status and overall wellbeing, which can lead to depressive symptoms and suicidal ideation (West et al., 2009; Dyrbye and Shanafelt, 2011; Shanafelt et al., 2016; Williford et al., 2018). For example, mental illness was shown to associate with job burnout negatively and have a significant mediating effect in the association between job burnout and poor quality of life among medical staff in a Malaysian hospital (Woon and Tiong, 2020). A study found that job burnout and SWB exhibited significant negative correlation among female doctors in Chinese hospital (Wang et al., 2020). In addition, job burnout has been linked to job dissatisfaction, frequent turnover, and increased in medical malpractice or errors. Therefore, job burnout is a potential obstacle to the mental health and SWB of medical staff and health care quality.

In the Chinese context, researches specifically focused on job burnout among clinicians, and the associated issues of mental health and SWB, is lacking. In conjunction with the previous arguments, we proposed the following research hypotheses: Hypothesis 1: Job burnout is positively related to mental illness. Hypothesis 2: Mental illness is negatively related to SWB. Hypothesis 3: Job burnout is negatively related to SWB. Hypothesis 4: Job burnout is negatively related to SWB through the mediation of mental illness. The purpose of this study was to explore how job burnout influenced SWB through the mediating roles of mental illness. Our proposed model is summarized in **Figure 1**. The finding

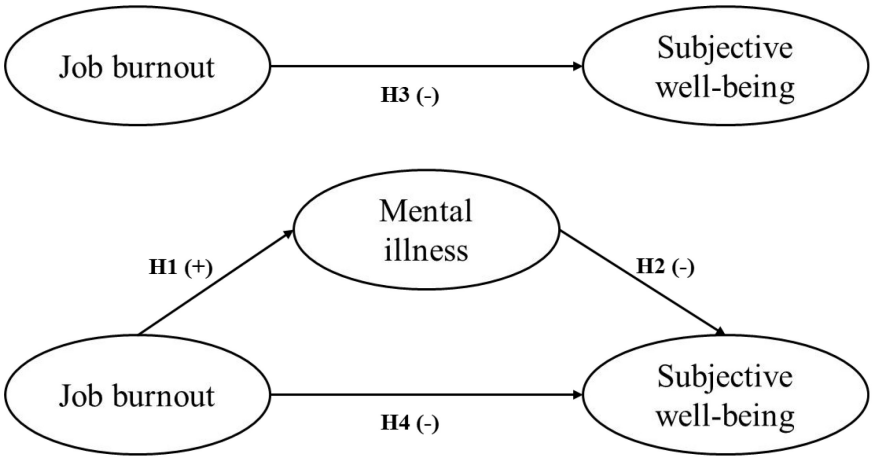

FIGURE 1
Theoretical model and hypotheses.

will enrich relevant theory and provide a new perspective for hospital human resource management.

Materials and methods

Participants

Our study was conducted in a hospital in Shandong Province from August to September 2019. All investigators received professional training on the questionnaire survey a few days before the formal investigation. Skilled or trained teachers and graduate students from Shandong University personally conducted structured face-to-face interviews with the survey participants in the relevant clinical departments of the hospital, with the assistance of medical administration department workers. Participants were selected by using convenience sampling method. This survey did not include intern doctors, standardized training doctors, training doctors from other hospitals and those who worked in the sample hospital for less than 1 year. The Ethics Committee of the first author's university approved this cross-sectional study (ECSHCMSDU20190303), and it adhered to the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants prior to entry into this study. We obtained written informed consent from 431 clinicians. However, nine questionnaires were excluded due to its unavailability. Finally, 422 clinicians were included in this study.

Measures

Sociodemographic and job-related variables

Sociodemographic variables included gender, age, marital status (married/cohabiting, and single including never married, divorced, and widowed), number of children and educational level. Job-related variables included working years, specialty, professional title, annual income, academic environment, work environment and welfare benefits.

PWI

Subjective wellbeing was explored using the Personal Wellbeing Index-Adult (PWI), which consists of seven items, with a response scale of 0 (completely unsatisfied) to 10 (completely satisfied) (International Wellbeing Group, 2006; Casas et al., 2008). The items refer to satisfaction with health, standard of living, life achievements, sense of security, the groups of people of which they part in, future security and relationships with others (Navarro Moya et al., 2017; Jovanovic et al., 2019). In this study, the seven items included health, standard of living, work achievements, safety, community involvement, future security, and personal relationships. The internal consistency analysis of the PWI for our sample indicates a Cronbach's alpha of 0.924, which is consistent with values obtained in other studies ranging from 0.70 to 0.87 (Navarro Moya et al., 2017; Jovanovic et al., 2019).

MBI-HSS

The Chinese version of the Maslach Burnout Inventory-Human Service Survey (MBI-HSS) was utilized to measure job burnout in this study, which consists of 22 items, with each item rated on a scale of 0 (never) to 6 (daily) (Chaoping et al., 2003). The scale was divided into three dimensions of EE, DP and LPA. As there are different thresholds for job burnout, the high score in each domain was designated as follows: EE score $\geq$ 27, DP score $\geq$ 13, and LPA score $\leq$ 31 (Rotenstein et al., 2018). The internal consistency coefficients of the three sub-scales range from 0.80 to 0.89 (Maslach et al., 2001). Based on the previous studies, one or more exacerbated dimensions in the MBI-HSS are considered an indication of the presence of professional burnout (Maslach et al., 2001; Chaoping et al., 2003; Rotenstein et al., 2018). The internal consistency of this study was measured using Cronbach's alpha, producing values of 0.937 for EE, 0.928 for DP, 0.902 for LPA, and 0.859 for the total MBI-HSS.

DASS-C21

Mental health status was measured by the Chinese Short Version of the Depression, Anxiety and Stress Scale (DASS-C21) (Taouk et al., 2001). The scale includes three sub-scales of

depression, anxiety and stress, with a total of 21 items, which respectively measure individuals' experience of negative emotions such as depression, anxiety and stress. The internal consistency coefficient of the three sub-scales is between 0.80 and 0.83 (Yi et al., 2012). The internal consistency coefficient of depression, anxiety and stress sub-scales in this study was 0.892, 0.882, and 0.876, respectively. A 4-level score from 0 to 3 was used ("0" was " not consistent," "1" was "partially consistent," "2" was "mostly consistent," and "3" was "always consistent"). The total score of each sub-scale multiplied by two was the score of the sub-scale, and the score ranged from 0 to 42. The higher the score was, the more serious the corresponding negative emotion was (Taouk et al., 2001). The cut-off points used for self-reported depressive, anxiety, and stress symptoms in their respective sub-scales were >13 for Depression, >9 for Anxiety, and >18 for Stress, which indicated at least moderate level of symptom severity (Taouk et al., 2001; Yi et al., 2012).

Statistical analyses

Data analysis was performed using SPSS version 24.0 (IBM Corp., Armonk, NY, USA) and AMOS 23.0 (IBM Corp., Armonk, NY, USA). Frequencies, percentages, means and standard deviations were performed to describe the socio-demographic characteristics of clinicians, job burnout, mental health, and SWB. A one-way analysis of variance (ANOVA) or student's *t*-test was used to compare the differences in the total SWB scores in each group, which are described by different demographic characteristic. Person correlation coefficients were calculated to examine the correlation between job burnout, mental health, and SWB. Finally, SEM was utilized to test the hypothesized interrelationships among the three key variables. The sub-scale scores of job burnout, mental health and SWB were used as indicators of each latent variable. The model was constantly refined to verify model fit and the best-suited model was selected. Indicators to evaluate model fit in the current study included the relative chi-square (χ^2/df) statistic, the standardized root-mean-square residual (SRMR), the root mean-square error of approximation (RMSEA), the goodness-of-fit index (GFI), the comparative fit index (CFI), and the normal fit index (NFI). The evaluation of the model fit was based on the following criteria: χ^2/df < 3, SRMR < 0.08, RMSEA < 0.05, GFI > 0.90, CFI > 0.90, and NFI > 0.90 (MacKinnon et al., 2002). Significance testing of each mediating pathway was also performed according to methods proposed by MacKinnon et al. (2002). Statistical significance was set at $P < 0.05$.

Results

Descriptive statistics of demographic characters

The proportion of female was slightly higher than male (50.9 vs. 49.1%). The mean age of clinicians was 36.28 ± 8.05. Most clinicians were married with spouses (83.9%), and more than half had raised at least one child (71.6%). The majority of clinicians had an education level above bachelor degree (89.1%), and have worked for more than 5 years (65.6%). More than half of the clinicians had an per capita annual income less than 160,000 Chinese yuan (79.7%). In addition, 30.1, 21.1, and 26.5% of clinicians were satisfied with the academic environment, work environment, and welfare benefits, respectively. **Table 1** shows more detailed information on the socio-demographic characteristics and job-related characteristics of clinicians.

SWB among clinicians with different characteristics

Table 1 also displays the SWB among clinicians with different characteristics. The PWI scores of most of these groups were distributed between 55 and 75. Results revealed statistical differences in the other variables except for gender, marital status, number of children, and educational level. The participants who belonged to such characteristic group as: age at least 41 years old, having one child, working years at least 21 years, Obstetrics and gynecology, senior professional title, annual income at least 210,000 Chinese yuan, satisfied with the academic environment, satisfied with the work environment, satisfied with the welfare benefits, had higher PWI score.

Job burnout, mental health, and SWB among clinicians

Table 2 presents the descriptive results of the study variables. The mean scores of the three dimensions of job burnout were 21.87 ± 1.00 (EE), 6.20 ± 1.07 (DP), and 22.16 ± 0.94 (LPA), respectively. Among the 422 participants, 24.2% experienced high level of EE, 10.2% experienced high level of DP, and 77.7% had a high sense of LPA. Overall, 80.8% of the participants reported at least one symptom of job burnout, whereas 5.7% reported all three symptoms of burnout. Mental illness included depression, anxiety and stress symptoms, with an average score of 8.79 ± 7.98 (Depression), 7.94 ± 7.90 (Anxiety), and 11.73 ± 8.00 (Stress), respectively. When considered these symptoms collectively, 198 respondents had experienced mental illness, indicating the presence of at least one of these symptoms, accounting for 46.9%. Among them, 170 respondents with various levels of depressive symptoms made up 40.3% of the group; 176 respondents with various levels of anxiety symptoms made up 41.7%; and 105 respondents with various levels of stress symptoms made up 24.9%. The mean score of the SWB of clinicians was 63.24 ± 15.72. Only 12.8% of the clinicians had high level of SWB. The proportions of clinicians who had low and moderate levels of SWB were 36.6 and 50.9%.

Correlation analyses of job burnout, mental illness and SWB

The correlation coefficients are presented in **Table 3**. Job burnout, depression, anxiety and stress were positively correlated with each other ($P < 0.01$). Additionally, those factors and SWB had a negative correlation ($P < 0.01$).

TABLE 1 Descriptive results of participants characteristic.

Characteristic	*N*	%	PWI	*t/F*	*P*-value
Gender					
Male	207	49.1	63.59 ± 15.66	0.452	0.652
Female	215	50.9	62.90 ± 15.80		
Age (years)					
26∼30	117	27.7	63.20 ± 13.36	4.335	0.005
31∼35	132	31.3	59.85 ± 16.65		
36∼40	72	17.1	63.95 ± 14.94		
41∼	101	23.9	67.20 ± 16.73		
Marital status					
Single	68	16.1	61.22 ± 15.11	−1.193	0.236
Married/cohabited	354	83.9	63.62 ± 15.82		
Number of children					
0	120	28.4	63.07 ± 14.56	2.670	0.070
1	226	53.6	64.51 ± 15.23		
2	76	18	59.72 ± 18.37		
Educational level					
Bachelor's degree	46	10.9	60.00 ± 15.67	2.329	0.099
Master's degree	246	58.3	62.71 ± 15.14		
Doctorate	130	30.8	65.37 ± 16.62		
Working years					
1∼5	145	34.4	63.61 ± 13.18	5.048	0.001
6∼10	142	33.6	59.36 ± 16.66		
11∼15	40	9.5	67.46 ± 14.91		
16∼20	31	7.3	62.53 ± 17.03		
21∼	64	15.2	68.71 ± 16.75		
Specialty					
Internal medicine	125	29.6	63.19 ± 15.35	1.843	0.047
Surgery	105	24.9	62.75 ± 14.67		
Obstetrics and gynecology	43	10.2	67.04 ± 13.61		
Pediatrics	37	8.8	60.66 ± 17.91		
Emergency medicine	23	5.5	59.88 ± 16.47		
Anesthesiology	18	4.3	55.08 ± 17.87		
Others	71	16.8	66.92 ± 16.48		
Professional title					
Primary	168	39.8	62.30 ± 13.80	9.089	<0.001
Intermediate	143	33.9	60.50 ± 17.09		
Senior	111	26.3	74.54 ± 13.78		
Annual income (Chinese yuan)					
60,000∼100,000	182	43.4	60.15 ± 15.00	11.177	<0.001
110,000∼150,000	154	36.3	62.54 ± 16.11		
160,000∼200,000	60	14.2	69.12 ± 14.83		
210,000∼	26	6.2	75.38 ± 10.62		
Academic environment					
unsatisfied	116	27.5	55.84 ± 19.18	14.073	<0.001

(Continued)

TABLE 1 (Continued)

Characteristic	*N*	%	PWI	*t/F*	*P*-value
general	179	42.4	65.62 ± 13.07		
satisfied	127	30.1	66.64 ± 13.34		
Work environment					
unsatisfied	118	28	59.94 ± 18.50	3.771	0.025
general	215	50.9	63.92 ± 14.80		
satisfied	89	21.1	65.95 ± 13.07		
Welfare benefits					
unsatisfied	187	44.3	58.63 ± 16.90	16.824	<0.001
general	123	29.1	65.13 ± 13.48		
satisfied	112	26.5	68.84 ± 13.69		

TABLE 2 Descriptive results of the job burnout, mental health, and SWB among clinicians.

Variables	M ± SD
Job burnout	50.21 ± 16.17
EE	21.87 ± 1.00
DP	6.20 ± 1.07
LPA	22.16 ± 0.94
Mental health	
Depression	8.79 ± 7.98
Anxiety	7.94 ± 7.90
Stress	11.73 ± 8.00
SWB	
Health	6.51 ± 1.99
Standard of living	6.27 ± 1.78
Work achievements	5.92 ± 1.89
Safety	6.36 ± 1.83
Community involvement	5.87 ± 2.07
Future security	6.37 ± 1.92
Personal relationships	6.95 ± 1.78
PWI total score	63.24 ± 15.72

M, means; SD, standard deviation; EE, emotional exhaustion; DP, depersonalization; LPA, low personal accomplishment; SWB, subjective wellbeing.

Mediation analyses

Structural equation modeling was used to quantify the hypothesized interrelationships among the three study variables. The results of SEM and hypothesis testing are presented in Tables 4, 5 and Figure 2. Tables 4, 5 summarize the results of the direct, indirect, and total effects of the study variables. Standardized coefficients representing the direct associations between variables are displayed over the arrows in Figure 2. Regarding the quality of fit, the overall model fit indices of the valid model in Figure 2 suggested a satisfactory level with $\chi^2/df = 2.379$, SRMR = 0.000, RMSEA = 0.057, GFI = 0.984, CFI = 0.992, and NFI = 0.987.

As expected, the results revealed a significant positive association between job burnout and mental illness ($\beta = 0.809$, $P < 0.001$), which meant H1 should be accepted. Mental illness had a significant negative association with SWB ($\beta = -0.236$, $P = 0.013$), thus supporting H2. The results also indicated that the direct negative association between job burnout and SWB was significant ($\beta = -0.377$, $P = 0.002$), thus supporting H3 (Table 4).

As shown in Table 5, the indirect association between job burnout and SWB was significant. The 95% confidence interval (95% CI) of mediating effects of the Job burnout→Mental illness→SWB pathway was (−0.361, −0.017), which did not include 0, indicating that mental illness mediated the indirect relationship between job burnout and SWB, the mediating effect of mental illness can explain 33.6% of the total effect of job burnout on SWB, thus supporting H4.

Discussion

In this study, we investigated the prevalence of job burnout and mental health among clinicians in a tertiary hospital and their SWB. Consistent with our hypotheses, a positive correlation was found between job burnout and mental illness, while a negative correlation was observed between job burnout and SWB. Mediation analysis revealed that mental illness mediated the association between job burnout and poor SWB among clinicians. Notably, this study represents the first attempt to comprehensively investigate job burnout, mental health, and SWB among clinicians in a Chinese hospital, adding to the existing literature in this field.

Job burnout has been common among healthcare professionals, especially those providing health care at the front line. Studies have shown that regardless of specialties among clinicians, the rates of job burnout symptoms ranged from 36 to 51% in the Western country (Medscape, 2019). A nationwide survey on physician job burnout in China has shown that 31.28% of physicians experienced job burnout (Wu et al., 2021). Based on the findings in this study, the prevalence of participants experienced at least one job burnout symptom was 80.8%, which was higher than that reported in Western countries and Chinese nationwide survey. This finding was consistent with a study by Qianqian and Aiyun (2017), which reported the job burnout rate was 76.64% among clinicians in tertiary hospitals in Yunnan Province, China. The rates of different categories of job burnout identified among participants of this study were different from previous studies using the same

TABLE 3 The descriptive analysis and correlations among relevant variables.

Variables	Job burnout	EE	DP	LPA	Depression	Anxiety	Stress	SWB
Burnout	1.000							
EE	0.820**	1.000						
DP	0.756**	0.577**	1.000					
LPA	0.629**	0.158**	0.225**	1.000				
Depression	0.635**	0.601**	0.554**	0.253**	1.000			
Anxiety	0.600**	0.567**	0.518**	0.242**	0.848**	1.000		
Stress	0.571**	0.584**	0.447**	0.212**	0.851**	0.83**	1.000	
PWI	−0.550**	−0.472**	−0.384**	−0.344**	−0.544**	−0.499**	−0.460**	1.000

**$P < 0.01$; EE, emotional exhaustion; DP, depersonalization; LPA, low personal accomplishment; SWB, subjective wellbeing.

TABLE 4 Structural model assessment and their corresponding results.

	Standardized regression coefficient	*P*-value	Result
Jon burnout→mental illness (H1)	0.809	<0.001	Support
Mental illness→Depression	0.939		
Mental illness→Anxiety	0.906	<0.001	
Mental illness→Stress	0.908	<0.001	
Job burnout→LPA	0.269		
Job burnout→DP	0.718	<0.001	
Job burnout→EE	0.796	<0.001	
Mental illness→SWB (H2)	−0.236	0.013	Support
Job burnout→SWB (H3)	−0.377	0.002	Support

EE, emotional exhaustion; DP, depersonalization; LPA, low personal accomplishment; SWB, subjective wellbeing.

TABLE 5 Direct, indirect, and total effects of study variables.

Model pathways	Standardized β coefficient	95% CI	
		Lower	Upper
Total effects			
Job burnout→mental illness	0.809	0.710	0.895
Mental illness→SWB	−0.236	−0.440	−0.029
Job burnout→SWB	−0.568	−0.673	−0.458
Direct effects			
Job burnout→mental illness	0.809	0.710	0.895
Mental illness→SWB	−0.236	−0.440	−0.029
Job burnout→SWB	−0.377	−0.649	−0.151
Indirect effects			
Job burnout→mental illness→SWB	−0.191	−0.361	−0.017

SWB, subjective wellbeing.

assessment tool and cut-off points, especially on the LPA. Our results showed that 77.7% of participants had a high sense of LPA, which is much higher than in other studies in China. For example, studies in Yunnan and Fujian Province, China both found clinicians had low or moderate sense of LPA in tertiary hospitals (Guozhong, 2014; Qianqian and Aiyun, 2017). Another study in Jinan, China showed that 79.52% of clinicians had a high sense of LPA in 2014 (Xiaojuan and Fuzhong, 2015), which was close to our results. At the same time, Chinese oncologists have similar job burnout rates as their American counterparts, but a greater loss of LPA (Ma et al., 2019). These inconsistent findings may be explained by the individuals' varied geographic location and work environments.

In this study, 46.9% of participants were screened positive for at least one of the mental illness symptoms: depression, anxiety, and stress. This result is very similar to the result of Malaysian hospital (41.8%) (Woon and Tiong, 2020). In terms of dimensions, the prevalence rates of self-reported depressive, anxiety, and stress

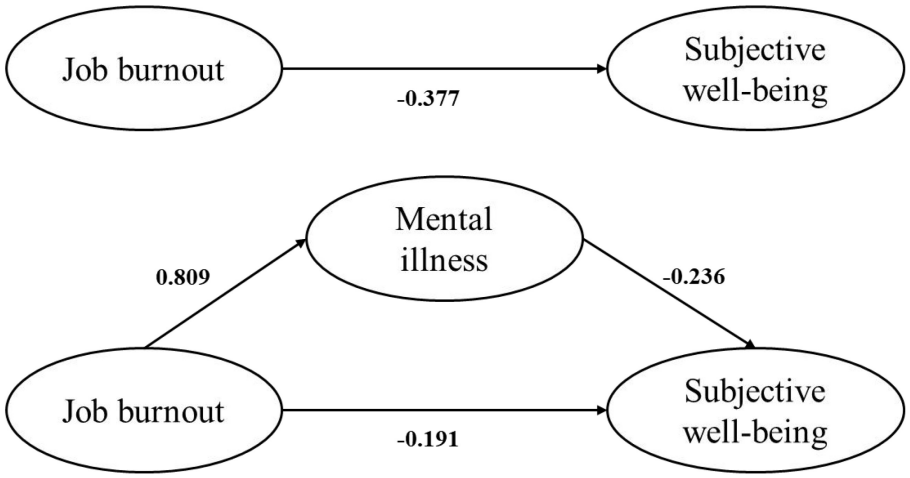

FIGURE 2
Structural equation analysis of job burnout, mental illness, and SWB.

symptoms were 40.3, 41.7, and 24.9%, respectively, which was consistent with a nationwide survey among medical staff in China. It can be seen that the mental health of medical staff is not optimistic, especially depression and anxiety. Foreign surveys have shown that 57–73% of clinicians have depression in the general sense, that is, depression, melancholy or sadness, with the highest proportion in Germany, Portugal and the United States, and the lowest proportion in Britain. French, Spanish and British clinicians had the highest rates of clinical depression (i.e., a state of severe depression that lasts for a period of time), while German clinicians had the lowest rates (Medscape, 2019). Despite the fact that these findings were not directly comparable, they are adequate to demonstrate that clinicians' mental health issues need attention from the wider community.

The PWI used in this study was divided into seven aspects: health, standard of living, work achievements, safety, social participation, future security and personal relationships. As can be seen from the measurement results, the clinicians scored the highest in the personal relationships, indicating that the clinicians in the sample hospital were most satisfied with the current harmonious colleague relationship and good cooperation atmosphere. This is also related to the nature of medical science. Medical science is a subject of collaborative development, and various disciplines are integrated with each other, with variances and commonalities. In the past long period of time, in order to promote the development of various medical specialties, various medical disciplines have gradually subdivided and derived many sub-specialties. The maintenance of human health, however, requires interdisciplinary collaboration since humans are organic wholes (Daiming, 2017). As a result, the idea of integrated medicine has progressively made it the development trend to improve collaboration across various specialties. Multi-disciplinary treatment and the construction of major medical centers in sample hospitals are the products of multidisciplinary collaboration. In addition to assisting clinicians in performing their responsibilities of saving lives and aiding the wounded, strong interpersonal linkages between and within clinical departments enable clinicians to fully enjoy a positive organizational climate and a feeling of organizational support. Clinicians in the sample hospital had the lowest scores for social participation and the second-lowest scores for work achievements. This is related to the daily workload and professional development characteristics of clinicians. As a university affiliated hospital, the sample hospital undertakes not only daily medical work, but also a large number of teaching and scientific research tasks. In addition, the development of clinicians themselves also needs constant learning to master more clinical skills and cutting-edge medical information. Work and study occupy most of their daily life, and it is difficult to spare time to participate in various other organizations and activities. Tertiary hospitals are places where incurable diseases are treated. In China, the effectiveness of primary care is limited (Xu et al., 2020), so patients prefer to visit doctors in tertiary hospitals as long as they are accessible and affordable. Under this circumstance, the heavy workloads can lead to job burnout among clinicians.

In this study, the three dimensions of job burnout were positively correlated with the three dimensions of DASS, and negatively correlated with the SWB, which confirms hypothesis 1–3. We also found that mental illness mediated the relationship between job burnout and poor SWB, which confirms hypothesis 4. Recognizing the mediating role of mental illness in the relationship between job burnout and poor SWB highlights the need to promote mental health promotion among clinicians through improved mental health literacy, early screening, and timely interventions. Researches have shown that non-mental health professionals have a relatively low level of mental health knowledge and literacy, which can impact their ability to provide appropriate care for patients with mental health needs and may also hinder awareness of their own mental health problems. For example, a study conducted in six general hospitals in China revealed that less than 60% of non-mental health professionals were able to correctly identify case vignettes of common mental disorders (Wu et al., 2017). Therefore, effective psychological interventions targeting clinicians need to be implemented regularly. Hospital administrators should pay more attention to the mental health problems of clinicians and improve the SWB of clinicians.

Limitations

Several study limitations must be mentioned. On the one hand, this study was somewhat limited by its cross-sectional design, which precluded us from exploring the causal relationships between job burnout, mental illness, and SWB. On the other hand, the participants recruited from a single hospital might introduce problems related to bias and generalizability. In addition, the self-reporting of these measures may present problems related to bias and social desirability. In the future, our study could use the longitudinal study designs to track the effects of job burnout and mental illness on SWB combined with structured interviews, and conduct the intervention studies, providing a more straightforward path to how these variables interact.

Conclusion

Job burnout and mental illness were not uncommon among clinicians in China. This study constructed a structural relationship model among job burnout, mental health and SWB. The significant association between job burnout and poor SWB, with mental illness acting as a partial mediator in this relationship. The results of this study provide a new perspective and thought on the negative effects of job burnout on SWB of clinicians. Medical administration departments and hospital administrators should prioritize the job burnout and mental health of clinicians, so as to effectively improve the SWB of clinicians.

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 Review Board of the Centre for Health Management and Policy Research, School of Public Health, Shandong 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

JW: conceptualization, critical revision, funding acquisition, supervision, writing—original draft preparation, and writing—reviewing and editing. YF: data curation, formal analysis, software, critical revision, writing—original draft preparation, and writing—reviewing and editing. DH and SZ: data curation, formal analysis, and supervision. All authors contributed to the article and approved the submitted version.

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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.

Publisher's note

References

Casas, F., Coenders, G., Cummins, R. A., Gonzalez, M., Figuer, C., and Malo, S. (2008). Does subjective well-being show a relationship between parents and their children? *J. Happiness Stud.* 9, 197–205. doi: 10.1007/s10902-007-9044-7

Chaoping, L., Kan, S., Zhengxue, L., Li, L., and Yue, Y. (2003). An investigation on job burnout of doctor and nurse. *Chin. J. Clin. Psychol.* 11, 170–172. doi: 10.16128/j.cnki.1005-3611.2003.03.004

Chen, Y., Bennett, D., Clarke, R., Guo, Y., Yu, C., Bian, Z., et al. (2017). Patterns and correlates of major depression in Chinese adults: A cross-sectional study of 0.5 million men and women. *Psychol. Med.* 47, 958–970. doi: 10.1017/S0033291716002889

Collings, J. A., and Murray, P. J. (1996). Predictors of stress amongst social workers: An empirical study. *Br. J. Soc. Work* 26, 375–387.

Daiming, F. (2017). HIM is the inevitable and necessary direction for the future development of medicine. *J. Air Force Med. Univ.* 8, 1–10. doi: 10.13276/j.issn.1674-8913.2017.01.001

Diener, E., Lucas, R. E., and Oishi, S. (2018). Advances and open questions in the science of subjective well-being. *Collabra Psychol.* 4:15. doi: 10.1525/collabra.115

Dyrbye, L. N., and Shanafelt, T. D. (2011). Physician burnout: A potential threat to successful health care reform. *JAMA* 305, 2009–2010. doi: 10.1001/jama.2011.652

Dyrbye, L. N., Varkey, P., Boone, S. L., Satele, D. V., Sloan, J. A., and Shanafelt, T. D. (2013). Physician satisfaction and burnout at different career stages. *Mayo Clin. Proc.* 88, 1358–1367. doi: 10.1016/j.mayocp.2013.07.016

Fang, P., Liu, X., Huang, L., Zhang, X., and Fang, Z. (2014). Factors that influence the turnover intention of Chinese village doctors based on the investigation results of Xiangyang City in Hubei Province. *Int. J. Equity Health* 13:84. doi: 10.1186/s12939-014-0084-4

Friedberg, M. W., Chen, P. G., Van Busum, K. R., Aunon, F., Pham, C., Caloyeras, J., et al. (2014). Factors affecting physician professional satisfaction and their implications for patient care, health systems, and health policy. *Rand Health Q.* 3:1.

Goitein, L. (2014). Physician well-being: Addressing downstream effects, but looking upstream. *JAMA Intern. Med.* 174, 533–534. doi: 10.1001/jamainternmed.2013.13253

Guozhong, L. (2014). *Study on the correlation between physician burnout and medical errors.* Master. Fuzhou: Fujian Agriculture and Forestry University.

International Wellbeing Group (2006). *Personal wellbeing index–Adult(PWI-A).* Melbourne, VIC: Australian Centre on Quality of Life, Deakin University.

Jovanovic, V., Cummins, R. A., Weinberg, M., Kaliterna, L., and Prizmic-Larsen, Z. (2019). Personal wellbeing index: A cross-cultural measurement invariance study across four countries. *J. Happiness Stud.* 20, 759–775. doi: 10.1007/s10902-018-9966-2

Kim, M. S., Kim, T., Lee, D., Yook, J. H., Hong, Y. C., Lee, S. Y., et al. (2018). Mental disorders among workers in the healthcare industry: 2014 national health insurance data. *Ann. Occup. Environ. Med.* 30:31. doi: 10.1186/s40557-018-0244-x

Koch, P., Zilezinski, M., Schulte, K., Strametz, R., Nienhaus, A., and Raspe, M. (2020). How perceived quality of care and job satisfaction are associated with intention to leave the profession in young nurses and physicians. *Int. J. Environ. Res. Public Health* 17:2714. doi: 10.3390/ijerph17082714

Li, J., Li, S., Jing, T., Bai, M., Zhang, Z., and Liang, H. (2022). Psychological safety and affective commitment among Chinese hospital staff: The mediating roles of job satisfaction and job burnout. *Psychol. Res. Behav. Manag.* 15, 1573–1585. doi: 10.2147/PRBM.S365311

Lo, D., Wu, F., Chan, M., Chu, R., and Li, D. (2018). A systematic review of burnout among doctors in China: A cultural perspective. *Asia Pac. Fam. Med.* 17:3. doi: 10.1186/s12930-018-0040-3

Ma, S., Huang, Y., Yang, Y., Ma, Y., Zhou, T., Zhao, H., et al. (2019). Prevalence of burnout and career satisfaction among oncologists in China: A national survey. *Oncologist* 24, e480–e489. doi: 10.1634/theoncologist.2018-0249

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., and Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychol. Methods* 7, 83–104. doi: 10.1037/1082-989x.7.1.83

Maslach, C., and Jackson, S. E. (1981). The measurement of experienced burnout. *J. Organ. Behav.* 2, 99–113. doi: 10.1002/job.4030020205

Maslach, C., and Leiter, M. P. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry* 15, 103–111. doi: 10.1002/wps.20311

Maslach, C., Schaufeli, W. B., and Leiter, M. P. (2001). Job burnout. *Annu. Rev. Psychol.* 52, 397–422. doi: 10.1146/annurev.psych.52.1.397

Medscape (2019). *Medscape global physicians' burnout and lifestyle comparisons*. New York, NY: Medscape.

Navarro Moya, P., González Carrasco, M., and Villar Hoz, E. (2017). Psychosocial risk and protective factors for the health and well-being of professionals working in emergency and non-emergency medical transport services, identified via questionnaires. *Scand. J. Trauma Resusc. Emerg. Med.* 25:88. doi: 10.1186/s13049-017-0433-6

Nojima, Y., Kumakura, S., Onoda, K., Hamano, T., and Kimura, K. (2015). Job and life satisfaction and preference of future practice locations of physicians on remote islands in Japan. *Hum. Resour. Health* 13:39. doi: 10.1186/s12960-015-0029-z

Prins, J. T., Gazendam-Donofrio, S. M., Tubben, B. J., van der Heijden, F. M., van de Wiel, H. B., and Hoekstra-Weebers, J. E. (2007a). Burnout in medical residents: A review. *Med. Educ.* 41, 788–800. doi: 10.1111/j.1365-2923.2007.02797.x

Prins, J. T., Hoekstra-Weebers, J. E., van de Wiel, H. B., Gazendam-Donofrio, S. M., Sprangers, F., Jaspers, F. C., et al. (2007b). Burnout among Dutch medical residents. *Int. J. Behav. Med.* 14, 119–125. doi: 10.1007/BF03000182

Qianqian, L., and Aiyun, Z. (2017). Research on job burnout of doctors in Yunnan Provincial first-class hospitals. *J. Kunming Med. Univ.* 38, 54–58.

Rotenstein, L. S., Torre, M., Ramos, M. A., Rosales, R. C., Guille, C., Sen, S., et al. (2018). Prevalence of burnout among physicians: A systematic review. *JAMA* 320, 1131–1150. doi: 10.1001/jama.2018.12777

Schaufeli, W. B., and Greenglass, E. R. (2001). Introduction to special issue on burnout and health. *Psychol. Health* 16, 501–510. doi: 10.1080/08870440108405523

Schaufeli, W., Marek, T., and Maslach, C. (1993). *Professional burnout: Recent developments in theory and research*. Washington, DC: Taylor & Francis.

Scheepers, R. A., Boerebach, B. C., Arah, O. A., Heineman, M. J., and Lombarts, K. M. (2015). A systematic review of the impact of physicians' occupational well-being on the quality of patient care. *Int. J. Behav. Med.* 22, 683–698. doi: 10.1007/s12529-015-9473-3

Shanafelt, T. D., Mungo, M., Schmitgen, J., Storz, K. A., Reeves, D., Hayes, S. N., et al. (2016). Longitudinal study evaluating the association between physician burnout and changes in professional work effort. *Mayo Clin. Proc.* 91, 422–431. doi: 10.1016/j.mayocp.2016.02.001

Shen, L. L., Lao, L. M., Jiang, S. F., Yang, H., Ren, L. M., Ying, D. G., et al. (2012). A survey of anxiety and depression symptoms among primary-care physicians in China. *Int. J. Psychiatry Med.* 44, 257–270. doi: 10.2190/PM.44.3.f

Stenius, K. (2007). Promoting mental health. Concepts, emerging evidence, practice. *Addiction* 102:1991. doi: 10.1111/j.1360-0443.2007.02046.x

Taouk, M., Lovibond, P. F., and Laube, R. (2001). *Psychometric properties of a Chinese version of the 21-item depression anxiety stress scales (DASS-21)*. Sydney, NSW: New South Wales Transcultural Mental Health Centre, Cumberland Hospital.

Thepapernews, (2015). China has clearly defined a hierarchical diagnosis and treatment system: Tertiary hospitals mainly diagnose and treat acute critical and intractable diseases. Available online at: https://www.thepaper.cn/newsDetail_forward_1374147 (accessed August 1, 2023).

Wallace, J. E., Lemaire, J. B., and Ghali, W. A. (2009). Physician wellness: A missing quality indicator. *Lancet* 374, 1714–1721. doi: 10.1016/S0140-6736(09)61424-0

Wang, L., Wang, H., Shao, S., Jia, G., and Xiang, J. (2020). Job burnout on subjective well-being among Chinese female doctors: The moderating role of perceived social support. *Front. Psychol.* 11:435. doi: 10.3389/fpsyg.2020.00435

Wang, X., Zhu, Y., Wang, F., and Liang, Y. (2022). Association of organizational and patient behaviors with physician well-being: A national survey in China. *PLoS One* 17:e268274. doi: 10.1371/journal.pone.0268274

West, C. P., Tan, A. D., Habermann, T. M., Sloan, J. A., and Shanafelt, T. D. (2009). Association of resident fatigue and distress with perceived medical errors. *JAMA* 302, 1294–1300. doi: 10.1001/jama.2009.1389

Williford, M. L., Scarlet, S., Meyers, M. O., Luckett, D. J., Fine, J. P., Goettler, C. E., et al. (2018). Multiple-institution comparison of resident and faculty perceptions of burnout and depression during surgical training. *JAMA Surg.* 153, 705–711. doi: 10.1001/jamasurg.2018.0974

Woon, L. S., and Tiong, C. P. (2020). Burnout, mental health, and quality of life among employees of a Malaysian hospital: A cross-sectional study. *Ann. Work Expo. Health* 64, 1007–1019. doi: 10.1093/annweh/wxaa075

Wu, Q., Luo, X., Chen, S., Qi, C., Long, J., Xiong, Y., et al. (2017). Mental health literacy survey of non-mental health professionals in six general hospitals in Hunan Province of China. *PLoS One* 12:e180327. doi: 10.1371/journal.pone.0180327

Wu, Y., Jiang, F., Ma, J., Tang, Y., Wang, M., and Liu, Y. (2021). Experience of medical disputes, medical disturbances, verbal and physical violence, and burnout among physicians in China. *Front. Psychol.* 11:556517. doi: 10.3389/fpsyg.2020.556517

Xiao, Y., Dong, D., Zhang, H., Chen, P., Li, X., Tian, Z., et al. (2022). Burnout and well-being among medical professionals in China: A national cross-sectional study. *Front. Public Health* 9:761706. doi: 10.3389/fpubh.2021.761706

Xiaojuan, L., and Fuzhong, X. (2015). Survey on current status of job burnout among doctors in 3A hospitals, Jinan City, 2014. *Prev. Med. Tribune* 21, 459–461. doi: 10.16406/j.pmt.issn.1672-9153.2015.06.020

Xinhua, X., Tianli, Z., and Jianguo, H. (2006). Mental health of doctors in general hospital. *Chin. J. Clin. Psychol.* 14, 324–325. doi: 10.16128/j.cnki.1005-3611.2006.03.040

Xu, J., Powell-Jackson, T., and Mills, A. (2020). Effectiveness of primary care gatekeeping: Difference-in-differences evaluation of a pilot scheme in China. *BMJ Glob. Health* 5:e002792. doi: 10.1136/bmjgh-2020-002792

Yi, W., Daxing, W., Xuejing, L., Hangui, L., Xiaochan, L., Yuping, Y., et al. (2012). Psychometric properties of the Chinese short version of depression anxiety and stress scale in Chinese adults. *Chin. J. Public Health* 28, 1436–1438.

Yinuo, W. (2020). *Self-rated health and influencing factors of medical staffs in 144 tertiary hospitals in China.* Master. Beijing: Peking Union Medical College.

Zhou, H., Han, X., Zhang, J., Sun, J., Hu, L., Hu, G., et al. (2018). Job satisfaction and associated factors among medical staff in tertiary public hospitals: Results from a national cross-sectional survey in China. *Int. J. Environ. Res. Public Health* 15:1528. doi: 10.3390/ijerph15071528

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The resilience of emergency and critical care nurses: a qualitative systematic review and meta-synthesis

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Background: Due to the unique work environment, emergency and critical care departments nurses face high job pressure, often resulting in burnout and a high turnover rate. Public health emergencies such as the Corona Virus Disease 2019 pandemic tend to exacerbate these problems further. Therefore, improving the resilience of nurses is crucial to enhance their retention rates.

Objective: This systematic review and meta-synthesis of qualitative studies on the resilience of emergency and critical nurses were conducted to provide a reference for clinical managers to develop strategies for improving the resilience of nurses.

Methods: Following databases were searched for relevant studies: CINAHL Plus, Elsevier, Cochrane Library, Embase, Medline, OVID, Pubmed, Science Direct, LWW and Web of Science, China National Knowledge Network (CNKI), Wanfang Database (CECDB), VIP Database, and Sinomed. Google Scholar and Opengrey were used to search for gray literature. The literature search period was from the establishment of the database to April 2023. The systematic review of qualitative studies followed the Joanna Briggs Institute (JBI) approach, including critical appraisal using the JBI Checklist and synthesis through meta-synthesis. Confidence of evidence was assessed with JBI's ConQual process.

Results: A total of 12 articles were identified, with 59 main results and 9 new integrated categories. Also, 3 themes, i.e., risk factors, protective factors, and personal growth, and 9 sub-themes, i.e., working pressure, negative emotion, an organizational issue, active learning, sense of occupational benefit, social support, self-cognition and regulation, learn to adapt, and self-actualization, were formed.

Conclusion: The resilience of emergency and critical care nurses depends on various factors. Managers should prioritize the mental health of nurses and implement measures to enhance their resilience through social support, team building, and psychological capital development. Additionally, management models can be updated based on domestic and international experience to improve nurses' job involvement, optimize nursing quality, and promote the advancement of the nursing profession.

KEYWORDS

resilience, emergency and critical care, nurses, systematic review, qualitative

Introduction

The emergency and critical care (ECC) departments have always been at the forefront of medical practice, serving as the exclusive hospitalization option for patients with diverse and critical conditions requiring immediate attention. Consequently, nurses working in these departments encounter heightened levels of stress compared to other departments due to the unique professional environment they operate within and the inherent demands of their occupation (Wu, 2015). The significance of the ECC departments has been widely acknowledged by the general public. During public health emergencies, such as the Corona Virus Disease 2019 (COVID-19) pandemic, ECC nurses bear primary responsibility. Despite infection risks, they made remarkable contributions by screening suspected and confirmed cases, implementing infection control measures, enhance measures to contain the epidemic, monitoring vital signs, collecting specimens, providing non-invasive and invasive ventilation support, administering mechanical circulation assistance (ECMO), and caring for critically ill patients (Han et al., 2022). In addition, ECC nurses, who spend the most time beside the patient's bed and have the highest level of contact with the patient, play an indispensable role as the backbone of the department. An analysis of their clinical role in intensive care revealed that their collaboration with physicians is critical to reducing emergency department waiting times, enhancing patient satisfaction, reducing mortality, and saving health care costs. The benefits of this approach surpass those of solo physician work (Woo et al., 2017).

However, unpredictable factors and high levels of uncertainty govern the working atmosphere in the ECC departments, making it an inferior working environment compared to other departments. The workload is heavy, the pace is fast and the intensity is elevated, increasing the risk of burnout for ECC nurses. Burnout is a psychological syndrome that occurs due to long-term work-related stressors, resulting in an inability to cope with emotional stress or depletion of energy and resources, leading to feelings of failure, and exhaustion (Schooley et al., 2016). A study conducted in Spain reported that one-third of emergency and critical care nurses experienced high burnout levels (Cañadas-de la Fuente et al., 2018). There is a strong link between job burnout and the turnover intention, as evidenced by multiple studies (Hämmig, 2018; Lee et al., 2021; Özkan, 2022). With an aging population, increasing demand for healthcare services, and the threat of infectious diseases, the global nurse shortage is becoming ever more severe (Peters, 2023). According to existing studies, older age groups utilize emergency and critical care services more frequently and require additional care due to complex chronic diseases accompanied by atypical symptoms. The need for labor in such fields is also expected to increase (Angus et al., 2000; Armoon et al., 2021; Wilhelms and Wilhelms, 2021). The issue of nurse burnout is particularly acute in this context. The shortage of ECC nurses leads to longer patient wait times, overcrowding in emergency departments, lower patient satisfaction, more nurse–patient conflicts, and difficulties with the ambulance allocation (Gorman, 2019). In fact, it has been suggested that reducing the number of ECC nurses could compromise patient safety and clinical outcomes (Adams et al., 2019). Furthermore, such loss would lead to an increased financial burden on hospitals and intensified pressure on the remaining staff (Adams et al., 2019). During the previous COVID-19 pandemic, emergency and intensive care nurses faced a significantly higher risk of mental health issues and job burnout due to understaffing, surging workload, limited medical resources, a highly contagious disease with high mortality rates, and social stigma associated with infection (Jiang et al., 2022). Due to these challenges, the job satisfaction of nurses has plummeted, and turnover rates soared (Lopez et al., 2022). However, literature (Han et al., 2022) suggests a close link between the mental health of nurses, nursing care quality, and patient clinical outcomes. Nurses with higher levels of resilience are more likely to stay in their jobs longer and are less likely to experience burnout. Training nurses to gain the necessary professional skills in the ECC departments requires significant time and effort, making nurse retention a top priority.

Resilience is a multi-dimensional concept that lacks a unified definition. It generally refers to an individual's ability to adapt well to adversity, pressure, and trauma (Han et al., 2023). The current definition of resilience involves two aspects, i.e., the stressor and the individual's ability to adapt (White et al., 2008). With the emergence of positive psychology, studies pertaining to resilience have increasingly been applied to diverse cohorts. Among these, the exploration of resilience in nurses has expanded both the scope and application domain of resilience research, while also offering valuable insights for further in-depth investigations within professional contexts (Lin and He, 2018). A review suggested that resilience in the field of nursing is a complex dynamic process that enables nurses to actively adapt to workplace stressors, avoid psychological harm, and consistently provide safe, high-quality patient care (Han et al., 2023). A study have shown that higher nurse resilience is associated with lower job burnout, indicating a significant negative correlation between the two (Guo et al., 2018). Resilient nurses can better handle adversity and trauma during public health emergencies through self - motivation (Jiang et al., 2022). Enhanced resilience in nurses is crucial for increasing retention, enhancing career satisfaction, improving nursing quality, and promoting career development. Because qualitative research can more profoundly explore the emotional experience of respondents and the deepest aspects of their spirit than other methods, and because of regional and cultural limitations, a single qualitative study may not be adequately representative of all ECC nurses. Therefore, the purpose of this study is to systematically review and synthesize qualitative studies on resilience in ECC nurses from different cultures. This will provide nursing managers with a valuable reference for developing more effective programs that can bridge the gap between clinical practice and research.

Materials and methods

Objective

The objective of this review is to identify factors affecting resilience in ECC nurses, and reveal the authentic requirements of ECC nurses in cultivating resilience. This review focuses on the following questions: How do ECC nurses understand their own resilience and the factors that influence it? What strategies can managers employ to enhance the resilience of ECC nurses?

Design

The meta-synthesis method was adopted to conduct a systematic review of qualitative research. Based on a comprehensive understanding of the philosophical foundation and methodology of meta-synthesis, we conducted repeated readings of the included studies to extract themes and implied meanings. Subsequently, we synthesized themes with similar connotations, established new categories, and integrated novel findings. By synthesizing new results, deeper and more substantive explanations of specific phenomena can be made, thus providing more influential and persuasive final conclusions (Sandelowski et al., 2007). This review used the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) (Moher et al., 2009) as the basis for reporting the review. The results were reported using the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) (Tong et al., 2012).

Search strategy

The following 10 databases were searched: CINAHL Plus, Elsevier, Cochrane Library, Embase, Medline, OVID, Pubmed, LWW, Science Direct, Web of Science, and in addition, four Chinese databases were searched: CNKI, VIP, Sinomed and Wanfang. Google Scholar and Opengrey were used to search for grey literature. The search method was almost identical for each database, that is, keywords are used to define the target literature and Boolean operators are used to connect them. Search terms included: nurs*, emergency*, acute, acute care, critical, critical care, ICU, intensive care unit, intensive care, resilient*, bounce*, elasticity, resistance, tenacity, toughness, mental toughness, and recovery. The search period spanned the time the database was established until April 2, 2023. Also, references to relevant literature were tracked to avoid omissions.

Eligibility criteria and study selection

The inclusion and exclusion criteria are shown in Table 1. After a systematic search, 3,475 literature sources were found. The document management software Endnote was used to organize them. After removing 1,072 duplicates and scanning the titles of the remaining sources, 1765 unrelated sources were removed. Finally, after screening for inclusion criteria through abstracts and full texts, only 12 sources remained for quality evaluation. Two researchers independently performed the literature screening process and cross-checked the results. A third researcher was consulted in case of disagreement, and finally, a consensus was reached on the results. Figure 1 shows the search results, selection, and the inclusion process according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021).

Quality assessment

Two researchers trained in the systematic evidence-based nursing course independently evaluated the quality of the included articles by using the Australian JBI Centre for Evidence-based Health Care Qualitative Research Quality Evaluation criteria (Lockwood et al., 2015), which consists of 10 items, including whether the research methodology is consistent with its philosophical basis, data collection method, data analysis method, and result interpretation, as well as the typicality of the research object, the researcher's own factors and ethical review. Each item is assessed as follows: 2 for "yes," 1 for "unclear," and 0 for "no"/"not applicable." Finally, the scores for each question were summarized and converted to a percentage. Literature with a score of >70% was included. Two researchers agreed upon the final score, and no literature was eliminated after quality evaluation. Table 2 shows the results of the quality evaluation.

JBI Australian Centre for Evidence-based Health Care Qualitative research Quality evaluation criteria (Lockwood et al., 2015): ① Is there congruity between the stated philosophical perspective and the research methodology? ② Is there congruity between the research methodology and the research question or objectives? ③ Is there congruity between the research methodology and the methods used to collect data? ④ Is there congruity between the research methodology and the representation and analysis of data? ⑤ Is there congruity between the research methodology and the interpretation of results? ⑥ Is there a statement locating the researcher culturally or theoretically? ⑦ Is the influence of the researcher on the research, and *vice-versa*, addressed? ⑧ Are participants, and their voices, adequately represented? ⑨ Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?⑩ Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

Data extraction and meta-synthesis

After carefully analyzing the literature, the two researchers extracted important information such as author, country, year, study

TABLE 1 Inclusion and exclusion criteria of the article.

Inclusion criteria	Exclusion criteria
P (Population): Nurses working in emergency and critical care departments	Full text article is not available
I (Interest of phenomena): The comprehension and experience of resilience among ECC nurses in the face of adversity and the factors influencing their resilience.	Non-chinese or non-English article
Co (Context): There are certain positive experiences for ECC nurses after adversity or trauma.	Article with repeated publication or incomplete data
S (Study design): Qualitative research refers to a systematic and subjective approach to describe life experience and assign meaning to it, includes articles that employ qualitative research methods such as phenomenology, ethnography, grounded theory, and action studies.	Article with a grade of C after quality evaluation

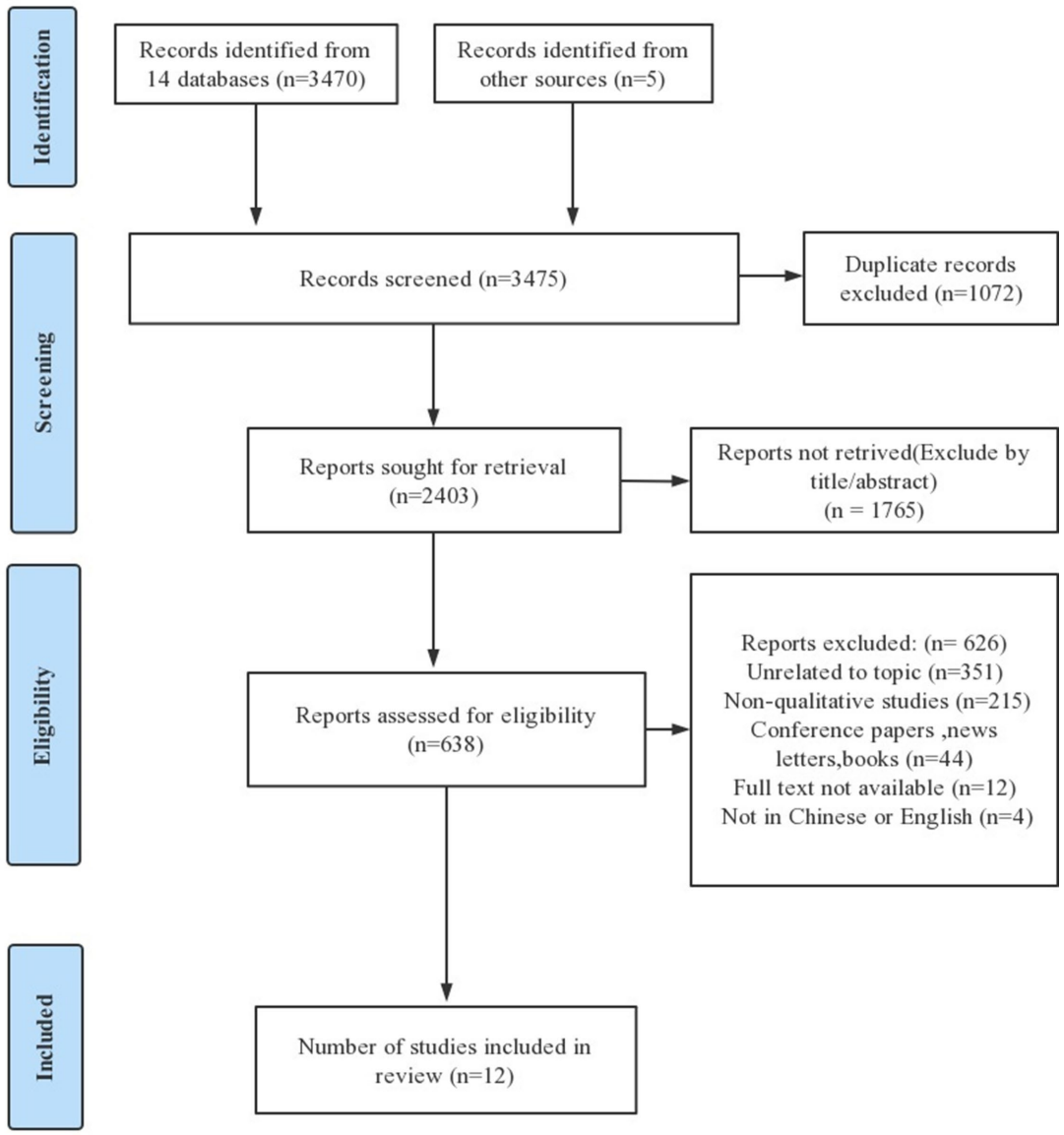

FIGURE 1
Article screening process.

purpose, data collection and analysis methods, subject characteristics and numbers, and study results. A third researcher was consulted in case of any disputes. Each finding in the original study was assigned a level of credibility (Munn et al., 2014): an outcome was deemed unequivocal (U) when it directly related to what was described in the article; an outcome was considered credible (C) when it appeared plausible or could be inferred from the content of the article; if there was no correlation between the content of the article and the result, or if the result was not reported in the article, it was considered as unsupported (NS). Two researchers rated each result for confidence, cross-checked it, and then asked a third researcher to resolve disagreements, if any.

In line with interpretive philosophy, meta-synthesis integrates multiple qualitative research results to generate new concepts and meanings based on postmodernism's multi-faceted understanding and interpretation of a phenomenon (Walsh and Downe, 2005). Furthermore, it aims at providing comprehensive and reliable evidence, embodying the concept of evidence-based nursing and promoting rational resource utilization (Walsh and Downe, 2005). Drawing on an understanding of qualitative research methodology and philosophical concepts, each finding presented in the literature undergoes iterative refinement and analysis. Results with similar meanings are then categorized into new groups, which are subsequently integrated to form novel findings. Finally, all researchers engaged in discussions and confirmed the synthesized results.

ConQual-assessment of confidence of evidence

The ConQual system, which evaluates and grades meta-synthesized bodies of evidence from qualitative studies, was

TABLE 2 Evaluation of methodological quality.

Included studies	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	Results (%)
Jiang et al. (2022)	Y	Y	Y	Y	Y	N	N	Y	Y	Y	16/20 (80%)
Ang et al. (2019)	Y	Y	Y	Y	Y	N	N	Y	Y	Y	16/20 (80%)
Mealer et al. (2012)	Y	Y	Y	U	Y	N	N	Y	Y	Y	15/20 (75%)
Hodges et al. (2008)	Y	Y	Y	Y	Y	N	N	Y	U	Y	15/20 (75%)
Shi et al. (2020)	Y	Y	Y	Y	Y	N	N	Y	U	Y	15/20 (75%)
Li et al. (2021)	Y	Y	Y	Y	Y	N	U	Y	U	Y	16/20 (80%)
Hancock et al. (2020)	Y	Y	Y	Y	Y	N	U	N	Y	Y	15/20 (75%)
Yuan et al. (2022)	Y	Y	Y	Y	Y	N	U	Y	Y	Y	17/20 (85%)
Marey-Sarwan et al. (2022)	Y	Y	Y	U	Y	U	U	Y	Y	Y	17/20 (85%)
Conolly et al. (2022)	Y	Y	Y	Y	Y	N	U	Y	Y	Y	17/20 (85%)
Huang et al. (2021)	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	19/20 (95%)
Jiang et al. (2020)	Y	Y	Y	N	Y	U	U	Y	U	Y	15/20 (75%)

constructed by the JBI Center for Evidence-Based Health Care in 2014 (Munn et al., 2014). The system assesses the credibility and dependability of integrated evidence, resulting in a ConQual-based quality rating of high, medium, low or very low. When assessing dependability and credibility, meta-synthesized evidence is assumed to be high quality and evaluated based on three aspects of credibility and five of dependability. Dependability focuses on the quality of the original studies included in the analysis, while credibility considers whether the integrated results are consistent with the supporting data. The ConQual system scores for this review are shown in Table 3.

Results

The 12 qualitative studies included in the study scored between 70 and 95%, indicating a medium to high level of quality, according to the Australian Centre for Evidence-Based Health Care quality assessment tool. None of the studies, however, provided clear information about the cultural background and values of the researchers. In addition, one study did not acknowledge the subjects' own words as the basis for their conclusions (Hancock et al., 2020), and only one study mentioned the researcher's influence (Huang et al., 2021). The four articles lacked clarity on whether they received approval from an ethics committee (Ang et al., 2019; Jiang et al., 2020; Shi et al., 2020; Li et al., 2021). The representativeness and typicality of the research objects in the three articles were not outstanding (Mealer et al., 2012; Jiang et al., 2020; Marey-Sarwan et al., 2022), which could affect the dependability of the meta-integrated evidence body. However, since each level of evidence in qualitative studies is unequivocal, credibility remains unchanged. Eventually, the ConQual level was found to be moderate.

This review included 12 qualitative studies involving a total of 205 subjects. Seven used the phenomenological approach (Hodges et al., 2008; Jiang et al., 2020, 2022; Shi et al., 2020; Li et al., 2021; Marey-Sarwan et al., 2022; Yuan et al., 2022) 1 used grounded theory (Ang et al., 2019), 1 described qualitative research (Marey-Sarwan et al., 2022), and 3 did not specify methodology (Mealer et al., 2012; Hancock et al., 2020; Conolly et al., 2022). Most studies (10 of the 12) used semi-structured interviews to collect data, while the remaining 2 used focus group interviews (Ang et al., 2019; Hancock et al., 2020), and diaries (Shi et al., 2020), respectively. Furthermore, 8 studied the resilience of ECC nurses in public health emergencies such as that induced by COVID-19 (Jiang et al. 2020, 2022; Shi et al., 2020; Huang et al., 2021; Li et al., 2021; Conolly et al., 2022; Marey-Sarwan et al., 2022; Yuan et al., 2022). In addition, 6 studies were from China (Jiang et al., 2020; Shi et al., 2020; Huang et al., 2021; Li et al., 2021; Jiang et al., 2022; Yuan et al., 2022), 2 from the United States (Hodges et al., 2008; Mealer et al., 2012), and 1 from Canada (Hancock et al., 2020), the United Kingdom (Conolly et al., 2022), Israel (Marey-Sarwan et al., 2022), and Singapore (Ang et al., 2019), respectively. The time span was from 2008 to 2022. After analysis, 59 clear findings were obtained and combined into 3 comprehensive results with the addition of 9 new categories. The specific extraction results of the included studies are shown in Table 4. The results of the meta-synthesis, categories, and the number of unequivocal findings are shown in Figure 2.

Synthesized finding 1: risk factors

The synthesized finding includes three specific categories reflecting risk factors: working pressure, negative emotions, and organizational issues. These specific categories were extracted from eight articles (Hancock et al., 2020; Shi et al., 2020; Huang et al., 2021; Li et al., 2021; Conolly et al., 2022; Jiang et al., 2022; Marey-Sarwan et al., 2022; Yuan et al., 2022).

Working pressure

Working pressure is a crucial risk factor affecting the resilience of ECC nurses. While appropriate pressure can motivate people, excessive pressure can lead to adverse outcomes such as job burnout, compassion fatigue, and resignation (Poncet et al., 2007). In their study, Hancock et al. (2020) argued that workplace violence and complex nurse–patient relationship were unique sources of stress for ECC nurses compared with other medical staff. In addition, factors

TABLE 3 ConQual system scores and the specific reason.

Synthesized findings	Type of research	Dependability	Credibility	ConQual score	Comments
Risk factors	Qualitative research – phenomenological, descriptive	Downgrade one level - Moderate*	Remains unchanged**	Moderate	The findings came from 8 papers *Downgraded one level as the majority of studies (7 out of 8) scored 3 on questions related to the appropriateness of the conduct of the study **Remains unchanged as all findings unequivocal
Protective factors	Qualitative research–phenomenological, descriptive	Downgrade one level - Moderate*	Remains unchanged**	Moderate	The findings came from 10 papers *Downgraded one level as the majority of studies (8 out of 10) scored 3 on questions related to the appropriateness of the conduct of the study **Remains unchanged as all findings unequivocal
Personal growth	Qualitative research–phenomenological, grounded theory	Downgrade one level - Moderate*	Remains unchanged**	Moderate	The findings came from 8 papers *Downgraded one level as the majority of studies (6 out of 8) scored 3 on questions related to the appropriateness of the conduct of the study **Remains unchanged as all findings unequivocal

such as heavy workload and intense work pace increased the psychological burden of nurses. During the previous COVID-19 pandemic, ECC departments were greatly affected, which caused increased difficulty and stress to medical staff due to material shortages, understaffing, and physical fatigue. "*We spend an average of six hours constantly working and on duty,*" said an ICU nurse involved in the COVID-19 response (Li et al., 2021). Another nurse said: "*The isolation ward is understaffed, and there are so many patients. I hand out medicine and check each patient more than 20 times and always worry that I have forgotten something. I feel exhausted by the end of the day (Yuan et al., 2022).*" A nurse said she had to "juggle" between the role of the social worker, physical therapist, and nutrition manager because there was no one to answer due to the shortage of nursing staff (Marey-Sarwan et al., 2022). In addition, the physiological fatigue caused by wearing protective clothing and its influence on the operation also increased the psychological pressure of nurses: "*I have to take blood from all patients between 3 a.m. and 6 a.m. Because of the fogging of goggles and protective gloves, it is difficult for me to operate, and I cannot finish all the tasks on time (Huang et al., 2021).*"

Negative emotions

In addition to working pressure, negative emotions hinder nurses' resilience. During the previous COVID-19 pandemic, ECC nurses had to cope with intrusive thoughts like anxiety, fear, and loneliness caused by the fear of the unknown, excessive workload, concern for family members, and patients' negativity. In their study, Shi et al. (2020) reported that among the study subjects, four nurses were married and expressed concern about their children, who were their top priority, and they felt guilty for not fulfilling their family role. Some even reported avoiding seeing elderly family members (Marey-Sarwan et al., 2022). Many nurses spoke of their unprecedented fear due to the rapid spread of the disease: "*Many of my colleagues around me are getting infected, and I am afraid that I am next. It seems dangerous to touch anyone who is sick (Jiang et al., 2022).*" Because of the impact of the pandemic, people had to keep social distancing themselves from each other. One nurse said: "*I feel more lonely than ever, I work most of the time and cannot go out to see friends and family (Marey-Sarwan et al., 2022).*" In their study, Huang et al. (Huang et al., 2021) reported that some nurses mentioned that they also felt dispirited because of the patients' depressed mood.

Organizational issues

Public health emergencies like COVID-19 highlighted issues within the organization, such as supply and staff shortages and a lack of emergency preparedness, a nurse said: "*We even avoid drinking water or going to the bathroom to save on protective clothing.*" Some isolation wards had to redeploy nurses from other departments due to the staff shortage, some of whom have previous experience in intensive isolation wards (Conolly et al., 2022). However, inadequate preparation, lack of communication with the new team, and unfamiliarity with the department culture in the new environment can lead to feelings of exclusion and helplessness, "*I felt really unsafe in this weird environment and there was nobody I could turn to for support. I'm not too familiar with a lot of the procedures, so I'm scared that I might end up delaying patients*," said one transfer nurse (Conolly et al., 2022). At the same time, nurses in the original department felt impatient with newcomers (Jiang et al., 2022): "*New nurses are not familiar with various procedures. Now, I have to teach them and do my own thing. I am exhausted.*" In addition, ICU nurses identified issues with management education and training, inadequate contingency plans for health emergencies like COVID-19, and policies out of touch with the public as areas requiring attention (Hancock et al., 2020).

Synthesized finding 2: protective factors

The synthesized finding includes four specific categories reflecting protective factors: active learning, sense of occupational benefit, self-cognition and regulation, social support. These specific categories

TABLE 4 Characteristics of qualitative studies.

Authors and year	Origin	Aim	Methodology	Results
Jiang et al. (2022)	China	To explore the resilience of nurses in the emergency department of Shanghai during the COVID-19 pandemic	Using a phenomenological approach to qualitative research, semi-structured in-depth interview via wechat video call. The sample size was 17, including 6 males and 11 females. Age range: 23–46	Three themes emerged: (1) Risk factors (2) Protective factors (3) Altruistic drive
Ang et al. (2019)	Singapore	To explore the different ways of resilience of acute and intensive care nurses	Using grounded theory of qualitative research, face-to-face interview. The sample size was 18, including 3 males and 15 females. Age range: 24–68	Three themes emerged: (1) Self-efficacy (2) Coping style (3) Work attitude
Mealer et al. (2012)	United States	To explore the psychological resilience and post-traumatic stress disorder of ICU nurses in the United States	Qualitative research and semi-structured telephone interview were used The sample size was 27, including 1 male and 26 females. Age range: 35–59	Four themes emerged: (1) World outlook (2) Social relations (3) Cognitive flexibility (4) Self-balance
Hodges et al. (2008)	United States	Explore the professional resilience of Baccalaureate ICU nurses	Using an interpretive phenomenological approach to qualitative research, face-to-face semi-structured in-depth interview. The sample size was 11, including 1 male and 10 females, with an age range of 23–31.	Three themes emerged: (1) Learning the milieu (2) Conscious integration (3) Growth
Shi et al. (2020)	China	To explore changes in the resilience of ICU nurses in Wuhan during the COVID-19 outbreak	Using a phenomenological approach to qualitative research. Diary as source material. The sample size was 9, including 2 males and 7 females. Age range: 26–35	Three themes emerged: (1) Stress period (2) Buffer period (3) Recombination period
Li et al. (2021)	China	To explore the experience of front-line nurses in designated hospitals dealing with COVID-19 from the perspective of resilience	Using a phenomenological approach to qualitative research, semi-structured in-depth interview via wechat video call. The sample size was 12 from ICU, including 4 males and 8 females. Age range: 23–43. ICU nursing age ranges from 0.5 to 10 years	Three themes emerged: (1) Multiple risk factors (2) Multiple protective factors (3) Multidimensional adaptation strategies
Hancock et al. (2020)	Canada	Explore burnout and ethical dilemmas in the ICU team to build resilience	Using qualitative research and Focus group interview. The sample size was 21. Male accounted for 80%, those who have worked for 0–5 years, 6–15 years and more than 16 years account for 37.1, 31.4 and 31.4%, respectively	Three themes emerged: (1) Organizational problems (2) High-pressure environment (3) Lack of team experiences
Yuan et al. (2022)	China	To explore the track of resilience of first-line nurses in Wuhan during the novel coronavirus epidemic	Phenomenological methods of qualitative research were used through semi-structured phone interviews. The sample size was 12. Age range: 29–36. Including 2 males and 10 females.	Three themes emerged: (1) Challenges and difficulties (2) Overcome difficulties (3) Personal growth
Marey-Sarwan et al. (2022)	Israel	To explore resilience and coping strategies among nurses during the COVID-19 pandemic	Using phenomenological methods of qualitative research, face-to-face semi-structured interview and Zoom software are adopted. The sample size was 18. Age range: 31–53.	Three themes emerged: (1) Adjust occupational demands and family life (2) Influencing factors of resilience and nurses' coping strategies (3) The application of metaphorical language
Conolly et al. (2022)	United Kingdom	Explore the building of nurse resilience during the COVID-19 pandemic	Using narrative in-depth interviews of qualitative research, Sample size:27. Mainly female and only three were from minority groups.	Three themes emerged: (1) Resilience is a badge of honor (2) The spur of resilience (3) Take pride in resilience

(Continued)

TABLE 4 (Continued)

Authors and year	Origin	Aim	Methodology	Results
Huang et al. (2021)	China	Explore the resilience of frontline nurses in China during the COVID-19 pandemic	Descriptive qualitative research was used and in-depth interviews were conducted via cell phone. The sample size was 23. The average age is 30 years, and the average length of service is 9 years.	Three themes emerged: (1) Initial negative emotions (2) Positive mental state after 1–2 weeks (3) Influencing factors
Jiang et al. (2020)	China	Explore the resilience of nurses during the COVID-19 pandemic	Using the phenomenological method of qualitative research and face-to-face and semi-structured interviews, the sample size was 10, all female and age range: 24–40.	Four themes emerged: (1) Resilience cognition (2) Resilience regulation (3) Adapt to the situation (4) Self-actualization

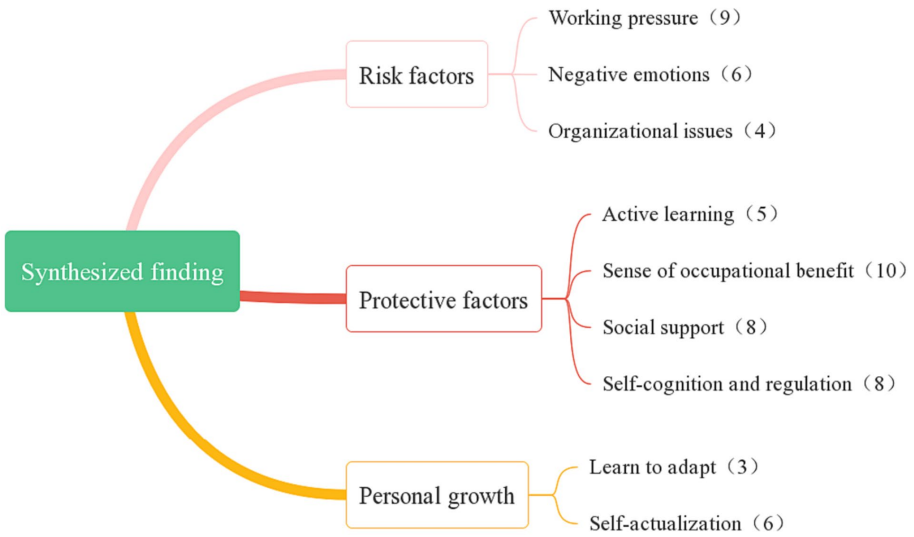

FIGURE 2
Meta-synthesis results 421 and categories.

were extracted from 10 articles (Hodges et al., 2008; Mealer et al., 2012; Jiang et al., 2020, 2022; Shi et al., 2020; Huang et al., 2021; Li et al., 2021; Conolly et al., 2022; Marey-Sarwan et al., 2022; Yuan et al., 2022).

Active learning

Active learning can help nurses quickly adapt to adversity and foster resilience. Learning has a crucial role in the adaptability of new nurses seeking knowledge and the initiative of experienced nurses exploring the unknown during crises like COVID-19 (Hodges et al., 2008; Li et al., 2021). One new nurse said: "*I used to keep asking questions, but I was afraid they would think I was stupid. Instead, they told me that even a senior nurse did not know everything and encouraged me to keep asking questions (Hodges et al., 2008).*" If they feel accepted and understood by colleagues, nurses are more motivated to learn, adapt faster to new environments, and are better equipped to handle stress. During the previous COVID-19 pandemic, overwhelming negative news from various media sources made it difficult for people to distinguish reliable information. One nurse said: "*I used to search the literature online and read many articles about the novel coronavirus, especially at the beginning of the epidemic, and I felt that much of what was written was exaggerated (Marey-Sarwan et al., 2022).*" Gaining relevant scientific knowledge about the virus restores the belief that the virus can be successfully fought. Similarly, a Chinese nurse improved her professional knowledge and emergency relief ability by closely following the latest literature reports during the pandemic (Li et al., 2021).

Sense of occupational benefit

According to one systematic review, satisfaction with a career among nurses is positively related to resilience and negatively related to job burnout (Yu et al., 2019). In the research of Hodges et al. (2008), many nurses stated that recognition from doctors, colleagues, and patients boosted their career confidence and was a crucial turning point in their work, "*It was a man in his sixties who was very unstable, and I took care of him for a long time by myself because as*

everyone else was busy, and then he told me, 'I feel very safe and comfortable in your care. You are calm and know what to do. 'I went home that day, and I was thinking, I did it, I can do it! (Hodges et al., 2008)." Many nurses have reported an increased sense of professional achievement as their patients recovered during the fight against COVID-19, "*I stood in the front line of epidemic prevention with honor and pride, especially when the patients were discharged from the hospital, I felt very contented (Yuan et al., 2022).*"

Social support

Multiple sources of social support for nurses have been described in the literature, including family, team, hospital, and organization. Nurses mentioned that their spouses' care and understanding, as well as their parents' encouragement, gave them the courage and motivation to persist (Huang et al., 2021). Team support is also an essential source of resilience. "*My colleagues encourage each other and complain to each other*," said one nurse, "*The atmosphere in the team is very relaxed and pleasant (Jiang et al., 2022).*" Another nurse noted, "*The head nurse went to the front with us, and it made me feel like she had my back (Jiang et al., 2022).*" In addition, the hospital administrators provided nurses with the necessary support, such as systematic training for all medical workers and addressing the issue of protective materials in more detail before they went to the frontline (Marey-Sarwan et al., 2022). Furthermore, the hospitals tried to improve the work-life balance for nurses, allowing them more time to rest and spend with their families, which boosted their positive emotions positively (Conolly et al., 2022). Finally, during the public health emergency, the nurses received support from caring individuals of all backgrounds, which helped them recover (Jiang et al., 2020; Li et al., 2021; Marey-Sarwan et al., 2022).

Self-cognition and regulation

A person's mentality, beliefs, cognitive abilities, and adaptability affect their attitude toward setbacks and their ability to overcome difficulties. Nurses' perception of adversity and resilience can help them reflect on challenges and find meaning in them (Hodges et al., 2008). One nurse said: "*When doing the health assessment, there are two ways to deal with stress:* i.e., *problem-oriented and emotion-oriented. I think I adhere to the former because I can deal with problems calmly, and I am optimistic that any problem can be solved (Huang et al., 2021).*" Another nurse referred to cognitive resilience as more of a motivator to push herself forward, "*I think I am very resilient, I've been in ICU for a long time, I've been through a lot of traumatic events, and I've seen really bad things. Some patients touch you, but other than that, I do not tend to lose my temper at work (Conolly et al., 2022).*" Some nurses have also said that their religious beliefs increased their resilience. "*I'm Catholic and must say that prayer helped me handle the situation. It made things less crappy (Ang et al., 2019).*" At the same time, self-management is also a good way to self-regulate. "*Food can make people happy. During the pandemic, our team often ordered food online (Jiang et al., 2022).*"Another nurse said, "*I read some history books and classical anthologies to relax after work (Jiang et al., 2022).*" Psychological capital is also a crucial protective factor for nurses managing stress, as it can help rebuild their resilience through self-efficacy, positivity, and optimism (Shi et al., 2020).

Synthesized finding 3: personal growth

The synthesized finding includes two specific categories reflecting personal growth: learn to adapt and self-actualization. These specific categories were extracted from eight articles (Hodges et al., 2008; Mealer et al., 2012; Ang et al., 2019; Jiang et al., 2020, 2022; Shi et al., 2020; Conolly et al., 2022; Yuan et al., 2022).

Learn to adapt

Adapting to adversity is the first step in personal growth, whether it's adjusting to work in ECC departments or shifting mindsets during public health emergencies. This shows that nurses have made mental progress through resilience. After going through various difficult and unexpected situations, nurses become more confident and competent, knowing who to ask for help, how to cope with difficult situations, and how to be respected by others (Hodges et al., 2008). One nurse finally said, "*This is my job, this is what I do every day, I know how to do it, and I know what I am doing (Hodges et al., 2008).*" During the previous COVID-19 pandemic, nurses have gradually adapted to their work after adjustment. One nurse said, "*It is a heavy day's work, but I seize the time to rest after work every day so that I can come to work the next day refreshed (Jiang et al., 2020).*" Another nurse said, "*Now I do not panic anymore, but sincerely serve the patients and get their recognition and gratitude (Jiang et al., 2020).*"

Self-actualization

Self-actualization, which is at the highest level of Maslow's hierarchy of needs, refers to fully developing an individual's physical and mental talents (Hayre-Kwan et al., 2021). Nurses gain deeper insights into life and career after overcoming adversity and building resilience. One nurse said, "*After this epidemic, I realized that I have many shortcomings. In the future, I need to embrace the belief of lifelong learning, master the latest nursing technology, and fulfill my mission (Jiang et al., 2020).*" Another nurse said, "*I used to feel like I had nothing to do on holidays. After this epidemic, I know that I should seize the free time to invest in myself and make myself more fulfilled (Yuan et al., 2022).*"Another nurse mentioned that she thought more about the meaning of life and understood that health is the most precious thing, making plans to keep exercising in the future to improve her immunity (Li et al., 2021). Some nurses understood the importance of a patient-centered nursing profession and strived to implement humanistic nursing concepts in their work, fulfilling both personal values and professional mission (Hodges et al., 2008).

Discussion

Enhancements to resilience strategies still require improvement

The synthesized findings suggest three key factors that impact the resilience of ECC nurses, which are individual cognitive processes and self-regulation, social support networks, and team resilience. While an individual's cognitive and regulatory abilities are shaped by their past experiences, personality traits, and worldview,

social support and team resilience can be influenced by managers. As Richardson noted (Richardson, 2002), developing resilience is a dynamic process that can be deconstructed in response to stimuli and reconstructed in response to changes in stressors and the activation of protective factors. Numerous studies have demonstrated the essential role of social support in fostering resilience (Conolly et al., 2022; Jiang et al., 2022; Marey-Sarwan et al., 2022); however, current nursing management measures remain inadequate (Taylor, 2019). Most strategies aimed at enhancing resilience within the UK National Health Service are predominantly grounded in an individual-centric framework, exhibiting a form of psychocentrism that overlooks the profound impact of social, cultural, and environmental factors. Consequently, this approach partially impedes the cultivation of individual resilience while yielding insignificant research outcomes (Joyce et al., 2018). Some scholars suggest that a holistic approach accounting for organizational culture and team dynamics can lead to a more effective long-term resilience strategy (Conolly et al., 2022).

The support in multiple dimensions enhances resilience development

Because of the unique working environment and nature of emergency and critical care, organizational support can yield unexpected results. Managers should optimize personnel and provide pre-service training to new nurses, especially in high-requirement departments like emergency and critical care, where new nurses often feel anxious and unfamiliar (Hodges et al., 2008). Pre-service training can alleviate the negative emotions of nurses and facilitate their adaptation to the department environment, enabling them to adapt to their work more quickly and efficiently. Additionally, managers should regularly assess nurses' skills, train them, and provide them with more opportunities to learn and broaden their horizons to absorb new nursing concepts. Numerous studies have mentioned that the satisfaction of nurses' desire for knowledge can increase their sense of career benefits to some extent (Hancock et al., 2020). Investment in education, mostly for nurses, could also help improve medical standards. In their study, Jiang et al. (2022) mentioned that giving nurses with clinical work experience a certain degree of clinical decision-making power can also improve their sense of professional benefit and help them understand their professional value. Due to the higher rate of burnout among ECC nurses compared to other departments, hospitals should set up counseling platforms or conduct mental health lectures to encourage nurses to openly discuss their psychological issues and express any stress they may be experiencing. Managers should communicate more, listen attentively, and organize activities to help nurses relax, such as watching movies, listening to music, and playing team games. Cognitive behavioral therapy has also been reported as a positive and efficient mean of improving resilience (Joyce et al., 2018). Other methods, such as debriefing sessions, stress management, resilience training, and mindfulness meditation, can also be used for ECC nurses. Combining multiple intervention strategies has been suggested for greater effectiveness (Joyce et al., 2018).

In terms of management strategy, the long-term nursing management concept solely focusing on patients tends to neglect nurses' crucial role and significance. According to Drucker (Peter, 2012), enterprises have only one real resource: people. As a concept of people-oriented management, flexible management has gained attention and applications in clinical practice. Studies have shown that such an approach can relieve nurses' pressure and meet their multi-level needs (Hu et al., 2009). As a fresh management concept, Management By Walking Around (MBWA) emphasizes communication and exchange among managers, the nursing staff, and patients, aiming at understanding nurses' real needs in on-site management, identifying areas for improvement in clinical practice, solving practical problems, improving nurses' career satisfaction, establishing excellent relationships between nurses and patients, and promoting rational resource allocation. This approach has been widely applied in intensive care medicine (Jiang et al., 2022). MBWA can enhance communication between ECC departments by promoting multidisciplinary collaboration. A Chinese hospital had tested MBWA in its internal surgery department and found that it significantly reduced adverse events and work errors while improving overall efficiency. These results demonstrate the potential for widespread implementation of ambulatory management in personnel management (Li, 2020).

Regarding team support, we learned that a good team atmosphere and department culture are essential to promote the development of nurses' resilience, which is consistent with the study of Labrague (2021). Whether it was during the previous COVID-19 pandemic or on a day-to-day basis, the support of colleagues helped nurses through challenging times. However, a poor team atmosphere and colleague bullying can significantly increase negative emotions and damage resilience (Conolly et al., 2022). Therefore, managers should focus on creating a positive department atmosphere, encouraging effective communication among nurses, and organizing activities or training to improve colleague relationships and communication skills. Meanwhile, nurses with high resilience should encourage those with low resilience to work together, promoting resilience through their daily tasks.

Social support also refers to support from family, friends, and patients. Building a healthy nurse–patient relationship has also been reported as an essential source of resilience (Yuan et al., 2022). In the previous study, some nurses mentioned that patient recognition and encouragement increased their forward motivation and confidence (Hodges et al., 2008). Therefore, managers can carry out more lectures and training activities related to therapeutic communication. Simultaneously, they can enhance the guidance of public opinion, disseminate the achievements of outstanding nurses, and elevate the status of nurses in society. Similarly, patients' defeatist attitudes, death, and other adverse clinical outcomes can also hinder the growth of nurses and even cause vicarious trauma and stress disorders (Yuan et al., 2022). The patients encountered by ECC nurses are usually critically ill, rapidly changing and have high mortality rates. In addition, these departments frequently face public health emergencies such as COVID-19 and adverse outcomes such as patient deaths. Therefore, it is crucial for managers to prioritize psychological counseling for nurses and provide hospice care training. It has been mentioned in the literature that support from hospital administrators is an influential predictor of nurse engagement. Managers can offer further training and develop mentoring programs to encourage nurses (Brykman and King, 2021).

Team resilience interacts with individual resilience

Team resilience, defined as a team's ability to recover from adversity or setbacks, is a state of mind among team members based

on shared beliefs, common emotions, and motivations (Othman and Nasurdin, 2013). There is an interaction between team resilience and individual resilience: when a team is under pressure or threat, individuals can use psychological resources to extend individual resilience to the team level through interpersonal interactions. Similarly, team resilience affects individuals equally, acting as a protective factor for individual resilience. Consistent with the results of Wang et al. (2023), we found that team resilience had a significant role during the public health emergencies such as the COVID-19 pandemic. Managers should pay attention to the cultivation of team resilience. It has been suggested (Othman and Nasurdin, 2013) that team resilience can be enhanced through fostering a positive team atmosphere, setting leadership goals, improving team learning ability, and promoting information sharing among members. A positive team atmosphere is an important prerequisite for achieving team resilience. Mutual encouragement and support among team members is conducive to extending individual resilience to the team level. The level of resilience of the leader plays a crucial role in determining the resilience of the team. As per the 'trickle-down' theory, the development objectives and confidence leaders establish during challenging times directly impact the direction of team progress (Othman and Nasurdin, 2013). Therefore, it is imperative not to overlook training programs to enhance leadership resilience. The ability of a team to learn also influences the development of team resilience. In addition to coping and management methods during adversity and adaptation and growth strategies after, team members should also learn to lower expectations and mentally prepare for adversity. It has been noted that nurses often experience frustration due to a significant gap between their career expectations and the clinical reality they face after starting work (Hodges et al., 2008). To tackle this issue, managers should provide new nurses with comprehensive pre-service training and ongoing guidance on adapting to adversity, identifying problems, learning from them, and adopting a "prepare for the worst, do the best" mindset in their daily practice. In addition, the ability of information elaboration among team members is crucial. This involves effective communication and the integration of diverse perspectives and experiences to facilitate shared learning from adversity. Managers should encourage the exchange of ideas among team members and provide constructive feedback on free opinions to foster the maturity of information elaboration.

Implications for future public health events

The previous COVID-19 pandemic has given managers new ideas on how to increase nurse resilience during similar public health events in the future, such as addressing material shortages, improving emergency planning and providing accurate media information. Managers should assist nurses in developing multi-dimensional adaptation strategies for public health events, preparing systematic emergency plans, reserving sufficient medical supplies, providing timely training on the latest nursing techniques, guiding nurses in the literature search and information screening, regularly assessing their first-aid abilities, strengthening logistics support and paying attention to their mental health.

Study limitations

There are several limitations to this review. First, most of the subjects included in the literature are clinical nurses, which is not representative of the entire medical workforce in ECC departments. Therefore, the resilience of head nurses and other leaders needs further discussion. Second, the literature included in this study has a short time span and most of the studies focus on the resilience of ECC nurses during public health emergencies such as the COVID-19 pandemic. Future research should extend the timeline and increase regional diversity to explore the dynamic changes in nurse resilience from a more comprehensive perspective. Finally, the included literature is limited to Chinese and English literature and thus has certain limitations in terms of retrieval. However, this review sheds further light on the factors that influence the resilience of ECC nurses, which care managers can use to develop more viable management plans.

Conclusion

In total, 12 qualitative studies are included in this review. After further understanding and generalizing the results, nine new categories and three synthesized findings were summarized, and the ConQual system scores of all the integrated results were moderate. Our results show that the resilience of ECC nurses is influenced by a variety of factors, with individual cognition and regulation, social support, and team resilience being particularly significant. Therefore, nursing managers should implement reasonable measures to improve the mental health of nurses and promote the development of resilience through improvements in work environment, departmental atmosphere, personnel optimization. In addition, nurses should be encouraged to fully utilize their self-worth and uphold their professional mission while ensuring safety. In the future, carefully planned and robust intervention studies should be conducted to validate the efficacy of resilience-enhancing strategies while taking into account the evolving trajectory of long-term resilience development among nurses.

Data availability statement

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

Author contributions

SL: conceptualization, methodology, formal analysis, writing-original draft, and writing-review and editing. YZ: conceptualization, methodology, writing-original draft, and writing-review and editing. PH and YL: conceptualization, methodology, formal analysis, and writing-review and editing. JJ and YZ: methodology, formal analysis, and writing–review and editing. All authors contributed to the article and approved the submitted version.

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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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References

Adams, A., Hollingsworth, A., and Osman, A. (2019). The implementation of a cultural change toolkit to reduce nursing burnout and mitigate nurse turnover in the emergency department. *J. Emerg. Nurs.* 45, 452–456. doi: 10.1016/j.jen.2019.03.004

Ang, S. Y., Uthaman, T., Ayre, T. C., Lim, S. H., and Lopez, V. (2019). Differing pathways to resiliency: a grounded theory study of enactment of resilience among acute care nurses. *Nurs. Health Sci.* 21, 132–138. doi: 10.1111/nhs.12573

Angus, D. C., Kelley, M. A., Schmitz, R. J., White, A., and Popovich, J.Committee on Manpower for Pulmonary and Critical Care Societies (COMPACCS) (2000). Caring for the critically ill patient. Current and projected workforce requirements for care of the critically ill and patients with pulmonary disease: can we meet the requirements of an aging population? *JAMA* 284, 2762–2770. doi: 10.1001/jama.284.21.2762

Armoon, B., Grenier, G., Cao, Z., Huỳnh, C., and Fleury, M. J. (2021). Frequencies of emergency department use and hospitalization comparing patients with different types of substance or polysubstance-related disorders. *Subst. Abuse Treat. Prev. Policy* 16:89. doi: 10.1186/s13011-021-00421-7

Brykman, K. M., and King, D. D. (2021). A resource model of team resilience capacity and learning. *Group Org. Manag.* 46, 737–772. doi: 10.1177/10596011211018008

Cañadas-de la Fuente, G. A., Albendín-García, L., R Cañadas, G., San Luis-Costas, C., Ortega-Campos, E., and de la Fuente-Solana, E. I. (2018). Nurse burnout in critical care units and emergency departments: intensity and associated factors. Factores asociados con los niveles de burnout en enfermeros de urgencias y cuidados críticos. *Emergencias* 30, 328–331.

Conolly, A., Abrams, R., Rowland, E., Harris, R., Couper, K., Kelly, D., et al. (2022). "what is the matter with me?" or a "badge of honor": Nurses' constructions of resilience during Covid-19. *Global Qual. Nurs. Res.* 9:1094862. doi: 10.1177/23333936221094862

Gorman, V. L. (2019). Future emergency nursing workforce: what the evidence is telling us. *J. Emerg. Nurs.* 45, 132–136. doi: 10.1016/j.jen.2018.09.009

Guo, Y. F., Luo, Y. H., Lam, L., Cross, W., Plummer, V., and Zhang, J. P. (2018). Burnout and its association with resilience in nurses: a cross-sectional study. *J. Clin. Nurs.* 27, 441–449. doi: 10.1111/jocn.13952

Hämmig, O. (2018). Explaining burnout and the intention to leave the profession among health professionals - a cross-sectional study in a hospital setting in Switzerland. *BMC Health Serv. Res.* 18:785. doi: 10.1186/s12913-018-3556-1

Han, P., Duan, X., Jiang, J., Zeng, L., Zhang, P., and Zhao, S. (2023). Experience in the development of nurses' personal resilience: a meta-synthesis. *Nurs. Open* 10, 2780–2792. doi: 10.1002/nop2.1556

Han, P., Duan, X., Zhao, S., Zhu, X., and Jiang, J. (2022). Nurse's psychological experiences of caring for severe COVID-19 patients in intensive care units: a qualitative Meta-synthesis. *Front. Public Health* 10:841770. doi: 10.3389/fpubh.2022.841770

Hancock, J., Witter, T., Comber, S., Daley, P., Thompson, K., Candow, S., et al. (2020). Understanding burnout and moral distress to build resilience: a qualitative study of an interprofessional intensive care unit team. Comprendre l'épuisement professionnel et la détresse morale afin de développer la résilience: une étude qualitative d'une équipe interprofessionnelle à l'unité de soins intensifs. *Can. J. Anaes. J.* 67, 1541–1548. doi: 10.1007/s12630-020-01789-z

Hayre-Kwan, S., Quinn, B., Chu, T., Orr, P., and Snoke, J. (2021). Nursing and Maslow's hierarchy: a health care pyramid approach to safety and security during a global pandemic. *Nurse Lead.* 19, 590–595. doi: 10.1016/j.mnl.2021.08.013

Hodges, H. F., Keeley, A. C., and Troyan, P. J. (2008). Professional resilience in baccalaureate-prepared acute care nurses: first steps. *Nurs. Educ. Perspect.* 29, 80–89. doi: 10.1097/00024776-200803000-00008

Hu, D., Fang, P., Zhao, G., Liu, Y., Chen, J., Chen, L., et al. (2009). Application of flexible management concept in the management of head nurses. *Chin. Nurs. J.* 10, 932–934.

Huang, F., Lin, M., Sun, W., Zhang, L., Lu, H., and Chen, W. T. (2021). Resilience of frontline nurses during the COVID pandemic in China: a qualitative study. *Nurs. Health Sci.* 23, 639–645. doi: 10.1111/nhs.12859

Jiang, W., Chen, Y., Guan, Q., Nong, J., Huang, Y., Mao, H., et al. (2020). A mixed study on nurses' resilience during the novel coronavirus pneumonia epidemic. *Chin. J. Nurs.* 1, 137–140.

Jiang, J., Liu, Y., Han, P., Zhang, P., Shao, H., Peng, H., et al. (2022). Psychological resilience of emergency nurses during COVID-19 epidemic in Shanghai: a qualitative study. *Front. Public Health* 10:1001615. doi: 10.3389/fpubh.2022.1001615

Joyce, S., Shand, F., Tighe, J., Laurent, S. J., Bryant, R. A., and Harvey, S. B. (2018). Road to resilience: a systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open* 8:e017858. doi: 10.1136/bmjopen-2017-017858

Labrague, L. J. (2021). Psychological resilience, coping behaviours and social support among health care workers during the COVID-19 pandemic: a systematic review of quantitative studies. *J. Nurs. Manag.* 29, 1893–1905. doi: 10.1111/jonm.13336

Lee, M. M. D., Gensimore, M. M., Maduro, R. S., Morgan, M. K., and Zimbro, K. S. (2021). The impact of burnout on emergency Nurses' intent to leave: a Cross-sectional survey. *J. Emerg. Nurs.* 47, 892–901. doi: 10.1016/j.jen.2021.07.004

Li, X. (2020). Application of ambulant management in hospital personnel management. *Hum. Resour.* 4, 18–19.

Li, R., Mou, J., Zeng, L., Zhang, L., Chen, D., Chen, M., et al. (2021). Experience of frontline nurses in designated hospitals dealing with COVID-19 from the perspective of resilience theory. *Nurs. Manag. China* 2, 215–218.

Lin, L., and He, G. (2018). Research progress on resilience of nurses abroad. *PLA Nurs. J.* 35, 41–44.

Lockwood, C., Munn, Z., and Porritt, K. (2015). Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. *Int. J. Evid. Based Healthc.* 13, 179–187. doi: 10.1097/XEB.0000000000000062

Lopez, V., Anderson, J., West, S., and Cleary, M. (2022). Does the COVID-19 pandemic further impact nursing shortages? *Issues Ment. Health Nurs.* 43, 293–295. doi: 10.1080/01612840.2021.1977875

Marey-Sarwan, I., Hamama-Raz, Y., Asadi, A., Nakad, B., and Hamama, L. (2022). "It's like we're at war": Nurses' resilience and coping strategies during the COVID-19 pandemic. *Nurs. Inq.* 29:e12472. doi: 10.1111/nin.12472

Mealer, M., Jones, J., and Moss, M. (2012). A qualitative study of resilience and posttraumatic stress disorder in United States ICU nurses. *Intensive Care Med.* 38, 1445–1451. doi: 10.1007/s00134-012-2600-6

Moher, D., Liberati, A., Tetzlaff, J., and Altman, D. G.PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med.* 6:e1000097. doi: 10.1371/journal.pmed.1000097

Munn, Z., Porritt, K., Lockwood, C., Aromataris, E., and Pearson, A. (2014). Establishing confidence in the output of qualitative research synthesis: the ConQual approach. *BMC Med. Res. Methodol.* 14:108. doi: 10.1186/1471-2288-14-108

Othman, N., and Nasurdin, A. M. (2013). Social support and work engagement: a study of Malaysian nurses. *J. Nurs. Manag.* 21, 1083–1090. doi: 10.1111/j.1365-2834.2012.01448.x

Özkan, A. H. (2022). The effect of burnout and its dimensions on turnover intention among nurses: a meta-analytic review. *J. Nurs. Manag.* 30, 660–669. doi: 10.1111/jonm.13525

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 372:n71. doi: 10.1136/bmj.n71

Peter, D.. *The practice of management*. Milton Park: Taylor and Francis (2012).

Peters, M. (2023). Time to solve persistent, pernicious and widespread nursing workforce shortages. *Int. Nurs. Rev.* 70, 247–253. doi: 10.1111/inr.12837

Poncet, M. C., Toullic, P., Papazian, L., Kentish-Barnes, N., Timsit, J. F., Pochard, F., et al. (2007). Burnout syndrome in critical care nursing staff. *Am. J. Respir. Crit. Care Med.* 175, 698–704. doi: 10.1164/rccm.200606-806O

Richardson, G. E. (2002). The metatheory of resilience and resiliency. *J. Clin. Psychol.* 58, 307–321. doi: 10.1002/jclp.10020

Sandelowski, M., Barroso, J., and Voils, C. I. (2007). Using qualitative metasummary to synthesize qualitative and quantitative descriptive findings. *Res. Nurs. Health* 30, 99–111. doi: 10.1002/nur.20176

Schooley, B., Hikmet, N., Tarcan, M., and Yorgancioglu, G. (2016). Comparing burnout across emergency physicians, nurses, technicians, and health information technicians working for the same organization. *Medicine* 95:e2856. doi: 10.1097/MD.0000000000002856

Shi, D., Zhou, L., and Zhou, M. (2020). Qualitative study on the change of mental toughness of ICU nurses in Wuhan under the novel coronavirus pneumonia epidemic. *Chin. J. Mod. Nurs.* 26, 4516–4520. doi: 10.3760/cma.j.cn115682-20200528-03616

Taylor, R. A. (2019). Contemporary issues: resilience training alone is an incomplete intervention. *Nurse Educ. Today* 78, 10–13. doi: 10.1016/j.nedt.2019.03.014

Tong, A., Flemming, K., McInnes, E., Oliver, S., and Craig, J. (2012). Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Med. Res. Methodol.* 12:181. doi: 10.1186/1471-2288-12-181

Walsh, D., and Downe, S. (2005). Meta-synthesis method for qualitative research: a literature review. *J. Adv. Nurs.* 50, 204–211. doi: 10.1111/j.1365-2648.2005.03380.x

Wang, Z., Liang, Q., Yan, Z., Liu, J., Liu, M., Wang, X., et al. (2023). The association between team resilience and team performance in nurses during COVID-19 pandemic: a network analysis. *BMC Nurs.* 22:54. doi: 10.1186/s12912-023-01216-w

White, B., Driver, S., and Warren, A. M. (2008). Considering resilience in the rehabilitation of people with traumatic disabilities. *Rehabil. Psychol.* 53, 9–17. doi: 10.1037/0090-5550.53.1.9

Wilhelms, S. B., and Wilhelms, D. B. (2021). Emergency department admissions to the intensive care unit - a national retrospective study. *BMC Emerg. Med.* 21:122. doi: 10.1186/s12873-021-00517-0

Woo, B. F. Y., Lee, J. X. Y., and Tam, W. W. S. (2017). The impact of the advanced practice nursing role on quality of care, clinical outcomes, patient satisfaction, and cost in the emergency and critical care settings: a systematic review. *Hum. Resour. Health* 15:63. doi: 10.1186/s12960-017-0237-9

Wu, X. (2015). The importance of emergency and emergency and preventive measures. *World Lat. Med. Inform. Abstr.* 44:139.

Yu, F., Raphael, D., Mackay, L., Smith, M., and King, A. (2019). Personal and work-related factors associated with nurse resilience: a systematic review. *Int. J. Nurs. Stud.* 93, 129–140. doi: 10.1016/j.ijnurstu.2019.02.014

Yuan, C. M., Chen, X., Zeng, X., and Mao, X. R. (2022). The disaster resilience trajectory of the first batch front-line nurses at fighting the novel coronavirus disease 2019 in Wuhan: a qualitative study. *Int. J. Disast. Risk Reduct.* 77:103071. doi: 10.1016/j.ijdrr.2022.103071

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Influence of job demands on implicit absenteeism in Chinese nurses: mediating effects of work–family conflict and job embeddedness

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Purpose: It has been widely noted that implicit absenteeism is common among nurses, with job demand influencing it. Theoretically, work–family conflict and job embeddedness may help link job demands to implicit absenteeism. However, the mediating effects of the two on the association between job demands and implicit absenteeism remain unclear. Thus, this study aims to explore the association between nurses' job demands and implicit absenteeism, and the chain mediating effect of work–family conflict and job embeddedness in this relationship.

Patients and methods: Data were collected from 1,420 nurses from five tertiary public hospitals in China. They were asked to respond to a questionnaire asking about job demands, implicit absenteeism, work–family conflict, and job embeddedness. The data were coded and analyzed using IBM SPSS version 21.0. Descriptive analysis, *t*-test, one-way ANOVA, hierarchical multiple regression analysis, and bootstrapping were used to analyze the extracted data.

Results: The mean score for implicit absenteeism was 17.75±5.60. There was a significant correlation ($p<0.05$) between nurses' job demands, work–family conflict, job embeddedness, and implicit absenteeism. Nurses' job demands directly influenced implicit absenteeism and indirectly influenced implicit absenteeism through the mediating effects of work–family conflict and job embeddedness. Furthermore, work–family conflict and job embeddedness have a chain effect on the association between job demands and implicit absenteeism.

Conclusion: The study found that nurses' job demands directly and positively influence implicit absenteeism, and indirectly influence implicit absenteeism through single and chain mediating effects of work–family conflict and job embeddedness.

KEYWORDS

implicit absenteeism, nurses, productivity loss, job embeddedness, China

1. Introduction

Implicit absenteeism (IA) refers to the phenomenon in which individuals work less efficiently because of physiological, psychological, and social factors. Although they are present at work, their work engagement is reduced, or their work motivation is lower (Aronsson et al., 2000; Burmeister et al., 2019). Previous research suggested that productivity loss attributed to IA is much higher than that due to absence from sickness (Liu et al., 2019; Sun et al., 2019). Implicit absenteeism is more common among healthcare workers with a significantly higher incidence than in other occupational types (Aysun and Bayram, 2017; Jin et al., 2022). Among Chinese nurses, heavy workloads, irregular working hours, and fierce competition for title promotion have led to IA being more prevalent among clinical nurses. China's National Mental Health Report states that the incidence of IA among nurses is 3–4 times higher than that of the average corporate employee (Fu and Zhang, 2019).

Several studies have indicated that nurses' IA is connected with patient safety, care quality, and work efficiency (Letvak et al., 2012; Labrague et al., 2020; Déry et al., 2022; Zeighami et al., 2023). It can increase the incidence of negative events such as patient falls and infections. Prolonged IA may also lead to deterioration of the nurses' health, which may affect their productivity or personal performance, resulting in greater financial losses to hospitals and patients. Therefore, it is important to investigate the inner mechanisms of IA among nurses and to take effective interventions to reduce its occurrence.

Job demands (JD) are defined as occupational skills that involve consistent physical and mental effort (Bakker et al., 2004). According to the personal-environmental matching theory and the ability-pressure model, the matching of an individual's abilities, values, expectations, or goals with the environment can produce different outcomes and effects (Cable and Derue, 2002; Nahemow et al., 2016). When personal traits do not match the characteristics of the environment in which they are located, it can cause negative consequences like stress to the individual. Simultaneously, according to the JD-R model, there is indeed a "depletion" path for the impact of work on individuals (Bakker et al., 2004). The work places physical, social or organizational demands on the individual. Examples include work overload, time pressure, interpersonal demands, and demands on emotional performance. In order to comply with these demands, individuals have to make constant physical or psychological efforts. Thus, these high demands have a negative effect on the psychology or physiology of individuals. Ultimately, they have a resultant negative impact.

Nurses face a heavy workload and fierce competition for promotions. As medical service workers, they also have to be strongly conscious of service, dedication, among other aspects of their jobs. Negative behaviors like IA will inevitably occur when nurses find that their job competencies do not match their JDs and that the work environment does not match their personal needs or preferences. Demerouti et al. confirmed an association between JD and nurses' IA (Demerouti et al., 2009). It has been noted that JD has a positive effect on nurse IA. However, the mechanism of action remains to be studied. Therefore, we propose the first hypothesis:

> *Hypothesis 1*: JD will significantly predict IA (JD → IA).

Work–family conflict (WFC) is the uncontrollable, incompatible, and irreconcilable negative experience of various characters in individuals' work and family domains and is divided into work-to-family conflict and family-to-work conflict (AlAzzam et al., 2017). Ghislieri et al. and Rhéaume found an association between JD and WFC: the higher the JD, the higher the level of WFC (Ghislieri et al., 2017; Rhéaume, 2022). Some studies have shown that failure to respond effectively to JD can create an imbalance between work and family, resulting in a series of possible adverse consequences (Frone, 2000; Amstad et al., 2011). Previous research has shown that WFC among nurses is associated with a variety of negative outcomes. Prior studies have found that nurses' WFC had an impact on work-related variables such as task performance, job satisfaction, and turnover intentions (Cortese et al., 2010; Wang and Tsai, 2014; Yildiz et al., 2021; Moreira et al., 2023). Furthermore, work–family conflict was associated with physical and mental health-related variables like depression and neck and back pain among nurses (Baur et al., 2018; Cheng et al., 2019; Lee et al., 2022). However, few studies have demonstrated the correlation between WFC and IA, and it remains to be seen whether WFC mediates the association between JD and IA. Therefore, we propose the second hypothesis:

> *Hypothesis 2*: JD will influence IA through the mediating effect of WFC (JD → WFC → IA).

Job embeddedness (JE) is defined as the degree of closeness between an employee and the organization and the difficulty for the employee in leaving the organization (Mitchell et al., 2001). It can provide a valuable research perspective for explaining the mechanism of action between JD and IA. When nurses' JD is low, they may match their job competencies with their job tasks better. This results in higher satisfaction with the organization and a higher level of closeness between the organization and colleagues, i.e., higher JE. Furthermore, the outcome variables of JE focus on attitudes or behavior-related variables like turnover intention, work performance, and organizational citizenship behavior (Afsar et al., 2018; Kapil and Rastogi, 2018; Lee and Huang, 2019). However, the association between JE and IA remains unclear, and whether JE mediates this relationship has not been investigated. Therefore, we propose the third hypothesis:

> *Hypothesis 3*: JD will influence IA through the mediating effect of JE (JD → JE → IA).

Based on the hypothesis of limited allocation of individual resources, work and family, as important domains of individual life, may compete with each other for individual's limited resources, and the competition between them may trigger an individual's psychological conflict (Grawitch et al., 2010). Based on the theory of work-family boundary management, WFC may lead to the confusion of the boundary between an individual's work and family domains, which in turn may have negative effects (Clark, 2000). Studies have shown that individuals encounter WFC or contradictions, and whether the problem can be resolved directly affects the employees' work performance and turnover intention. According to the work-family border theory, the degree of JE of nurses is influenced by WFC. A prior study found that WFC has a negative impact on JE - the higher the degree of WFC, the lower the degree of JE (Ng and

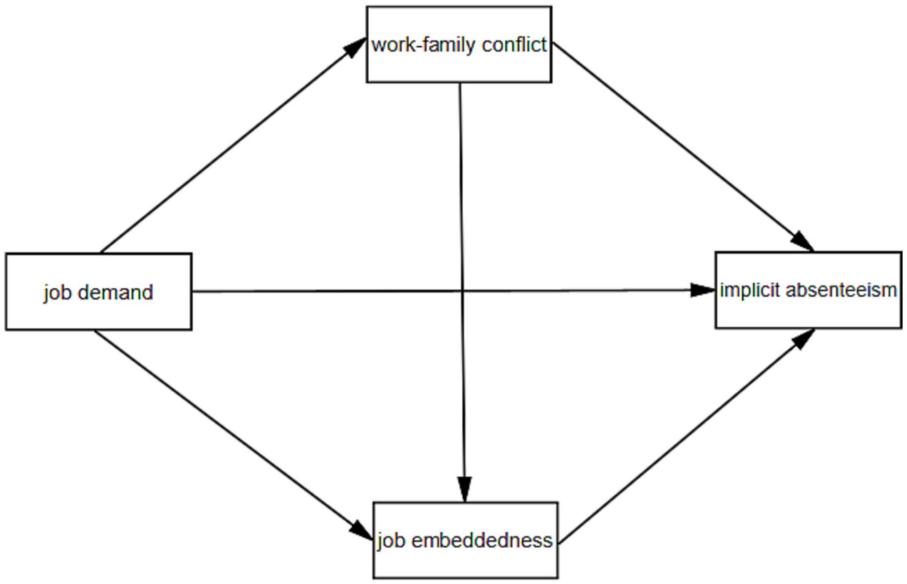

FIGURE 1
Hypothesis model.

Feldman, 2014). Therefore, we propose the fourth hypothesis of this study:

> *Hypothesis 4*: WFC and JE will jointly play an intermediary role in the relationship between JD and IA (JD → WFC → JE → IA).

Based on theories and the existing literature, taking nurses in tertiary public hospitals as the study participants, this study performed a hypothesis model (Figure 1) to investigate the mechanisms of WFC and JE between JD and IA to provide theoretical references for the adoption of targeted measures.

2. Materials and methods

2.1. Study design

Cross-sectional research was conducted to report the chain-mediating effect of WFC and JE between nurses' JD and IA.

2.2. Participants and data collection

A two-stage sampling method was adopted in the period between October and December 2021. In the first stage, five tertiary public hospitals in Weifang City, Shandong Province, were selected as sampling units using the grasping random ball method. In the second stage, several departments were randomly selected in each hospital according to the principle of 30% equal proportion, and nurses on duty in the sampled departments on that day participated in the survey. The inclusion criteria were as follows: (i) active registered nurses; (ii) more than 1 year of experience in clinical nursing; and (iii) informed consent and voluntary participation in this study. The exclusion criteria were as follows: (i) enrolled nurses, nurse interns, advanced practice nurses, and (ii) nurses who were not on duty during the survey period. Of the 1,542 nurses, 1,420 completed the questionnaire effectively. The response rate was 0.921. The participants were assured of the anonymity of their responses, and that their refusal to participate did not have any negative consequences.

2.3. Instruments

2.3.1. Demographic questionnaire

Demographic characteristics included gender, age, educational level, marital status, type of employment, monthly income, health status, and work intensity.

2.3.2. Job demands scale

This scale, developed by Li et al. (2014), includes six dimensions: workload; job-sharing; and emotional, environmental, psychological, and timing demands, with a total of 19 items. All items were described negatively, and the questionnaire was scored on a 5-point Likert scale. Higher scores indicate higher JD.

2.3.3. Work–family conflict scale

This scale was developed by Grzywacz and Marks (2000) and translated by Zeng and Yan (2013). It comprises two dimensions: work-to-family conflict and family-to-work conflict, with a total of eight items. The scoring was based on a 5-point Likert scale, with a self-assessment scale ranging from "1" to "5," indicating "*strongly disagree*," "*relatively disagree*," "*uncertain*," "*agree*," and "*strongly agree*," respectively. The higher the score, the stronger the degree of WFC.

2.3.4. Global job embeddedness scale

This unidimensional scale with seven entries was developed by Crossley et al. (2007) and is widely used in China. It is rated on a

5-point Likert scale, with higher scores indicating higher levels of JE.

2.3.5. Stanford presenteeism scale

Developed by the Stanford University (Koopman et al., 2002), United States, and translated and revised by Zhao et al. (2010), this scale contains six entries and uses a 5-point Likert scale, where entries 5 and 6 are reverse-scored. The higher the score, the higher the level of IA. The Chinese version of the scale was proven to have good reliability, with Cronbach's alpha coefficients for each entry ranging between 0.76 and 0.90.

2.4. Data analysis

The SPSS (version 22.0) and AMOS software were used for data input and statistical analyzes. The reliability of scales were tested in terms of internal consistency reliability and composite reliability. Internal consistency reliability was measured by Cronbach's alpha coefficients. The scale's validity was tested in terms of structural validity, convergent validity, and discriminant validity. Structural validity was tested using confirmatory factor analysis. Convergent validity and discriminant validity were measured on the basis of average variance extracted and factor loading. The measurement data were expressed as mean ± standard deviation, and the count data were described by frequency and percentage (%). All data were checked for normality using QQ plots and histograms and were found to be approximately normally distributed. One-way ANOVA was performed using an independent *t*-test and one-way ANOVA. Pearson's correlation analysis was used to explore the correlations among JD, WFC, JE, and IA. Hierarchical multiple regression analysis and bootstrapping were used to test the mediating effects. The significance level was set at $p < 0.05$.

3. Results

3.1. Demographic characteristics of participants

Table 1 shows the sociodemographic and occupational characteristics of the participants. The majority of the participants were women (95.6%), aged between 31 and 40 years (44.4%). They had a bachelor's degree or higher (89.2%), were informally employed (83.2%), and received an average monthly income between RMB 5001–7,000 (35.6%). Less than half of the nurses (38.7%) had an average health status, and more than half of the nurses (52.0%) considered their work to be more intensive.

3.2. Assessment of the measurement instruments reliability and validity

The Cronbach's alpha coefficients for the variables ranged between 0.738 and 0.930, and the CR values ranged between 0.739 and 0.931. Both exceeded the recommended critical value of 0.7, indicating good reliability of the scales (Table 2). The results of the confirmatory factor analysis indicated that JDs, WFC, JE, and IA had a six-factor, two-factor, one-factor, and one-factor structure, respectively. The model fit was good (Hu and Bentler, 1999), and the factor loadings were all greater than 0.5 (Supplementary material). The scales had a good construct validity.

The average extracted variance values for each variable were all above 0.5. The factor loading values were all above 0.5 (Table 2). This indicated that the scales had good convergent validity. The square root of the average variance extracted values of the dimensions of JDs and WFC were greater than their correlation coefficients with the other dimensions. The correlation coefficients between the dimensions were less than 0.85 (Table 2). This indicated that JDs and WFC had good discriminant validity.

3.3. Differences in variables based on demographic characteristics

We found differences in the level of IA among nurses of different ages, education, monthly income, work intensity, and health status ($p < 0.05$), with relatively higher levels of IA among nurses aged 31–40 years, with a bachelor's degree, higher monthly income, very poor health status, and very high work intensity (Table 1).

3.4. Correlation analysis of JD, WFC, JE, and IA

The results showed that JD was positively associated with WFC and IA ($p < 0.01$); JD was negatively correlated with JE ($p < 0.01$); WFC was positively correlated with IA ($p < 0.01$); WFC was negatively associated with JE ($p < 0.01$) and JE was negatively related to IA ($p < 0.01$) (Table 3).

3.5. The chain mediating effect of WFC and JE between JD and IA

Model 6 in the PROCESS macro program developed by Preacher and Hayes (2004) was used to test the chain-mediating effect of WFC and JE between JD and IA. Age, education level, monthly income, work intensity, and health status were used as control variables. The results showed that JD positively predicted IA ($\beta = 0.27$, $p < 0.001$), positively influenced WFC ($\beta = 0.49$, $p < 0.001$), and negatively predicted JE ($\beta = -0.12$, $p < 0.001$); while WFC negatively predicted JE ($\beta = -0.33$, $p < 0.001$). When JD, WFC, and JE were entered into the regression equation simultaneously, JD ($\beta = 0.13$, $p < 0.001$), WFC ($\beta = 0.23$, $p < 0.001$), and JE ($\beta = -0.12$, $p < 0.001$) predicted IA (Table 4 and Figure 2).

Further results showed that indirect path 1 (JD → WFC → IA) had an indirect effect value of 0.112; indirect path 2 (JD → JE → IA) had an indirect effect value of 0.014; indirect path 3 (JD → WFC → JE → IA) had an indirect effect value of 0.020. The upper and lower limits of Bootstrap 95% confidence intervals for the above paths do not contain 0, indicating that all above paths are significant, with effect values of 41.18, 5.15, and 7.35% of the total effect, respectively (Table 5).

TABLE 1 Differences in variables based on demographic characteristics.

Characteristic	*N* (%)	Mean ± SD	*t*/*F*	*p*
Sex				
Male	63 (4.4)	16.86 ± 5.90	−1.29	0.20
Female	1,357 (95.6)	17.79 ± 5.58		
Age(year)				
≤30	548 (38.6)	17.36 ± 5.41	2.84	0.04
31–40	630 (44.4)	18.23 ± 5.63		
41–50	195 (13.7)	17.32 ± 5.86		
≥51	47 (3.3)	17.55 ± 5.83		
Educational level				
Junior college and below	153 (10.8)	16.54 ± 5.21	4.75	0.009
Undergraduate	1,251 (88.1)	17.91 ± 5.62		
Postgraduate or above	16 (1.1)	16.19 ± 5.50		
Marital status				
With spouse/partner	336 (88.2)	17.61 ± 5.47	−0.50	0.62
Without spouse/partner	1,084 (11.8)	17.79 ± 5.64		
Monthly income (RMB)				
<3,000	89 (6.3)	17.57 ± 4.66	3.16	0.01
3,000 ~ 5,000	269 (18.9)	16.94 ± 5.14		
5,001 ~ 7,000	505 (35.6)	17.55 ± 5.66		
7,001 ~ 9,000	363 (25.6)	18.31 ± 5.91		
>9,000	194 (13.7)	18.39 ± 5.69		
Healthy status				
Very unhealthy	35 (2.5)	19.77 ± 6.93	19.03	<0.001
Less healthy	333 (23.5)	19.26 ± 5.40		
General healthy	550 (38.7)	18.16 ± 5.20		
More healthy	430 (30.3)	16.19 ± 5.66		
Very healthy	72 (5.1)	15.96 ± 5.66		
Work intensity				
Very low/rarely	34 (2.4)	14.29 ± 6.41	23.93	<0.001
Commonly	419 (29.5)	16.40 ± 5.01		
Higher	739 (52.0)	18.06 ± 5.44		
Very high	228 (16.1)	19.74 ± 6.15		

4. Discussion

The objective of this study was to explore the association between nurses' JD and IA and to clarify whether WFC and JE have a chain-mediating effect on the association. This study also provides a new perspective on the association between nurses' JD and IA. The results showed that the nurses' IA score was 17.75, which was slightly higher than that reported by Jin et al. (2022) and Ren et al. (2019). The median score was used as the cutoff point to classify high and low levels of IA. The findings revealed that 54.1% of nurses had a relatively higher level of IA. This suggests that IA among nurses is relatively common in China. It suggests that preventing and intervening in the implicit absenteeism of nurses is essential.

From the perspective of JD, this study is similar to previous research findings in regard to the fact that there is an association between JD and IA (Framke et al., 2019; Aronsson et al., 2021). The tertiary public hospitals in China are large medical institutions in the region and nurses have a heavy workload (Wu et al., 2018). Moreover, competition for promotion among nurses is fierce, and there is more pressure on professional knowledge, learning, and research. Simultaneously, the nurses have to face patients with different diseases and personality types in their daily work and meet the reasonable needs of patients as much as possible. Along with the increasing awareness of patients' self-advocacy, if they cannot maintain a high degree of concentration, there is a higher risk of nurse–patient disputes or medical errors in cases of negligence (Tucker et al., 2015). This places high psychological and emotional demands on the nurses. Nurses face heavy workloads and psychological and emotional demands, especially those with a lower level of clinical technical ability and work experience, such as new

TABLE 2 Assessment of the measurement instruments reliability and validity.

Variables	1	2	3	4	5	6	*AVE*	Cronbach's α	*CR*
Job demands									
1 Workload demands	–						0.532	0.843	0.849
2 Psychological demands	0.319	–					0.587	0.738	0.739
3 Emotional demands	0.156	0.516	–				0.654	0.841	0.848
4 Environmental demands	0.605	0.267	0.146	–			0.579	0.802	0.804
5 Job-sharing demands	0.593	0.287	0.188	0.489	–		0.787	0.916	0.917
6 Timing demands	0.688	0.314	0.146	0.581	0.640	–	0.509	0.755	0.757
AVE square root	0.729	0.766	0.809	0.761	0.887	0.713			
Work–family conflict									
1 Work-to-family conflict	–						0.756	0.922	0.925
2 Family-to-work conflict	0.458	–					0.771	0.930	0.931
AVE square root	0.869	0.878							
Job embeddedness							0.541	0.872	0.890
Implicit absenteeism							0.535	0.850	0.869

TABLE 3 Pearson correlation coefficient among variables.

Variables	*M*	SD	JD	WFC	JE	IA
JD	69.16	12.10	1			
WFC	22.53	6.54	0.55**	1		
JE	23.54	5.98	−0.28**	−0.40**	1	
IA	17.75	5.60	0.32**	0.38**	−0.26**	1

** indicates $p < 0.01$.

nurses and nurses with a lower education level. Their physical and psychological load is heavy, and they may experience corresponding physical or psychological problems, which affect their work efficiency, resulting in IA.

The results suggested that WFC mediated the association between nurses' JD and IA. The high JD of nurses in tertiary public hospitals and the necessity of working as a means to make a living can cause them to focus their time and energy primarily on work. Most nurses are female. Owing to the influence of traditional Chinese ideologies, women bear heavy family responsibilities in raising children and supporting older adults (Dousin et al., 2019). Moreover, most nurses' family members are "double workers," hence, their spouses and family members have limited sharing of family responsibilities, which may lead to conflicts between family and work nurses. Based on the work-family boundary theory, family-work dissonance can affect an individual's work behavior. For individuals experiencing WFC, it is difficult to make a smooth transition between the boundaries of the work and family life domains. This in turn produces negative impact outcomes (Ernst Kossek and Ozeki, 1998; Clark, 2002). It can be said, WFC may affect nurses' physical and mental health, making it difficult for them to maintain a high level of physical and mental engagement at work, leading to impaired productivity and IA.

This study confirmed the mediating effect of JE on JD and IA among nurses. It validates the possibility of exploring the effect of JD on IA from the perspective of JE. In China, nurses in tertiary public hospitals have relatively better job remuneration, stability, and security than those in low-grade hospitals, private hospitals, or some other occupations. When the level of JD is lower, nurses may have more positive experiences at the work level, which gives them a stronger sense of occupational group identity and organizational belonging, and a higher degree of closeness with the organization and colleagues, i.e., a higher degree of JE. Nurses with a higher degree of JE are more likely to take sick leaves when they have physical or psychological problems, which can effectively influence IA (Ren et al., 2019). It is possible that when they attend work with physical discomfort, due to their sense of responsibility toward the organization, colleagues, and patients, nurses may maintain more positive emotions at work and avoid implicit absences as much as possible.

This study also found that WFC and JE had a chain-mediating effect between nurses' JD and IA. This result was similar to that reported by Yang and Chen (2020). On the other hand, Ma et al. (2014) verified the relationship between work-family facilitation and JE from the perspective of work-family facilitation. Ma et al.'s study of corporate employees found that work-family facilitation had a positive effect on JE. This result is also in line with the work-family balance theory, which states that when nurses have difficulty balancing work and family life, the degree of JE decreases as the level of WFC increases. In particular, family-to-work conflict can make it difficult for nurses to receive understanding and support from family members so they work with a lower degree of commitment. Inevitably, it is easy to experience IA in the long run, such as being out of work or attending work without a sense of responsibility.

In this study, nurses in five tertiary public hospitals were selected as respondents, hence the comprehensiveness of the data may be somewhat limited. Therefore, it is difficult to infer a causal association between these variables in the cross-sectional study. Large-scale, multicenter prospective research is necessary to validate the study findings. Additionally, this study adopted a questionnaire survey to collect relevant data and information, which is susceptible to the influence of subjective factors of survey respondents. Because of the

TABLE 4 Results of hierarchical regression analysis.

Model	Variables		Fit indices		Coefficient significance		
	Dependent variable	Independent variable	R^2	F	β	SE	t
Model 1	IA	JD	0.12	31.77***	0.27	0.01	8.41***
Model 2	WFC	JD	0.37	139.99***	0.49	0.01	17.84***
Model 3	JE	JD	0.18	43.45***	−0.12	0.02	−3.34***
		WFC			−0.33	0.03	−10.79***
Model 4	IA	JD	0.18	38.04***	0.13	0.02	3.62***
		WFC			0.23	0.03	7.26***
		JE			−0.12	0.02	−4.63***

*** indicates $p < 0.001$.

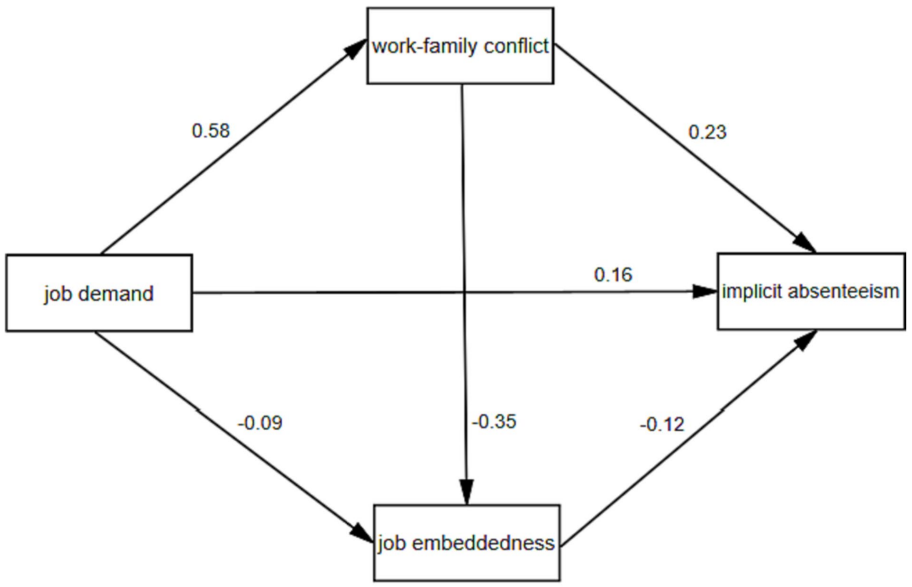

FIGURE 2
Multiple mediating models of WFC and JE between JD and IA.

TABLE 5 Results of bootstrapping mediation effect examination.

Path	Effect	SE	Bootstrap 95% CI		Proportion of effect
			Lower	Upper	
JD → WFC → IA	0.112	0.018	0.077	0.149	41.18%
JD → JE → IA	0.014	0.006	0.004	0.027	5.15%
JD → WFC → JE → IA	0.020	0.006	0.009	0.032	7.35%
Total indirect effects	0.146	0.019	0.110	0.184	53.68%

dynamic nature of IA, the data and information may have some limitations in reflecting the IA of nurses.

Our study constructed a chain-mediation model to explore the association among JD, WFC, JE, and IA. We found that nurses' IA was high, and that nurses' JD could directly and positively influence IA, while WFC and JE had a single and chained mediating role between JD and IA. The practical implications of this study are prominent, and the results can be used to develop strategies for mitigating IA among nurses, particularly among Chinese nurses. The results suggested that hospital managers should effectively alleviate physical and mental stress caused by JD on nurses by reasonably reducing their workload, promptly relieving their psychological stress, and optimizing their shift patterns. Furthermore, nurses' families should focus on creating a good

family atmosphere to enhance their understanding and support for nursing work.

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 Ethics Committee of Weifang People's Hospital. 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

YZ: Writing – original draft, Writing – review & editing. SL: Writing – original draft, Writing – review & editing. LC: Writing – original draft, Writing – review & editing. FY: 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.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1265710/full#supplementary-material

References

Afsar, B., Shahjehan, A., and Shah, S. I. (2018). Frontline employees' high-performance work practices, trust in supervisor, job embeddedness and turnover intentions in hospitality industry. *Int. J. Contemp. Hosp. Manag.* 30, 1436–1452. doi: 10.1108/IJCHM-11-2016-0633

AlAzzam, M., AbuAlRub, R. F., and Nazzal, A. H. (2017). The relationship between work-family conflict and job satisfaction among hospital nurses. *Nurs. Forum* 52, 278–288. doi: 10.1111/nuf.12199

Amstad, F. T., Meier, L. L., Fasel, U., Elfering, A., and Semmer, N. K. (2011). A meta-analysis of work-family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. *J. Occup. Health Psychol.* 16, 151–169. doi: 10.1037/a0022170

Aronsson, G., Gustafsson, K., and Dallner, M. (2000). Sick but yet at work. An empirical study of sickness presenteeism. *J. Epidemiol. Community Health* 54, 502–509. doi: 10.1136/jech.54.7.502

Aronsson, G., Hagberg, J., Björklund, C., Aboagye, E., Marklund, S., Leineweber, C., et al. (2021). Health and motivation as mediators of the effects of job demands, job control, job support, and role conflicts at work and home on sickness presenteeism and absenteeism. *Int. Arch. Occup. Environ. Health* 94, 409–418. doi: 10.1007/s00420-020-01591-w

Aysun, K., and Bayram, Ş. (2017). Determining the level and cost of sickness presenteeism among hospital staff in Turkey. *Int. J. Occup. Saf. Ergon.* 23, 501–509. doi: 10.1080/10803548.2016.1274159

Bakker, A. B., Demerouti, E., and Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Hum. Resour. Manag.* 43, 83–104. doi: 10.1002/hrm.20004

Baur, H., Grebner, S., Blasimann, A., Hirschmüller, A., Kubosch, E. J., and Elfering, A. (2018). Work-family conflict and neck and back pain in surgical nurses. *Int. J. Occup. Saf. Ergon.* 24, 35–40. doi: 10.1080/10803548.2016.1263414

Burmeister, E. A., Kalisch, B. J., Xie, B., Doumit, M. A. A., Lee, E., Ferraresion, A., et al. (2019). Determinants of nurse absenteeism and intent to leave: an international study. *J. Nurs. Manag.* 27, 143–153. doi: 10.1111/jonm.12659

Cable, D. M., and Derue, D. S. (2002). The convergent and discriminant validity of subjective fit perceptions. *J. Appl. Psychol.* 87, 875–884. doi: 10.1037/0021-9010.87.5.875

Cheng, S. Y., Lin, P. C., Chang, Y. K., Lin, Y. K., Lee, P. H., and Chen, S. R. (2019). Sleep quality mediates the relationship between work-family conflicts and the self-perceived health status among hospital nurses. *J. Nurs. Manag.* 27, 381–387. doi: 10.1111/jonm.12694

Clark, S. C. (2000). Work/family border theory: a new theory of work/family balance. *Hum. Relat.* 53, 747–770. doi: 10.1177/0018726700536001

Clark, S. C. (2002). Communicating across the work/home border. *Community Work Fam.* 5, 23–48. doi: 10.1080/13668800020006802

Cortese, C. G., Colombo, L., and Ghislieri, C. (2010). Determinants of nurses' job satisfaction: the role of work-family conflict, job demand, emotional charge and social support. *J. Nurs. Manag.* 18, 35–43. doi: 10.1111/j.1365-2834.2009.01064.x

Crossley, C. D., Bennett, R. J., Jex, S. M., and Burnfield, J. L. (2007). Development of a global measure of job embeddedness and integration into a traditional model of voluntary turnover. *J. Appl. Psychol.* 92, 1031–1042. doi: 10.1037/0021-9010.92.4.1031

Demerouti, E., Le Blanc, P. M., Bakker, A. B., Schaufeli, W. B., and Hox, J. (2009). Present but sick: a three-wave study on job demands, presenteeism and burnout. *Career Dev. Int.* 14, 50–68. doi: 10.1108/13620430910933574

Déry, J., Paquet, M., Boyer, L., Dubois, S., Lavigne, G., and Lavoie-Tremblay, M. (2022). Optimizing nurses' enacted scope of practice to its full potential as an integrated strategy for the continuous improvement of clinical performance: a multicentre descriptive analysis. *J. Nurs. Manag.* 30, 205–213. doi: 10.1111/jonm.13473

Dousin, O., Collins, N., and Kler, B. K. (2019). Work-life balance, employee job performance and satisfaction among doctors and nurses in Malaysia. *Int. J. Hum. Resour. Stud.* 9, 306–319. doi: 10.5296/ijhrs.v9i4.15697

Ernst Kossek, E., and Ozeki, C. (1998). Work-family conflict, policies, and the job-life satisfaction relationship: a review and directions for organizational behavior-human resources research. *J. Appl. Psychol.* 83, 139–149. doi: 10.1037/0021-9010.83.2.139

Framke, E., Sørensen, J. K., Nordentoft, M., Johnsen, N. F., Garde, A. H., Pedersen, J., et al. (2019). Perceived and content-related emotional demands at work and risk of long-term sickness absence in the Danish workforce: a cohort study of 26 410 Danish employees. *Occup. Environ. Med.* 76, 895–900. doi: 10.1136/oemed-2019-106015

Frone, M. R. (2000). Work-family conflict and employee psychiatric disorders: the national comorbidity survey. *J. Appl. Psychol.* 85, 888–895. doi: 10.1037/0021-9010.85.6.888

Fu, X. L., and Zhang, K. (2019). *Mental health blue book: report on the development of Chinese national mental health (2017-2018)*. Beijing: Social Science Literature Publishing House

Ghislieri, C., Gatti, P., Molino, M., and Cortese, C. G. (2017). Work-family conflict and enrichment in nurses: between job demands, perceived organisational support and work-family backlash. *J. Nurs. Manag.* 25, 65–75. doi: 10.1111/jonm.12442

Grawitch, M. J., Barber, L. K., and Justice, L. (2010). Rethinking the work-life interface: It's not about balance, It's about resource allocation. *Appl. Psychol. Health. Wellbeing.* 2, 127–159. doi: 10.1111/j.1758-0854.2009.01023.x

Grzywacz, J. G., and Marks, N. F. (2000). Reconceptualizing the work-family interface: an ecological perspective on the correlates of positive and negative spillover between work and family. *J. Occup. Health Psychol.* 5, 111–126. doi: 10.1037/1076-8998.5.1.111

Hu, L., and Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equ. Model.* 6, 1–55. doi: 10.1080/10705519909540118

Jin, Y., Bi, Q., Song, G., Wu, J., and Ding, H. (2022). Psychological coherence, inclusive leadership and implicit absenteeism in obstetrics and gynecology nurses: a multi-site survey. *BMC Psychiatry* 22:525. doi: 10.1186/s12888-022-04137-1

Kapil, K., and Rastogi, R. (2018). Promoting organizational citizenship behaviour: the roles of leader–member exchange and organizational job embeddedness. *S. Asian J. Hum. Resour. Manag.* 5, 56–75. doi: 10.1177/2322093718766803

Koopman, C., Pelletier, K. R., Murray, J. F., Sharda, C. E., Berger, M. L., Turpin, R. S., et al. (2002). Stanford presenteeism scale: health status and employee productivity. *J. Occup. Environ. Med.* 44, 14–20. doi: 10.1097/00043764-200201000-00004

Labrague, L. J., Nwafor, C. E., and Tsaras, K. (2020). Influence of toxic and transformational leadership practices on nurses' job satisfaction, job stress, absenteeism and turnover intention: a cross-sectional study. *J. Nurs. Manag.* 28, 1104–1113. doi: 10.1111/jonm.13053

Lee, C. J., and Huang, S. Y. B. (2019). Can ethical leadership hinder sales performance? A limited resource perspective of job embeddedness. *Chin. Manag. Stud.* 13, 985–1002. doi: 10.1108/CMS-05-2018-0517

Lee, J., Lim, J. E., Cho, S. H., Won, E., Jeong, H. G., Lee, M. S., et al. (2022). Association between work-family conflict and depressive symptoms in female workers: an exploration of potential moderators. *J. Psychiatr. Res.* 151, 113–121. doi: 10.1016/j.jpsychires.2022.04.018

Letvak, S. A., Ruhm, C. J., and Gupta, S. N. (2012). Nurses' presenteeism and its effects on self-reported quality of care and costs. *Am. J. Nurs.* 112, 30–38. doi: 10.1097/01.NAJ.0000411176.15696.f9

Li, J., Huang, R. H., Shen, H. Y., and Gao, L. (2014). Job demands-resources model of nurses' job burnout. *Chin. J. Clin. Psychol.* 22, 881–884. doi: 10.16128/j.cnki.1005-3611.2014.05.074

Liu, J., Sun, X. M., and Liu, F. Y. (2019). The correlation between work fatigue and hidden absenteeism among ICU nurses in three tertiary hospitals in Beijing. *J. Qilu Nurs.* 25, 20–23. doi: 10.3969/j.issn.1006-7256.2023.07.001

Ma, L., Liu, X., and Yu, X. M. (2014). Research on relationship between work-family facilitation and intention to retain: perspective of job embeddedness. *Hum. Resour. Dev. China.* 307, 65–71. doi: 10.16471/j.cnki.11-2822/c.2014.13.016

Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablynski, C. J., and Erez, M. (2001). Why people stay: using job embeddedness to predict voluntary turnover. *Acad. Manag. J.* 44, 1102–1121. doi: 10.5465/3069391

Moreira, A., Encarnação, T., Viseu, J., and Au-Yong-Oliveira, M. (2023). Conflict (work-family and family-work) and task performance: the role of well-being in this relationship. *Adm. Sci.* 13:94. doi: 10.3390/admsci13040094

Nahemow, L., Lawton, M. P., and Center, P. G. (2016). *Toward an ecological theory of adaptation and aging 13. Environmental Design Research*: Routledge. London

Ng, T. W., and Feldman, D. C. (2014). Embeddedness and well-being in the United States and Singapore: the mediating effects of work-to-family and family-to-work conflict. *J. Occup. Health Psychol.* 19, 360–375. doi: 10.1037/a0036922

Preacher, K. J., and Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behav. Res. Methods Instrum. Comput.* 36, 717–731. doi: 10.3758/bf03206553

Ren, W., Chen, L., Liu, S., Zhao, Z. M., and Cai, W. Z. (2019). The level of and factors associated with presenteeism among pediatric nurses. *J. Nurs. Sci.* 34, 64–67. doi: 10.3870/j.issn.1001-4152.2019.20.064

Rhéaume, A. (2022). Job characteristics, emotional exhaustion, and work-family conflict in nurses. *West. J. Nurs. Res.* 44, 548–556. doi: 10.1177/01939459211005712

Sun, X. M., Bao, J., Xu, J., Liu, F. Y., Zhu, L. H., and Shen, Y. L. (2019). Correlation between psychological capital and hidden absence of ICU nurses. *J. Nurs. (China)* 7, 70–73. doi: 10.16460/j.issn1008-9969.2019.07.070

Tucker, J. D., Cheng, Y., Wong, B., Gong, N., Nie, J. B., Zhu, W., et al. (2015). Patient-physician mistrust and violence against physicians in Guangdong Province, China: a qualitative study. *BMJ Open* 5:e008221. doi: 10.1136/bmjopen-2015-008221

Wang, M. L., and Tsai, L. J. (2014). Work–family conflict and job performance in nurses: The moderating effects of social support. *J. Nurs. Res.* 22, 200–207. doi: 10.1097/jnr.0000000000000040

Wu, X., Li, J., Liu, G., Liu, Y., Cao, J., and Jia, Z. (2018). The effects of emotional labor and competency on job satisfaction in nurses of China: a nationwide cross-sectional survey. *Int. J. Nurs. Sci.* 5, 383–389. doi: 10.1016/j.ijnss.2018.08.001

Yang, C., and Chen, A. (2020). The double-edged sword effects of career calling on occupational embeddedness: mediating roles of work-family conflict and career adaptability. *Asian Nurs. Res.* 14, 338–344. doi: 10.1016/j.anr.2020.09.005

Yildiz, B., Yildiz, H., and Ayaz Arda, O. (2021). Relationship between work-family conflict and turnover intention in nurses: a meta-analytic review. *J. Adv. Nurs.* 77, 3317–3330. doi: 10.1111/jan.14846

Zeighami, M., Mangolian, S. P., and Dehghan, M. (2023). Iranian nurses experiences with sexual harassment in workplace: a qualitative study. *Sex. Res. Social. Policy.* 20, 575–588. doi: 10.1007/s13178-022-00688-w

Zeng, L. P., and Yan, L. S. (2013). Reliability and validity of Chinese version of work-family balance scale. *Chin. J. Clin. Psychol.* 21, 988–991. doi: 10.16128/j.cnki.1005-3611.2013.06.012

Zhao, F., Dai, J. M., and Yan, S. Y. (2010). Reliability and validity of Stanford Presenteeism scale Chinese version. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi* 28, 679–682. doi: 10.3760/cma.j.issn.1001-9391.2010.09.012

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Past the Pandemic: a virtual intervention supporting the well-being of healthcare workers through the COVID-19 pandemic

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To decrease burnout and improve mental health and resiliency among doctors, nurses, and hospital staff during the COVID-19 pandemic, the University of Colorado partnered with ECHO Colorado to offer the state's healthcare workforce an interactive, psychoeducational, and online intervention that encouraged connection and support. The series utilized the Stress Continuum Model as its underlying conceptual framework. Between July 2020 and February 2022, 495 healthcare workers in Colorado participated in the series across eight cohorts. One-way repeated measures ANOVAs were performed to test for differences in pretest and posttest scores on series' objectives. Healthcare workers showed significant improvement from pretest to posttest in (1) knowing when and how to obtain mental health resources, $F(1, 111) = 46.497$, $p < 0.001$, (2) recognizing of the importance of being socially connected in managing COVID-related stress, $F(1, 123) = 111.159$, $p < 0.001$, (3) managing worries, $F(1, 123) = 94.941$, $p < 0.001$, (4) feeling prepared to manage stressors related to the pandemic, $F(1, 111) = 100.275$, $p < 0.001$, (5) feeling capable in dealing with challenges that occur daily, $F(1, 111) = 87.928$, $p < 0.001$, and (6) understanding the Stress Continuum Model $F(1, 123) = 271.049$, $p < 0.001$. This virtual series showed efficacy in improving the well-being of healthcare workers during a pandemic and could serve as a model for mental health support for healthcare workers in other emergency response scenarios.

KEYWORDS

mental health, burnout, resiliency, online, healthcare workforce, doctors, nurses, hospital staff

Introduction

It is well established that mental health symptoms and disorders increased among healthcare workers during the COVID-19 pandemic, with substantial increases documented for anxiety (22% pre-pandemic to 31% during; Giusti et al., 2022), depression (17% pre-pandemic to 36% during; Giusti et al., 2022), insomnia (45% pre-pandemic to 64% during; McCall et al., 2021), and posttraumatic stress symptoms (13% pre-pandemic to 37% during; Giusti et al., 2022). Even for healthcare workers who did not experience a mental health disorder during the pandemic, burnout remained a critical concern. Burnout is defined as a state of emotional, physical, and mental exhaustion caused by excessive and prolonged stress (Moll et al., 2022) and has increased substantially among healthcare workers during the pandemic, with one study showing increased

rates from 36% pre-pandemic to 52% during the pandemic (Giusti et al., 2022). Healthcare workers experiencing burnout provide lower quality patient care, increasing the risk of patient death and medical malpractice lawsuits (Dyrbye et al., 2017).

Healthcare workers who are burned out exit the field at alarmingly high rates, which is very costly and burdensome for the healthcare system (Dyrbye et al., 2017; Moran et al., 2020). Nurses in particular experience high rates of burnout due to overwhelming workloads, and feeling underpaid and underappreciated. These circumstances were only exacerbated during the pandemic, when 3.3% of the nursing workforce left the field (Martin et al., 2023). While prior to the pandemic both doctors and nurses already had higher rates of suicidal ideation and suicide than the general population (Davis et al., 2021), during the pandemic the World Health Organization acknowledged an association between exhaustion and suicidal thoughts in healthcare workers, and a 25% increase in anxiety and depression worldwide (COVID-19 Pandemic Triggers, 2022). The consequences of increased mental health problems and burnout due to the pandemic cannot be overstated or overlooked.

At the time of this writing, new variants of COVID-19 continue to spread (The Lancet, 2023), highlighting the critical need for interventions for healthcare workers that are aimed at preventing burnout and enhancing coping strategies (Moran et al., 2020). Web-based interventions are particularly effective during a pandemic as they are highly accessible to healthcare workers and promote peer support and social connection, reducing feelings of isolation without risk of virus transmission (Ye, 2021). A study found that healthcare workers who received a self-paced, web-based intervention during the COVID-19 pandemic felt that the most helpful aspects were the normalization of what they were feeling as well as psychoeducation on self-care strategies and emotional management techniques (Blake et al., 2020).

The Stress Continuum Model is an efficacious model for assessing psychological well-being developed by the US military. In this model, the psychological stress of active-duty personnel is understood as potentially causing injury, and four stages of psychological well-being are defined – "ready" (green zone), "reacting" (yellow zone), "injured" (orange zone), and "ill" (red zone) – with the latter three stages indicating progressively more impaired states of stress (Nash, 2011). Once someone self-reports their current color zone, appropriate interventions can be identified and utilized. Notably, stress injury is considered a physical injury, highlighting the importance of understanding the physical toll stress takes on our bodies while also diminishing our emotional and psychological capacity to cope. Similar to soldiers in conflict, healthcare workers during the COVID-19 pandemic were deployed into high-risk roles and faced uncertainty, illness, and death for an indeterminate length of time, making the Stress Continuum Model especially applicable for healthcare workers within the context of the pandemic (Morganstein and Flynn, 2021). The model uses language that creates awareness of one's stress by assessing deployment-related stress, or in this case, pandemic-related occupational stress. This process empowers healthcare workers to intentionally respond to their stress levels with the goal of preventing or mitigating stress injury (burnout) and its impact on their personal and professional well-being.

Recognizing the immediate need for a mental health intervention targeting healthcare workers in the initial stages of the pandemic, the University of Colorado School of Medicine's Department of Psychiatry collaborated with ECHO Colorado to develop an interactive, virtual, didactic series aimed at addressing the stress and anxiety unique to healthcare workers during the pandemic. The intervention incorporated concepts and terminology from the Stress Continuum Model. A team of licensed professional counselors, psychiatrists, psychologists, nurse practitioners, and licensed clinical social workers provided psychoeducation and support free of charge to eight cohorts of Colorado healthcare workers. The series was offered to direct patient care providers (e.g., nurses, doctors, technicians) as well as ancillary workers in the healthcare system, as all those in healthcare were impacted by the pandemic. This is a novel approach given that interventions tend to target nurses and doctors exclusively (Dyrbye et al., 2017). To our knowledge, our program is the only web-based, synchronous, population-based intervention in Colorado offered free of charge to healthcare workers across the evolving phases of the pandemic.

Here, we report on the outcomes of the intervention during the program evaluation period from July 2020 through February 2022. Although the pandemic is ongoing at the time of this writing, we refer to it in the past tense for clarity as well as to represent the evaluation period.

Methods

Between July 2020 and February 2022, a psychoeducational, interactive, and virtual didactic series called *Past the Pandemic* was offered free of charge to eight cohorts of healthcare workers in Colorado to name and address stress and improve coping. The series was intended to target the challenges healthcare workers faced during the COVID-19 pandemic. Healthcare workers who provided direct patient care (e.g., doctors and nurses) as well as those with ancillary jobs within the healthcare system (e.g., social workers, front desk staff, care coordinators, public health consultants, and environmental services) were eligible to enroll in the series. The program was funded by a Substance Abuse and Mental Health Services Administration (SAMHSA) Emergency Grant awarded to Colorado and was implemented through a partnership between the University of Colorado's Department of Psychiatry and ECHO Colorado. The University of Colorado's Department of Psychiatry provided clinical expertise, designed the curriculum, and facilitated sessions whereas ECHO Colorado provided technological assistance, support and communication with participants, and data collection to evaluate the success of the program. The program was marketed through University of Colorado and ECHO email blasts, featured in a local news segment in December 2021, and promoted through programmatic outreach efforts. Participants registered for *Past the Pandemic* via an online link. Sessions took place over Zoom and relied heavily on the chat and poll functions to promote connection between participants by unifying, validating, and normalizing shared struggles and concerns. In addition, participants had the option to attend resource rooms led by a mental health professional, which provided an opportunity to connect, discuss stress using a common language, and implement coping strategies.

For Cohorts 1–4, the series consisted of eight weekly sessions: (1) Stress and the human machine: Impact of stress on mind, body, and living a life you love; (2) Digging deeper: How the biology of stress informs burnout prevention; (3) Staying connected: Communication,

relationships, and cultivating strength; (4) Back to the basics: Balancing nutrition, sleep, and movement; (5) Using mindfulness practices to approach burnout, stress, and uncertainty; (6) Using your SMART brain towards parenting and relationship struggles; (7) Managing what we have lost: Mourning, growing, and making meaning; and (8) Caring for yourself and your patients in the midst of uncertainty. Based on feedback from participants, program leadership decided to shorten the series from eight to six sessions to make it more accessible, beginning with Cohort 5 (June–August 2021). Therefore, for Cohorts 5–8, content was either condensed and combined with another session or eliminated altogether, particularly for content that was less relevant as the pandemic-related stressors shifted (e.g., the topic of uncertainty became less important as the pandemic persisted and vaccines became available and physical distancing restrictions lifted).

Statistical analyses

We categorized healthcare workers into three categories by profession: doctors/providers, nurses/technicians, and ancillary healthcare professionals. The "doctors/providers" category included participants who listed their degree/profession as either Doctor of Medicine (MD), Osteopathic Medicine (DO), Nurse Practitioner (NP), Physician Assistant (PA), Doctor of Philosophy (PhD), Doctor of Psychology (PsyD), Doctor of Medicine in Dentistry (DMD), or Doctor of Dental Surgery (DDS). When more than one degree was listed, the higher degree was used. The "nurses/technicians" category included participants who listed their degree/profession as either Registered Nurse (RN), Licensed Practical Nurse (LPN), Registered Dental Hygienist (RDH), or Medical Assistants (MA). The "ancillary healthcare professionals" category included participants who listed any other healthcare degrees or professions than the ones listed above (e.g., Licensed Clinical Social Workers [LCSW], public health professionals, practice management, administrative staff, and nutritionists). Participants were also included as "ancillary professionals" in cases when no degree or profession was indicated, but the participant listed a healthcare setting as their organizational setting (e.g., a clinic, health and human services agency, school of medicine). Participants were considered missing for professional category analyses if (1) their degree was either not one of the degrees listed above or was left blank, (2) if their profession was not indicated, and (3) if their organizational setting was not indicated. For example, if a participant indicated they had a Master of Arts degree but did not list their profession or organizational setting, they were considered "missing" for their professional category because we could not determine in which healthcare professional category they belonged.

To understand whether the distribution of demographic variables [participant sex (male vs. female), geographic region (urban vs. rural), and direct patient care (provided vs. did not provide)] differed from chance within each professional category, we ran Chi-Square Tests of Independence for each demographic variable crossed with each professional category, which were recoded as dichotomous variables (e.g., doctors/providers: yes vs. no). If model assumptions were met, then Pearson's Chi-Square was reported. If at least one cell had an expected count of less than five, then model assumptions were violated, and Fisher's Exact Test was reported instead.

To examine whether the outcomes targeted by the program improved from baseline, we ran a one-way repeated measures ANOVA of pretest and posttest scores for each outcome: (1) knowing when and how to obtain mental health resources, (2) recognizing the importance of being socially connected in managing the COVID-19 crisis, (3) managing worries, (4) feeling prepared to manage stressors related to the COVID-19 pandemic, (5) feeling capable in dealing with challenges that occur daily, and (6) understanding the Stress Continuum Model. This allowed us to test whether posttest (measured after the completion of the program) differed statistically from pretest (measured at baseline).

Consistent with research showing that nurses (Brooks et al., 2018; Lai et al., 2020; Shechter et al., 2020; Croghan et al., 2021), female healthcare workers (Lai et al., 2020; De Kock et al., 2021), and healthcare workers in urban settings (Kelly et al., 2022) experience higher rates of mental health problems and burnout, in our analyses, we considered whether these demographic variables predicted who benefited most from the intervention. To test whether demographic variables [professional category (doctors/providers, nurses/technicians, ancillary), participant sex (male vs. female), geographic region (urban vs. rural), and direct patient care (provided vs. did not provide)] predicted which healthcare workers would benefit more from the program, we ran a mixed model ANOVA for each outcome with the demographic variable as the between subject factor and time (pretest vs. posttest) as the within subject factor. For each demographic variable, we ran a separate model for each outcome.

Results

The eight cohorts of *Past the Pandemic* had 590 participants who attended at least one session. Although *Past the Pandemic* was marketed to healthcare workers in Colorado, healthcare workers across the country participated in the program. Participants ($n = 95$) from other states were excluded from analyses as the program was developed and intended for in-state healthcare workers ($N = 495$).

Past the Pandemic participants were more likely to identify as white (77%) than the general population in Colorado (based on Colorado Census data: 68% white) and were more likely to be female (92%) than the national healthcare workforce (based on national Census data: 76% female). However, because answering the demographic questions was optional, rates of missing data for each demographic question were high (>55%).

Across all six learning objectives, healthcare workers showed significant improvement from pretest to posttest. Analyses showed significantly increased (1) knowledge of when and how to obtain mental health resources, $F(1, 111) = 46.497$, $p < 0.001$, (2) recognition of the importance of being socially connected in managing the COVID-19 crisis, $F(1, 123) = 111.159$, $p < 0.001$, (3) management of worries, $F(1, 123) = 94.941$, $p < 0.001$, (4) preparedness to manage stressors related to the COVID-19 pandemic, $F(1, 111) = 100.275$, $p < 0.001$, (5) capability in dealing with challenges that occur daily, $F(1, 111) = 87.928$, $p < 0.001$, and (6) understanding of the Stress Continuum Model $F(1, 123) = 271.049$, $p < 0.001$ (see Figure 1). In addition, we tested whether any of our demographic variables (professional category, geographic region, direct patient care, and participant sex) moderated any of the effects reported above to consider whether certain demographic groups benefitted more from

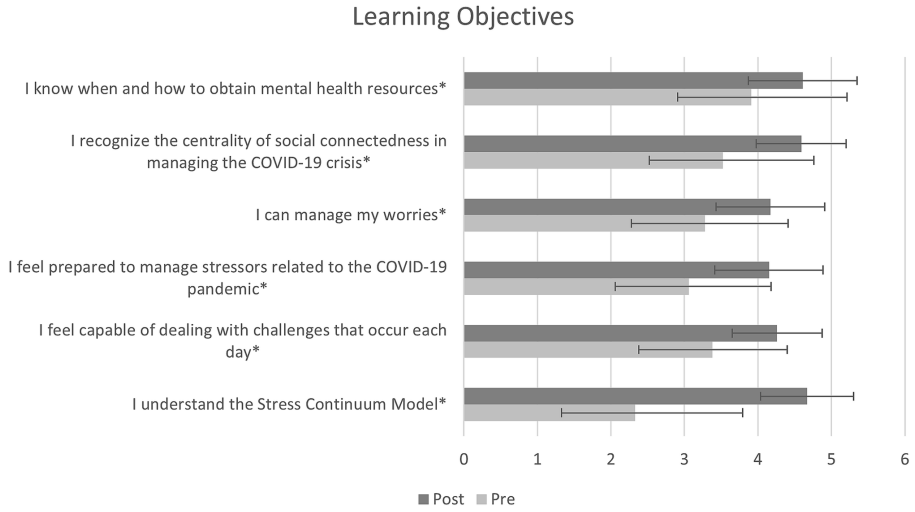

FIGURE 1
Participants completed questions to measure the impact of the program at baseline and at the end of the series. Participants showed significant improvement in all learning objectives (*$p < 0.001$).

the program. However, none of our effects differed significantly by demographic group ($ps > 0.05$).

Discussion

Our results indicate that after our live, virtual intervention, *Past the Pandemic*, healthcare workers showed significant improvement and confidence in feeling able to manage worries, stressors, and daily challenges during the pandemic, acquire mental health resources, recognize the importance of social connection, and understand the Stress Continuum Model. No demographic group that we assessed (professional category, geographic region, direct patient care, and participant sex) benefited more from the intervention, underscoring its widespread utility and effectiveness among all types of healthcare workers.

During the COVID-19 pandemic, healthcare workers were at increased risk for mental health challenges, partially due to being inadequately prepared to handle the trauma they were exposed to (Moreno et al., 2020; Dohrn et al., 2022). Intervention design that resembles disaster training and leverages technology while emphasizing coping methods, self-care, and support from colleagues can be particularly efficacious for healthcare workers' well-being (Moreno et al., 2020). The focus of the online *Past the Pandemic* series was to help healthcare workers build skills to mitigate stress and manage the complex emotions related to the pandemic. The intervention's design allowed participants and facilitators to connect weekly to name, validate, and develop coping strategies to address the struggles healthcare workers faced during the pandemic. By offering consecutive sessions, each cohort had time to build trust, forge a community of support, and instill a sense of reliability and predictability, during a time when those resources felt scarce. This offering provided facilitated opportunities for peers to support each other and normalize their experiences, which was especially valuable as the pandemic (and society's response to it) continued to evolve – with case and death surges, personal protective equipment shortages, hospital overload, staffing shortages, lockdowns, mask mandates, restrictions lifting, and vaccines becoming available.

Research has suggested that the Stress Continuum Model could be a beneficial framework to address stress for healthcare workers (Lippy, 2019; Marco et al., 2020; Ganzel et al., 2021; Major et al., 2021; Morganstein and Flynn, 2021), yet to our knowledge, our program was the first to test the efficacy of the Stress Continuum Model within an intervention for healthcare workers. The Responder Alliance[1] adapted the Stress Continuum Model in order to service search and rescue teams, ski patrol, and National Park Service first responders in Colorado. Their adaptations included using the term "critical" instead of "ill" (red zone), emphasizing the importance of specific behavioral patterns like sleep, and explicitly discussing suicidal ideation (Responder Alliance, 2023). Additionally, their adapted model emphasized self-awareness, self-deployment, and self-assessment, which is a departure from the original model used by leaders to categorize and externally evaluate colleagues subordinate to them. We used this adapted model, the Responder Stress Continuum, as the framework for *Past the Pandemic*, which enabled the healthcare workforce to develop a shared language on the biology of stress and stress injury as an occupational injury (e.g., burnout) as well as learn how to examine and respond to one's own emotional and physical states (see Figure 2). The Responder Stress Continuum framework allows for early recognition and mitigation of stress, through naming the predictable and modifiable nature of occupational stress exposure. All *Past the Pandemic* sessions asked participants to share their current zone to normalize the often-difficult conversation about one's personal experience of lived and ongoing stress. The content delivered in *Past the Pandemic* addressed relevant themes for healthcare workers during the pandemic, such as managing stress reactions, experiencing grief, improving resiliency through staying connected, receiving and giving support, getting adequate sleep, and being mindful in everyday life.

1 www.responderalliance.com

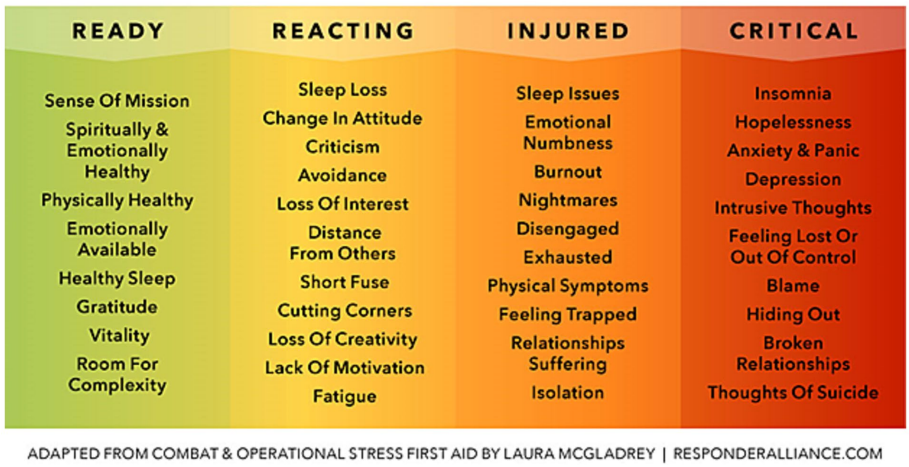

FIGURE 2
Adapted responder stress continuum framework used for *Past the Pandemic*.

Past the Pandemic was a unique support program that evolved to respond to themes most relevant at any phase of the pandemic. As we saw new needs of healthcare workers emerge, we modified our program to respond to those needs using an adaptive approach to update the curriculum. Early in the pandemic, for example, we narrowed our initial curriculum from eight to six sessions to focus on the most important content and reduce participant burden. As the pandemic continued, we learned that healthcare workers needed even more flexibility with the timing of when they could access program content, so we provided an option on our website to view video content at their own pace. While we strongly recommended that participants attend the first two *Past the Pandemic* sessions live, they were not required to attend all the sessions thereafter and could view recordings of the sessions as they desired. After the program's first year, the website[2] was created to host session videos, resources, and a toolkit. These continual modifications and additions allowed participants to attend sessions or view resources when they had the capacity to do so, without imposing a sense of pressure.

Since feelings of self-efficacy and social connectedness have been shown to mediate the stressful impacts of trauma exposure for healthcare workers (Shoji et al., 2014; Morganstein and Flynn, 2021), the *Past the Pandemic* program was designed to provide healthcare workers with strategies to improve self-efficacy and social connectedness. For later cohorts, we shared with participants the *Past the Pandemic* Toolkit, a 42-page compilation of exercises, worksheets, and resources. The toolkit allowed participants to apply the curriculum to their specific struggles and concerns, implement strategies they learned (e.g., enhancing self-efficacy) as well as share them with coworkers and family (e.g., enhancing social connection). While we have not yet formally evaluated the toolkit, it is one of the most visited pages on our website, and in qualitative evaluations, participants have endorsed it as a helpful and timely resource.

Limitations

Since we thought it was important to support not only healthcare providers in hospital settings but all professionals who work in healthcare settings (including administrators, care coordinators, social workers, and outreach coordinators), our cohorts included an array of professionals who were not healthcare providers (categorized as "ancillary") in line with recommendations to reach all who work in healthcare settings whose lives and workplaces have been affected by the pandemic (Morganstein and Flynn, 2021). However, future interventions could more intentionally target those professions that are typically not targeted for such interventions, like those working in food or custodial services. In addition, future interventions could also be tailored to professionals in rural healthcare settings, who may have different challenges related to economic disadvantage, geographical isolation, supply chain issues, and provider shortages (O'Sullivan et al., 2020).

Our current program evaluation is limited to assessing the program's impact immediately after completion. However, in a future program evaluation, it would be beneficial to follow-up with participants longitudinally to assess lasting knowledge acquisition, behavioral change, job retention, and overall well-being. In addition, the current program evaluation relied exclusively on participant self-report, which could result in response bias due to demand characteristics of such questions (i.e., in which the context makes participants aware of the way they are expected to respond). Furthermore, we did not measure burnout, depression, anxiety, and PTSD pre and post intervention although it would be helpful to know whether our intervention impacted such outcomes. Future pandemic response programs would likely benefit from collecting more thorough participant data. Because we designed our program early in the pandemic, our primary goal was to respond to the increasingly troublesome and frequent burnout symptoms apparent in our healthcare colleagues (e.g., stress, exhaustion, irritability, negativity, loss of motivation); thus, having a robust dataset was of secondary concern. In addition, we did not anticipate the longevity of the program, which we continued to run when pandemic stress became chronic.

2 https://pastthepandemic.org

During the COVID-19 pandemic, healthcare workers have faced unprecedented risk and incidence of burnout and mental health disorders, particularly anxiety, depression, insomnia, posttraumatic stress, and even suicidal ideation. Healthcare workers who become aware of their stress and its impact and use coping strategies to decrease their burnout and improve their resiliency in the face of an ongoing pandemic have the potential to find fulfillment and purpose in their jobs, remain in their healthcare positions, save the healthcare system money, and, most importantly, provide better patient care. *Past the Pandemic* was our solution to the potential fallout of the pandemic for healthcare workers and showed initial efficacy in helping healthcare workers cope. The skills, strategies, and resiliency learned through our program may not only help healthcare workers during a disaster response but are also applicable beyond the pandemic and can be incorporated into everyday life.

Data availability statement

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

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the patients/participants or patients/participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

AM, KD, and SB contributed to the conception and design of the study. AM organized the database and wrote the first draft of the manuscript. AM and KD performed the statistical analysis. AD, LC, and LM wrote sections of the manuscript. All authors contributed to the article and approved the submitted version.

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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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References

Blake, H., Bermingham, F., Johnson, G., and Tabner, A. (2020). Mitigating the psychological impact of COVID-19 on healthcare workers: a digital learning package. *Int. J. Environ. Res. Public Health* 17, 1–15. doi: 10.3390/ijerph17092997

Brooks, S. K., Dunn, R., Amlôt, R., Rubin, G. J., and Greenberg, N. (2018). A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. *J. Occup. Environ. Med.* 60, 248–257. doi: 10.1097/JOM.0000000000001235

COVID-19 Pandemic Triggers (2022). 25% increase in prevalence of anxiety and depression worldwide. World Health Organization. Available at: https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide

Croghan, I. T., Chesak, S. S., Adusumalli, J., Fischer, K. M., Beck, E. W., Patel, S. R., et al. (2021). Stress, resilience, and coping of healthcare workers during the COVID-19 pandemic. *J. Prim. Care Community Health* 12:215013272110084. doi: 10.1177/21501327211008448

Davis, M. A., Cher, B. A. Y., Friese, C. R., and Bynum, J. P. W. (2021). Association of US nurse and physician occupation with risk of suicide. *JAMA Psychiatry* 78, 1–8. doi: 10.1001/jamapsychiatry.2021.0154

De Kock, J. H., Latham, H. A., Leslie, S. J., Grindle, M., Munoz, S.-A., et al. (2021). A rapid review of the impact of COVID-19 on the mental health of healthcare workers: implications for supporting psychological well-being. *BMC Public Health* 21, 1–18. doi: 10.1186/s12889-020-10070-3

Dohrn, J., Ferng, Y.-h., Shah, R., Diehl, E., and Frazier, L. (2022). Addressing mental and emotional health concerns experienced by nurses during the COVID-19 pandemic. *Nurs. Outlook* 70, 81–88. doi: 10.1016/j.outlook.2021.07.009

Dyrbye, Lotte N., Shanafelt, Tait D., Sinsky, Christine A., Cipriano, Pamela F., Bhatt, Jay, Ommaya, Alexander, et al. (2017). "Burnout among health care professionals: A call to explore and address this Underrecognized threat to safe, high-quality care." NAM Perspectives. Discussion Paper. National Academy of Medicine, Washington, DC.

Ganzel, B., Kozina-Evanoski, K., Newland, P., Richards, L., and Watson, P. (2021). Stress Injury and Stress First Aid: Coping on the Front Lines of the COVID-19 Pandemic. *J. Aging Life Care* 9–15.

Giusti, E. M., Veronesi, G., Callegari, C., Castelnuovo, G., Iacoviello, L., and Ferrario, M. M. (2022). The north Italian longitudinal study assessing the mental health effects of SARS-CoV-2 pandemic health care workers-part II: structural validity of scales assessing mental health. *Int. J. Environ. Res. Public Health* 19, 1–16. doi: 10.3390/ijerph19159541

Kelly, D., Schroeder, S., and Leighton, K. (2022). Anxiety, depression, stress, burnout, and professional quality of life among the hospital workforce during a Global Health pandemic. *J. Rural. Health* 38, 795–804. doi: 10.1111/jrh.12659

Lai, J., Ma, S., Wang, Y., Cai, Z., Jianbo, H., Wei, N., et al. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw. Open* 3:e203976. doi: 10.1001/jamanetworkopen.2020.3976

Lippy, R. (2019). Health-Care Provider Burnout. *J Extra Corpor Technol.* 51, P5–P9.

Major, A., Recklitis, C. J., and Bober, S. (2021). Providing effective mental health support for oncology health-care workers in the COVID-19 era: responding quickly but carefully. *JNCI Cancer Spect.* 5, 1–6. doi: 10.1093/jncics/pkab031

Marco, C. A., Larkin, G. L., Feeser, V. R., Monti, J. E., and Vearrier, L.for the ACEP Ethics Committee (2020). Post-traumatic stress and stress disorders during the COVID-19 pandemic: survey of emergency physicians. *JACEP Open* 1, 1594–1601. doi: 10.1002/emp2.12305

Martin, B., Kaminski-Ozturk, N., O'Hara, C., and Smiley, R. (2023). Examining the impact of the COVID-19 pandemic on burnout and stress among U.S. nurses. *J. Nurs. Regul.* 14, 4–12. doi: 10.1016/S2155-8256(23)00063-7

McCall, W. V., Mensah-Bonsu, D., Withers, A. E., and Gibson, R. W. (2021). Short-term insomnia disorder in health care workers in an academic medical center before and during COVID-19: rates and predictive factors. *J. Clin. Sleep Med.* 17, 749–755. doi: 10.5664/jcsm.9034

Moll, V., Meissen, H., Pappas, S., Kejun, X., Rimawi, R., Buchman, T. G., et al. (2022). The coronavirus disease 2019 pandemic impacts burnout syndrome differently among multiprofessional critical care clinicians-a longitudinal survey study. *Crit. Care Med.* 50, 440–448. doi: 10.1097/CCM.0000000000005265

Moran, D., Wu, A. W., Connors, C., Chappidi, M. R., Sreedhara, S. K., Selter, J. H., et al. (2020). Cost-benefit analysis of a support program for nursing staff. *J. Patient Saf.* 16, e250–e254. doi: 10.1097/pts.0000000000000376

Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., et al. (2020). How mental health care should change as a consequence of the COVID-19 pandemic. *Lancet Psychiatry* 7, 813–824. doi: 10.1016/S2215-0366(20)30307-2

Morganstein, J. C., and Flynn, B. W. (2021). Enhancing psychological sustainment & promoting resilience in healthcare workers during COVID-19 & beyond: adapting crisis interventions from high-risk occupations. *J. Occup. Environ. Med.* 63, 482–489. doi: 10.1097/JOM.0000000000002184

Nash, William P. (2011). "US marine corps and navy combat and operational stress continuum model: a tool for leaders." in *Combat and operational behavioral health, edited by Borden institute Walter Reed Army Medical Center*. Government Printing Office. pp. 107–119.

O'Sullivan, B., Leader, J., Couch, D., and Purnell, J. (2020). Rural pandemic preparedness: the risk, resilience and response required of primary healthcare. *Risk Manag. Healthc. Policy* 13, 1187–1194. doi: 10.2147/RMHP.S265610

Responder Alliance (2023). The responder stress continuum. Available at: https://www.responderalliance.com/stress-continuum [Accessed January 20, 2023].

Shechter, A., Diaz, F., Moise, N., Anstey, D. E., Ye, S., Agarwal, S., et al. (2020). Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic. *Gen. Hosp. Psychiatry* 66, 1–8. doi: 10.1016/j.genhosppsych.2020.06.007

Shoji, K., Bock, J., Cieslak, R., Zukowska, K., Luszczynska, A., and Benight, C. C. (2014). Cultivating secondary traumatic growth among healthcare workers: the role of social support and self-efficacy. *J. Clin. Psychol.* 70, 831–846. doi: 10.1002/jclp.22070

The Lancet (2023). The COVID-19 pandemic in 2023: far from over. *Lancet* 401:79. doi: 10.1016/S0140-6736(23)00050-8

Ye, J. (2021). Advancing mental health and psychological support for health care workers using digital technologies and platforms. *JMIR Form. Res.* 5:e22075. doi: 10.2196/22075

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Perceiving violence against healthcare workers in a child and adolescent emergency psychiatric ward in Hungary: a qualitative pilot study

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Aim: Psychiatry is a challenging setting that requires extraordinary effort from the staff. Healthcare workers in the field of psychiatry face substantial levels of violence, making the identification of abuse risk factors a social concern. Both the conduct of the children and their relatives can pose potential harm. Our study delved into the criminological and psychiatric factors underlying violence against healthcare workers.

Methodology: We used qualitative, semi-structured, self-developed, online questionnaire involving 21 respondents. The participants were representing the staff composition of our department. The data set was coded in two phases using a multi-stage content analysis method. The results were compared with Hungarian and international literature.

Findings: Among the participants, 52% reported no instances of physical abuse. The most prevalent form of perceived non-contact abuse was threats, accounting for 38% of reported cases. The identified risk factors for abuse included the child's psychiatric disorder, communication issues, parental behavior, and low socio-economic status. Psychological trauma was identified as the most severe consequence. The respondents' opinion indicated that the most common cause of violence (52%) was attributed to the child's mental disorder. Workers primarily deal with abuse through negative emotions, with 76% of them reporting feelings of victimization. Additionally, 43% believed that abuse cannot be avoided, while 19% emphasized the significance of worker competence.

Value: Our research can help to identify risk factors in child psychiatry wards and provide guidance for developing effective responses to violence against healthcare workers in Hungary, especially at our ward.

KEYWORDS

multi-causal model, doctor-patient relationship, high-security psychiatry, workplace violence, relatives in psychiatry, debriefing, child and adolescent psychiatry

Introduction

Violence against healthcare workers (VAHCW) encompasses both physical and psychological forms of aggression experienced by healthcare professionals in their work environment. The motivation behind such violence can stem from both criminological and psychiatric factors.

In Hungary, such acts can be considered as criminal offenses. The media pays special attention to these cases, though healthcare workers rarely report them. A recent Hungarian study (Ráczkevy-Deák and Besenyő, 2022) revealed a high level of latency related to verbal insults, 45% and physical violence, 52%. Another research (Irinyi et al., 2017) concluded that only 4.4% of healthcare workers do not experience violence during their work.

Risk factors of VAHCW can be divided into three groups: patient-related factors, external factors, and situational factors. A meta-analysis by MohammadiGorji et al. (2021) explored internal, external, and situational motives behind VAHCW, with internal factors pertaining to patients, external factors to the environment, and the third factor linked to low-quality staff-patient relationships. Angland et al. (2014) explored the perceptions of nurses. Among the patient-related factors, drug and alcohol abuse turned out to be crucial. External causes included a shortage of nursing staff, inadequate security measures, overcrowding, night shifts, and insufficient life-work balance. The inexperience of staff, communication problems, staff attitudes, and the demanding behavior of patients was listed among the situational factors. Similarly, Brophy et al. (2017) identified physical, psychological, interpersonal, and financial motives. They found environmental, organizational, social, and material risk factors. In their ethnographically inspired research of Lau et al. (2012) highlighted situational risk factors like the first few hours, long waiting, the social representation of the staff and the patient, and victim blaming. They also described less authoritative settings as more protective.

Earlier results (Pich et al., 2011) showed that long waiting times, lack of aggression management training and debriefing, and patronizing communication of the staff were among the motives. Internal factors included mental disorders, low socio-economic status (SES), and alcohol or drug abuse. Older and experienced staff play a protective role. However, a quantitative study with children diagnosed with schizophrenia (Goethals and van Marle, 2007) explained aggressive behavior with more patient-related features. They revealed schizophrenic parents, history of offending, antisocial behavior, and attention problems also as risk factors. A meta-analysis of 428 scientific articles (Dack et al., 2013) linked the patient-related risk factors in young men: emergency admission, loneliness, schizophrenia diagnosis, previous inpatient psychiatric treatment, history of violence and self-harm, and drug use. For girls, only substance use and previous history of violence counted.

Risk factors are also shaped by attribution bias (Ezeobele et al., 2019), healthcare staff tends to blame the patients first. Even higher qualified nurses regard the patients as the source of risk and not the external or situational factors. According to the decision-making model of Moylan and Cullinan (2011), three factors influence staff responses: (1) options (e.g., supportive intervention, medication, and restraint), (2) perceived information, and (3) the acceptance of aggression. Tolerance of violence, formal and informal education, individual acceptance of restraint, and professional standards are also relevant issues. It is challenging to harmonize professional standards and emotional reactions in some situations. In child psychiatric institutions, staff is lacking a well-defined view on aggression and on interventions (Fleury and Van Engelen, 2007).

Several qualitative studies (Bonner et al., 2002; Iozzino et al., 2015) underlined that physical and mechanical restraint can be traumatic for staff and patients. Additional risk factors are progressive mental disorder, refusal to take medication, and substance use. Medical staff can also commit violent acts, which are considered ill-treatment from a human rights perspective. According to a German study of more than 2,000 people (Hoffmann et al., 2020), one-third of former patients in child and adolescent psychiatric hospitals reported that they had been abused in some way by nurses. The majority of them were physically ill-treated (31.7%). From the research, it seems that boys who were more likely to be physically abused, while girls were subjected to excessive restraint. Emotional abuse was experienced by 23.1% of the respondents. Humiliation, insults, threats, or intimidation were also alleged.

Early traumatization is an underlying factor of psychiatric disorders. Childhood trauma (physical, psychological, or sexual abuse) is associated with neuropsychiatric consequences, and a large scale of mental disorders: depression, dissociative symptoms, opposition, dysthymia, obsessive-compulsive traits, phobias, anxiety, post-traumatic stress disorder, drug abuse, borderline personality disorder, attention deficit hyperactivity disorder, as well as schizophrenia (Gaskill and Perry, 2012). Aggression can be a manifestation of all these symptoms. The brain developing in a trauma-environment mobilizes maladaptive functions. These mechanisms serve to survive in a situation in which analytical thinking would be more damaging (Perry, 2008). Childhood abuse also changes behavior patterns (Anda et al., 2006). The fight-or-flight reactions of children exposed to this type of stressor are uncontrollable and unpredictable. Pathology is therefore an indirect factor of VAHCW, the problem is rooted in adverse childhood experiences. Since any child abuse is a criminal act and violence perpetrated by adolescents is dangerous to society, the criminological factors cannot be overlooked (Perry, 1984).

Conversely, aggressive behavior exhibited by either the child or their relatives adversely impacts the self-esteem and dignity of the staff, potentially resulting in burnout. Workplace hazards (Gale et al., 2009) can take several forms: sexual harassment, threats to family, damage to property, and stalking.

Adverse consequences of VAHCW include leaving the workplace, anger, helplessness, isolation, negative attitudes toward the employer, psychosomatic symptoms, reduced work performance, and post-traumatic stress disorder (PTSD) (Gillespie et al., 2013). Alden et al. (2008) compared the involvement of witnesses and participating individuals. They concluded that the affected people experienced greater fear during VAHCW, had more arousal symptom complexes (PTSD E), and they were more dissatisfied with their jobs. Witnesses also exhibited PTSD-like symptoms but interpreted them as a weakness in their personality (PTSD D). Patient aggression causes anxiety or anger in staff (Nijman, 2002), which creates communication problems. When combined with environmental factors, this can give rise to a detrimental cycle of violence.

In light of these findings, it is recommended to scrutinize the risk factors in a child and adolescent psychiatric unit in Hungary, as no targeted research has been conducted so far. The key question is the Hungarian characteristics and their uniqueness compared to international research. In this paper, we examine how healthcare staff

experience and process violence at work and what are their most frequently expressed thoughts on the subject.

Methods

In this study, we use the term "risk factor" in the sense of circumstances and preliminary signs staff considers important in the development of VAHCW. The multiple coding and content analysis was based on the methodology of three articles (Burnard, 1991; Braun and Clarke, 2006; Bengtsson, 2016). As a result, trends—a frequency hierarchy of items—were identified along the questions.

The inclusion criterion for the sample required individuals to possess prior a total of 1 year experience within both medical and psychiatric wards. Nevertheless, a unique exception was granted to an individual, a general practitioner with a completed 6 years long medical faculty program, who had recently initiated their residency within the department, despite not meeting the initial criteria. We believed their fresh insights would also contribute to our knowledge.

At the time of data collection, the department had a staff complement of 40 individuals. Additionally, we extended our outreach to employees who had been employed within the department in the year preceding the survey but had subsequently departed for various reasons. In totality, we made contact with 51 individuals, and 21 (41.18%) of these respondents completed the questionnaire. We aimed to invite subjects from diverse occupational backgrounds, including but not limited to medical professionals such as doctors and nurses, within our sample. Our rationale for achieving representativeness was predicated on securing a minimum of 20 respondents for the questionnaire. Increasing the number of participants could have posed a risk of pushing their involvement in the research. The data collection period was planned to last approximately 4 weeks, from the 11th of October to the 11th of November 2022. In the research field, previous qualitative studies have also employed relatively small sample sizes (Bonner et al., 2002; Pich et al., 2011; Angland et al., 2014).

The research took place at the Child and Adolescent Psychiatry Unit of Heim Pál National Pediatric Institute (Hospital). Considering the sensitivity of the topic and the nature of the work, audio-recorded interviews were not feasible. Therefore, an online qualitative questionnaire was developed, which underwent four modifications following consultations with experts, including Hungarian researchers in the field and professionals from the Unit. Discussions on the questionnaire started at the end of September 2022. The Head of the Institute authorized the research in October 2022. Data protection and privacy statements were prepared.

The questionnaire covered 10 issues: definition of contact and non-contact violence, case descriptions, perceived risk factors, consequences, triggers, processing, reporting, prevention, and other comments.

Elaborative explanations were required. The questionnaires were sent out in several phases by email or via social network messages to employees in the department.

Results

The online data collection method ensured anonymity and considerably increased confidence in the research. We have consolidated the sociodemographic data of the 21 participants into a unified chart (Table 1).

The total number of characters in the corpus was 35,057. A total of 412 extracts were subjected to multilevel coding and frequency ranking based on the responses, as detailed in Table 2. Subsequently, these extract types were condensed into 133 distinct items. In our analytical approach, we focused on the three most frequently occurring content items for each question.

Almost all the phenomena mentioned in the introduction are confirmed by our results. The most common forms for assault (hitting, kicking, biting, pushing, pushing down, and spitting) is attributed to the child's mental disorder, and the perceived consequence is physical injury. This implies that the staff of the Unit consider children's aggressive acts as a symptom of their disorder, in line with the results of previous research (Goethals and van Marle, 2007; Gaskill and Perry, 2012; Dack et al., 2013). At the same time, the responses also pointed to situational and external factors, as expected in light of other previous research (Brophy et al., 2017; MohammadiGorji et al., 2021). Non-physical abuse included humiliation and threats, which are primarily expressed by parents, but also by children toward the staff; these acts were explained by interpersonal factors in our research (see also Brophy et al., 2017). Our findings suggest that the self-esteem and dignity of the staff are often compromised and that bullying can occur not only in face-to-face interactions but also via email or telephone. In contrast to a previous findings (Irinyi et al., 2017), the majority of respondents (52%) in this research stated that they had not experienced violence. This result can be explained by the perception of children by the staff members, who see these children as sick persons who need help, and therefore their aggression is not regarded as abuse. In addition, staff identified patterns of abusive behavior on the parents' side that could be described as narcissistic (entitlement, devaluation, sense of importance, arrogance, and lack of empathy) and identified as forms of verbal abuse. Assault with a chair was a frequently flagged issue.

Risk factors included psychiatric disorder of the child, communication, parental emotions, and low SES in the family, as predicted by other research (Pich et al., 2011). Psychological trauma, trivialization, physical trauma, and utilizing de-escalation techniques were among the consequences. This suggests that psychological injury has a greater impact on workers than physical injury or the threat of physical injury. The question on causes revealed the child's illness, negative emotions, and other deficits in the child's personality development. Employees see multiple and interrelated components behind the violence. It appears that staff, in line with previous research (Alden et al., 2008; Gillespie et al., 2013), mostly deal with the situation with negative emotional reactions, but at the same time they are able to self-reflect and prevent more serious harm.

In our sample, the majority, 76% of workers, immediately pass on information about bullying to their managers. This proportion is higher than a Hungarian trend described recently (Ráczkevy-Deák and Besenyő, 2022). It is believed that bullying cannot be prevented, but training could be organized and protocols should be developed. This implies that workers could have a possible solution to combat abuse despite feeling powerless. In line with the previous research (Meerwijk et al., 2007) we found, it is important that those working directly with patients have to be competent in psychiatric work, communicate well with children, and that debriefing sessions should take place after abuse.

In this research, risk factors were reported related to the visitation, admission, mechanical restraint, and to the withdrawal symptoms. This supports previous research findings (Bonner et al., 2002; Iozzino

10.3389/fpsyg.2023.1220183

TABLE 1 Participant demographics derived from content analysis of narrative responses to survey questions.

Features	*n* (21)	%
Gender		
Female	15	71
Male	6	29
Average age (year/minimum/maximum)	39,6/23/55	
Marital status		
In a relationship	8	38
Married	6	28
Single	5	24
Divorced	2	10
Education		
University	7	33
Technical and further education	7	33
High school	4	19
Bachelor degree in progress	2	10
PhD	1	5
Medical training level		
Physician (of which child and adolescent psychiatrist)	5 (1)	24 (5)
Nurse	5	24
Specialist nurse	5	24
Other*	3	14
No medical qualification**	3	14
Position		
Manager	0	0
Employee	21	100
Work schedule		
12-h shift	8	38
Constant daytime shift (8 h; 7 am to 3 pm)	7	33
8-h on working days shift (8 am to 4 pm)	5	24
24/48-h shift	1	5
Total years participants spent in health care/average/minimum/maximum	233/11,1/0/34	
Total years participants spent in the department/average/minimum/maximum	58/2,76/0/14	
Monthly overtime in hours total/average/minimum/maximum	256,5/12,21/0/70	

*Graduates with Master's degrees. Further specifics cannot be disclosed to safeguard against potential identification.
**Individuals with a secondary school education. Further specifics cannot be disclosed to safeguard against potential identification.

et al., 2015; Hoffmann et al., 2020). Patient admission was considered as consequences and causes too. This may be explained by the fact that both the child and their parents are confronted during the patient's admission with the fact that the patient will spend more time in the ward. While waiting for an admitting medical doctor and the examination, the child is most likely to leave the institution. The parent perceives the child's resistance, and on the other hand, the doctor is obliged to withdraw the patient's liberty due to emergency psychiatric symptoms. In such cases, scenarios can be escalated, which in our research were classified as situation conflicts (Lau et al., 2012). The three problematic cornerstones of the admission are the announcement of the decision, the deprivation measures to be taken (e.g., taking the telephone and the tobacco product), and the moment when the child leaves the relatives. In practice, several minutes may elapse between these three moments. Conflict escalations leading to physical restraint are often resulting from avoid self-harm, as several studies have indicated (Bonner et al., 2002; Iozzino et al., 2015). Among other contributors, staff burnout and anxiety, unpredictable, abused and fleeing children, and parental behavior were outlined as particular concerns. In terms of processing and managing VAHCW,

10.3389/fpsyg.2023.1220183

TABLE 2 Overview of online self-completion questionnaire responses post-content analysis.

Questions and three most common items	*n**	%**
Perception of physical violence		
It causes physical harm	13	62
Rooted in the mental disorders of children	6	29
Forms: punch, kick, bite, push, push down, and spit	6	29
Non-contact assault		
Degrading	18	86
Threat	8	38
Bullying (mocking, insulting, blackmailing, and blaming)	5	24
Content of case descriptions		
Reported no VAHCW	11	52
Narcissistic traits in parents (entitlement, devaluation, sense of importance, arrogance, and lack of empathy)	8	38
Attack with a chair	6	29
Perception of risk factors***		
Psychiatric disorder of the child	3	14
Communication between staff and patients	3	14
Emotions of the parents (worry, frustration, and hopelessness)	3	14
Low socioeconomic status of the family	3	14
Consequences		
Psychological harm	8	38
Trivialization of the consequences	7	33
Physical harm	6	29
Triggers		
The psychiatric disorder of the child	11	52
Negative emotions (aggression, hopelessness, and despair)	8	38
Maladaptation of the child (socialization, recognition of illness, lack of information, and inadequate coping)	6	29
Managing and processing VAHCW		
Negative emotional reactions	12	57
Self-reflection	9	43
Tried to handle the situation verbally	6	29
Reporting		
The information is transmitted	16	76
Reporting the management	11	52
Instant report	6	29
Prevention		
VAHCW cannot be prevented.	9	43
Training and workshops should be organized to improve communication, value orientation, and emotion regulation.	8	38
Professional protocols should be established.	4	19
Other comments		
Employee aptitude	4	19
Communication is important	2	10
Debriefing needed	2	10

**n*, Number of times the item appeared in the responses;
***%, compared to 21 responses;
****The four most frequent responses had the same value.

we also identified decision dilemmas and the personality traits of employees as risk factors (Moylan and Cullinan, 2011).

Infrequent yet distinctly Hungarian-specific elements, such as the perception of cultural conflict, were present. Our sample uncovered biased views about the Romani minority in such conflicts. We found no reference to this in any literature. The cultural conflicts between the relatives of inpatient children and staff members cause daily operational difficulties because they jeopardize the process of visiting. This is influenced by a larger societal challenge in Hungary, which highlights the lack of empathy toward groups with lower SES and lower educational backgrounds (Pich et al., 2011). This finding is important because it is unlikely that the phenomenon would have been expressed through direct questioning. Furthermore, 71% of the respondents were female, yet violence against women appeared in only four items (19%), in the themes of physical, and non-contact abuse, and case descriptions, again somewhat contradicting previous research findings (Gale et al., 2009). One of the most frequent features of non-physical violence was bullying, which occurred in both face-to-face and online spaces. In describing incidents, the child's antisocial traits were more often mentioned than psychiatric causes, i.e., respondents had different thoughts about bullying in general and when they recalled it. When recollected, the child's antisocial personality development is more prominent, while the psychiatric pathology is referred to the background. Broader societal causes are also highlighted, as well as the fact that the Hospital alone cannot resolve the situation. This suggests that also in the view of the employees these problems are rooted in wider social anomalies.

It should be emphasized that the generalizability of the results is limited due to the study's focus on a single specific psychiatric ward. Furthermore, the surveyed group of individuals was relatively small in size. Additionally, the diverse range of professions makes comparisons challenging.

Discussion

This research is limited to the experiences of the staff within our Unit. Our facility is small, so the response and its content may have been distorted by group dynamics. From this perspective, our findings can only provide a starting point for exploring the nature of violence against staff in child psychiatry. Due to the sensitivity of the topic and ethical considerations, we did not investigate bullying among the staff. For these delicate reasons, no audio recording was used, the data set was generated by typing. We consider that our results may allow us to ask valid questions about VAHCW in a future survey on a larger sample of other psychiatric wards or other childcare settings, and to assess the social structure and criminological and psychiatry trends behind the abuse.

If a child or a parent threatens healthcare staff, it may amount to violence against a public official, which can be prosecuted in Hungary even in some cases for perpetrators under the age of 14. In such cases, the Hospital will press charges. Our study shows that healthcare staff perceives the threat as the most common non-contact violence. Therefore, the threat should be taken seriously and reported in all cases.

The extent to which a psychiatric disorder influences the actions of perpetrators is a legal and forensic matter. Our research provides examples, such as throwing a chair or inflicting a punch resulting in a broken upper arm, which can be interpreted as criminal acts with potential imprisonment sanctions. The presence of CCTV surveillance at the ward entrance serves as a deterrent and holds legal implications. Additionally, actions like tearing clothes and spitting may be considered defamation or even assault under Hungarian legislation.

On the contrary, from a human rights perspective, it is essential to acknowledge the issue of mechanical restraint and other forms of restrictive measures. According to the 16th Annual Report of the CPT[1] (URL1), paragraph 54, the frequency of use of restraint measures can have a detrimental effect on the workplace environment and should be avoided wherever possible, but paragraph 37 declares that in some situations the safety of the patient and the staff is also important. Our research obviously demonstrated that in such a situation the decision dilemma may be a risk factor.

From a practical standpoint, our research highlights the likelihood that women in healthcare refrain from explicitly addressing the specific nature of the abuse they encounter, despite being well-aware of its existence. Children at earlier stage of antisocial personality development appear relatively more frequently at our ward, as previous research also has implicated (Perry, 1984; Neumann and Klatt, 2022). These adolescents, mostly boys, are confronted by female nurses during their treatment in the ward. As the majority of healthcare workers are women, VAHCW may be a specific form of violence against women (Gale et al., 2009). The practical experience that supports our results is that hetero-anamnestic data on children are mostly obtained from mothers, which may suggest that in families with a patriarchal structure, the mother plays the traditional caregiver role while the father is responsible for family maintenance. The latter may include both protection and domestic violence. In families organized based on non-traditional roles, women also work, but fathers in patriarchal cultural settings can be as aggressive with female employees as with homemaker women in their families. This draws our attention to the specific Hungarian gender inequalities and to the fossils of medieval social structures.

In our pilot study, we have identified several significant risk factors that are highly likely to provoke VAHCW. These are the admission, mechanical restraint, medication withdrawal (the children did not take their prescribed medication for some reason), visiting, and failures of patient-staff communication. All five situations are related to some form of interaction. In our opinion, social skill trainings can solve these shortcomings exclusively with external experts in all child psychiatric wards. Further education and debriefing seem to be important. Mindfulness can be a key to the prevention of violence against healthcare workers (Brunero and Stein-Parbury, 2008; Bryant, 2010). Brewer (1999) indicated that assertiveness is crucial in the immediate prevention of violence and that confidentiality must not compromise personal safety. A qualitative study conducted in Canadian child psychiatric hospitals (Faulkner-Gibson, 2012) found that interpersonal relationships between colleagues influence the perceptions of children's aggressive behavior. The perception of aggression lies on a continuum that is triggered by the group dynamics among staff members. The integration of individual and group clinical supervision into the work schedule can reduce burnout and moral distress. Discussing and sharing practice issues (debriefing) reduces anxiety, burnout, and the frequency of conflicts between colleagues.

1 European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment (CPT).

Effective focus on the situation, self-awareness, self-confidence, good time management, regular feedback, and the development of communication techniques are crucial. It is imperative to emphasize that individuals entering the psychiatric field should have a profound understanding of their fears, anxieties, and sensitivities, as emphasized by Meerwijk et al. (2007). While the findings are supported, further intensive research is necessary to strengthen their credibility. Extending the material would contribute to a more robust understanding of the subject.

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 Heim Pal National Pediatric Institute IKEB (Hungarian acronym for Institutional Board of Research Ethics) (Authorization number: KUT-26/2022). 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

GS: conceptualization, data curation, and supervision. KT: validation. GC: validation, and translation. GF: formal analysis, investigation, methodology, project administration, translation, writing—original draft, and writing—editing. All authors contributed to the article and approved the submitted version.

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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References

Alden, L. E., Regambal, M. J., and Laposa, J. M. (2008). The effects of direct versus witnessed threat on emergency department healthcare workers: implications for PTSD criterion a. *J. Anxiety Disord.* 22, 1337–1346. doi: 10.1016/j.janxdis.2008.01.013

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., et al. (2006). The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *Eur. Arch. Psychiatry Clin. Neurosci.* 256, 174–186. doi: 10.1007/s00406-005-0624-4

Angland, S., Dowling, M., and Casey, D. (2014). Nurses' perceptions of the factors which cause violence and aggression in the emergency department: a qualitative study. *Int. Emerg. Nurs.* 22, 134–139. doi: 10.1016/j.ienj.2013.09.005

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *Nurs. Plus Open* 2, 8–14. doi: 10.1016/j.npls.2016.01.001

Bonner, G., Lowe, T., Rawcliffe, D., and Wellman, N. (2002). Trauma for all: a pilot study of the subjective experience of the physical restraint for mental health inpatients and staff in the UK. *J. Psychiatr. Ment. Health Nurs.* 9, 465–473. doi: 10.1046/j.1365-2850.2002.00504.x

Braun, V., and Clarke, V. (2006). Using thematic analysis in psychology. *Qual. Res. Psychol.* 3, 77–101. doi: 10.1191/1478088706qp063oa

Brewer, S. (1999). Commentary. The cost of violence to healthcare workers. *NT Res.* 4, 116–118. doi: 10.1177/136140969900400205

Brophy, J. T., Keith, M. M., and Hurley, M. (2017). Assaulted and unheard: violence against healthcare staff. *New Solut. J. Environ. Occup. Health Policy* 27, 581–606. doi: 10.1177/1048291117732301

Brunero, S., and Stein-Parbury, J. (2008). The effectiveness of clinical supervision in nursing: an evidence-based literature review. *Aust. J. Adv. Nurs.* 25, 86–94.

Bryant, L. (2010). Clinical supervision. *Pract. Nurs.* 39, 36–41.

Burnard, P. (1991). A method of analyzing interview transcripts in qualitative research. *Nurse Educ. Today* 11, 461–466. doi: 10.1016/0260-6917(91)90009-y

Dack, C., Ross, J., Papadopoulos, C., Stewart, D., and Bowers, L. (2013). A review and meta-analysis of the patient factors associated with psychiatric in-patient aggression. *Acta Psychiatr. Scand.* 127, 255–268. doi: 10.1111/acps.12053

Ezeobele, I. E., McBride, R., Engstrom, A., and Lane, S. D. (2019). Aggression in acute inpatient psychiatric care: a survey of staff attitudes. *Can. J. Nurs. Res.* 51, 145–153. doi: 10.1177/0844562118823591

Faulkner-Gibson, L (2012). "Mental health nurses' perceptions of aggression in children" in *Violence in the Health Sector, Proceedings of the Third International Linking Local Initiatives With Global Learning.* (eds.) Needham, I., McKenna, K., Kingma, M., Oud, N. pp. 219–222.

Fleury, H.W., and Van Engelen, Y.M. (2007). "Workshop 1—management of aggression—control, avoidance, or contact? A different perspective on the management of aggression and disruptive behavior in (child) mental health care and (special) school practice" in *Proceedings of the 5th European Congress on violence in Clinical Psychiatry* (eds.) Callaghan P., Nijman H., Palmstierna T., Oud N. pp. 59–62.

Gale, C., Arroll, B., and Coverdale, J. (2009). The 12-month prevalence of patient-initiated aggression against psychiatrists: a New Zealand National Survey. *Int. J. Psychiatry Med.* 39, 79–87. doi: 10.2190/PM.39.1.f

Gaskill, R. L., and Perry, B. D. (2012). "Child sexual abuse, traumatic experiences, and their impact on the developing brain" in *Handbook of Child Sexual Abuse: Identification, Assessment, and Treatment*. ed. P. Goodyear-Brown (Hoboken, New Jersey: John Wiley & Sons, Inc.), 29–47.

Gillespie, G. L., Bresler, S., Gates, D. M., and Succop, P. (2013). Posttraumatic stress symptomatology among emergency department workers following workplace aggression. *Workplace Health Safe.* 61, 247–254. doi: 10.1177/216507991306100603

Goethals, K., and van Marle, H. (2007) "Behaviour problems in childhood and adolescence in schizophrenic offenders: an exploratory study" in *Proceedings of the 5th European Congress on Violence in Clinical Psychiatry*. (eds.) Callaghan P., Nijman H., Palmstierna T., Oud N. pp. 117–119.

Hoffmann, U., Clemens, V., König, E., Brähler, E., and Fegert, J. M. (2020). Violence against children and adolescents by nursing staff: prevalence rates and implications for practice. *Child Adolesc. Psychiatry Ment. Health* 14:43. doi: 10.1186/s13034-020-00350-6

Iozzino, L., Ferrari, C., Large, M., Nielssen, O., and de Girolamo, G. (2015). Prevalence and risk factors of violence by psychiatric acute inpatients: a systematic review and Meta-analysis. *PLoS One* 10:e0128536. doi: 10.1371/journal.pone.0128536

Irinyi, T., Németh, A., and Lampek, K. (2017). Az egészségügyi szakdolgozókat ért agresszív cselekmények kapcsolata szociodemográfiai és munkahelyi tényezőkkel. *Orvosi Hetilap OH* 158, 229–237. doi: 10.1556/650.2017.30658

Lau, J. B. C., Magarey, J., and Wiechula, R. (2012). Violence in the emergency department: an ethnographic study (part II). *Int. Emerg. Nurs.* 20, 126–132. doi: 10.1016/j.ienj.2011.08.001

Meerwijk, E.L., van der Bijl, J.J., and de Boer, F. (2007). "Self-efficacy in self-management programs to prevent aggression in children with a psychiatric disorder" in *Proceedings of the 5th European Congress on Violence in Clinical Psychiatry*. eds. Callaghan P., Nijman H., Palmstierna T., Oud N pp. 264–267.

MohammadiGorji, S., Bosch, S. J., Valipoor, S., and De Portu, G. (2021). Investigating the impact of healthcare environmental design on staff security: a systematic review. *HERD* 14, 251–272. doi: 10.1177/1937586720921407

Moylan, L. B., and Cullinan, M. (2011). Frequency of assault and severity of the injury of psychiatric nurses in relation to the nurses' decision to restrain. *J. Psychiatr. Ment. Health Nurs.* 18, 526–534. doi: 10.1111/j.1365-2850.2011.01699.x

Neumann, M., and Klatt, T. (2022). Identifying predictors of inpatient verbal aggression in a forensic psychiatric setting using a tree-based modeling approach. *J. Interpers. Violenc.* 37, NP16351–NP16376. doi: 10.1177/088626052 11021972

Nijman, H. L. I. (2002). A model of aggression in psychiatric hospitals. *Acta Psychiatr. Scand.* 106, 142–143. doi: 10.1034/j.1600-0447.106.s412.30.x

Perry, B. (1984). Escape from freedom, criminal style: the hidden advantages of being in jail. *J. Psychiatry Law* 12, 215–230. doi: 10.1177/009318538401200205

Perry, B. D. (2008). "Child maltreatment: a neurodevelopmental perspective on the role of trauma and neglect on psychopathology" in *Child and Adolescent Psychopathology*. eds. T. P. Beauchaine and S. P. Hinshaw (Hoboken, NJ: John Wiley), 93–129.

Pich, J., Hazelton, M., Sundin, D., and Kable, A. (2011). Patient-related violence at triage: a qualitative descriptive study. *Int. Emerg. Nurs.* 19, 12–19. doi: 10.1016/j.ienj.2009.11.007

Ráczkevy-Deák, G., and Besenyő, J. (2022). Egészségügyi dolgozók ellen elkövetett erőszakos cselekedetek. *Orv. Hetil.* 163, 1112–1122. doi: 10.1556/650.2022.32466

Online references

URL1: 16th General Report on the CPT's activities (n.d.). Available at: https://rm.coe.int/1680696a83

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Ambivalent identification mediates the relationship between organizational justice and stress

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The present study aims to examine the relationship between organizational justice and employee stress through the lenses of social identity theory and the ambivalent identification process. The research hypotheses assume that employees working in organizational environments with low levels of justice could experience more stress, and this relationship is also mediated by ambivalent identification. In other words, the mediating mechanism of this relation posited that low levels of organizational justice were associated with high levels of ambivalent identification, which in turn increased levels of work-related stress. Across a field study in several organizations from healthcare sectors, results confirmed that employees treated with less fairness experienced high ambivalence toward their organization, which increased their perception of stress, i.e., work-related burnout, client-related burnout, physical symptoms, and interpersonal strain at work. Furthermore, results supported only a full mediation model, in which the direct relationship between organizational justice and stress was not significant. The present results make an important contribution to the research literature on justice: the inclusion of the mediator variable, namely, ambivalent identification, drops the expected direct effect of organizational justice on stress, suggesting a call for action in adopting the social identity perspective in addition to organizational justice models, and specifically introducing the study of a detrimental form of identification, such as ambivalent identification. Limitations and practical implications of the study were discussed.

KEYWORDS

ambivalent identification, organizational justice, stress, social identity, work-related burnout, client-related burnout, interpersonal strain, physical symptoms

1 Introduction

What could be more frustrating than a colleague receiving credit for a job you did? It is generally accepted that when facing unfair situations, the immediate reaction could be anger or negative emotions (Fox et al., 2001; Pérez-Rodríguez et al., 2019), but sometimes such conditions could have even worse effects on both individuals and organizations, like employee turnover intention or withdrawal (Conlon et al., 2005; Moon, 2017; Zhou et al., 2022). Nevertheless, if employees have a strong desire to keep working with the perpetrator of the injustice, or with the group of colleagues they admire, their reactions or consequences could not be so consistent or linear. In literature, the investigation of employees' reactions more rarely takes into account the complexity of contradictory inner feelings that arise from a disjunction between people's aspirations and desires and the actual possibility of realizing them. On the other hand, studies over the past three decades have provided important information about the negative effects of organizational (in)justice or unfairness (e.g., Colquitt et al., 2001), across

cultures and countries, specifically on health and psychological well-being (Fischer, 2013; Silva and Caetano, 2016). Most of the literature recognizes that a perceived lack of organizational justice or fairness represents an important psychosocial risk factor particularly related to high levels of stress, that may even lead to coronary heart disease (Sara et al., 2018), inducing a profound negative impact on employee well-being. Hence, understanding the relationship between organizational justice and stress is vital for organizations aiming to enhance employee well-being and organizational performance. By identifying how organizational injustice can increase employee stress levels, organizations can develop targeted interventions and policies to promote a fair and supportive work environment, limiting the negative consequences for the whole organization. Accordingly, the purpose of this investigation is not only to explore the relationship between organizational justice and stress, but also to propose an explanatory mechanism for this link. Thus, the present study has two aims. First, testing the direct relationship between organizational justice and different outcomes of stress. Second, exploring how this relationship works, hypothesizing the mediating role of ambivalent identification between the justice-stress relationship, that is adopting the social identity perspective to empirically evaluate whether the mediator explains why the effect of organizational justice on stress happens.

To date, the field of organizational justice has produced different models of studying employee perceptions of fairness and their correlates (see, e.g., Greenberg, 1987; Greenberg and Colquitt, 2013; Cropanzano and Ambrose, 2015). Of particular concern for employee health is the relationship between organizational justice and work-related stress, which has been widely supported by empirical literature (see Cropanzano and Wright, 2011). For example, researchers found that low perceived justice was associated with sickness absence from work, in presence of poor self-rated health, and minor psychiatric disorders (Elovainio et al., 2002). Fox et al. (2001) used a theoretical job stress framework considering organizational justice as a fundamental job stressor that could lead to behavioral strain responses, such as counterproductive work behaviors, and negative emotions (Fox et al., 2001). The link between organizational justice and perceived stress was also found in a study by Judge and Colquitt (2004), who examined the mediational role of work–family conflict in this relationship. Another study on this link confirmed that two specific dimensions of organizational justice, namely, distributive and procedural, were related to a general measure of job stress (Lambert et al., 2007). The organizational justice models have also been applied to examine their association with stress-related disorders, like sickness absence (Head et al., 2007), but also burnout, and depression (Liljegren and Ekberg, 2009; Ndjaboulé et al., 2012; Eib et al., 2018). Overall, these studies provide evidence for the negative impact of organizational (in)justice on employee health and well-being, although much of the literature mainly focuses on mental health and psychiatric disorders (e.g., Elovainio et al., 2009; Ndjaboulé et al., 2012; Fischer et al., 2014). As a matter of fact, only a limited number of studies have examined the association between organizational justice and specific measures of work-related stress. Accordingly, based on the literature reviewed here, and the consideration that more attention should be paid to unexplored outcomes (Cachón-Alonso and Elovainio, 2022), the following hypothesis was posited:

> *Hypothesis 1*: Organizational justice will be negatively related to perceptions of stress, i.e., work-related burnout, client-related burnout, physical symptoms, and interpersonal strain at work.

With regard to the mechanisms that can explain the association between organizational justice and stress, there is still very little scientific understanding of this aspect. Although some research has explored this link using different theoretical frameworks (see, e.g., Pérez-Rodríguez et al., 2019; Murtaza et al., 2023), much of the perspective adopted considers employees as isolated agents within the organization in which they work, neglecting that they are immersed in social contexts. As Tajfel and Turner stated: "In our judgments of other people, […] in our work relations, in our concern with justice, we do not act as isolated individuals but as social beings who derive an important part of our identity from the human groups and social categories we belong to; and we act in accordance with this awareness" (Tajfel et al., 1984, p. 5). Building on social identity and self-categorization perspectives, we can thus explain why individuals interpret external stimuli as stressors, and what happens when they cannot rely on their internal resources – such as their strong identification with their organization – to cope with stress. According to this perspective, the organizational identity becomes part of individuals' self-concept (Tajfel and Turner, 1979; Turner et al., 1987), experiencing a particular type of social identity, that is, employee identification towards the organization (Ashforth and Mael, 1989), protecting individuals from developing stress responses (Steffens et al., 2017; Ciampa et al., 2019). Therefore, considering that the definition of ourselves varies as a function of contexts, employees' social identity cannot become salient when injustice and inequity characterize the organization and people are treated unfairly. In such conditions, indeed, the sense of "we" or "us" may not raise stronger than the sense of "I" or "me," undermining the process to define "myself" as a group member (in contrast to outgroup members). Consequently, when the contextual conditions are not favorable, i.e., in the presence of organizational injustice, individuals could develop conflicting emotions and cognitions toward the organization, simultaneously identifying with some aspects while rejecting other aspects of their organization that they do not want to integrate into their self-definition, developing contradictory and ambivalent attachments (Pratt, 2000; Kreiner and Ashforth, 2004). Ambivalent identities may be elicited in such situations because individuals must struggle between a context discouraging their social identity (or rather not fostering it), and their implicit desire for belongingness. The social need of belonging to the ingroup is indeed a primary inner motivator that comes from the need to enhance social self-esteem and to achieve collective self-actualization, which is not less important than the need for personal self-actualization and self-esteem (Leavitt, 1995; Haslam, 2004, p. 386). Moreover, Ashforth et al. (2014) argue that organizational dualities are particularly likely to provoke ambivalence because they simultaneously promote opposite norms, values, and beliefs about what is and what is not acceptable within the ingroup (e.g., competition versus cooperation). For example, when the management establishes a collective goal, but employees are not treated fairly receiving different honors and payoffs based on the boss' preferences, this could implicitly spread the idea that cooperation for a common goal does not benefit the whole group. Consequently, a violation of the explicit norms settled by the management about, e.g., rewarding a completed task, can induce employees to compete against

each other, instead of cooperating for a common goal. Such dualities are thus a potential way to develop and spread "paradoxes of belonging" (Smith and Berg, 1987): all those situations that we can call injustices or unfair conditions can easily undermine the sense of "us" of the group, inducing ambivalent feelings, particularly in employees who do not benefit from unequal treatments.

About the consequences of ambivalent identification on employee health, this relationship has not been thoroughly examined in previous research within organizational psychology, despite the literature offering some general models of potential adverse effects of ambivalence (Pratt, 2000; Rothman et al., 2017; Zhao and Zhou, 2021; Wu et al., 2023). For example, a study by Ciampa et al. (2019) revealed that ambivalent identification was positively associated with ego depletion and emotional exhaustion (Ciampa et al., 2019). More specifically, their results showed that the negative association between positive organizational identification and strain was significant and stronger for employees experiencing low levels of ambivalence, meaning that the presence of ambivalence decreases the likelihood that a clear identification may protect against stress reactions (Ciampa et al., 2019). In the same vein, another recent study linked ambivalent leadership to different mental health outcomes in employees, i.e., depression, anxiety, vital exhaustion, and fatigue, both at within-group and between-group levels (Herr et al., 2022). In summary, according to the literature reviewed here, there are reasons to expect that ambivalent identification would mediate the relationship between (in) justice and stress, representing a detrimental factor for employee health. Therefore, the following two predictions were advanced:

> *Hypothesis 2*: Organizational justice will be negatively related to ambivalent identification.
>
> *Hypothesis 3*: The negative relationships among organizational justice and work-related burnout, client-related burnout, physical symptoms, and interpersonal strain at work will be partially mediated by ambivalent identification, which, in turn, will be positively associated with such stress outcomes.

Overall, the present study can contribute to the literature by highlighting the role of ambivalent identification, a specific form of identification – related to the simultaneous coexistence of opposite orientations toward the organization – still overlooked in this area of research. Moreover, the focus on this negative dimension can be crucial in designing preventive programs aimed to develop individual and organizational resources to counteract organizational injustice and its consequences.

2 Method

2.1 Participants and procedures

Several organizations from public and private healthcare sectors were involved in the present study. Specifically, the target sample consisted of employees working in public hospitals and private clinics accredited by the National Health System, where the typical organizational structure would usually be a combination of a hierarchical and departmental structure. These organizational characteristics allowed the possibility of studying organizational justice in the presence of a chain of command, where some levels are subordinate to another level, but employees are organized in wards that have their own tasks. Furthermore, to select similar environmental conditions, only wards with staff working with hospitalized patients were included, while emergency and intensive care units were excluded. The employees invited to participate in the study were physicians, medical technicians, nurses, and administrative staff, excluding the top level of administrative services, such as the board of directors, executive officers, presidents, and vice presidents. A letter of invitation to participate in the study was sent to managers, explaining the purpose of this investigation, and requesting that employees with the required characteristics be invited to complete an anonymous questionnaire containing the research measures. Participation was completely voluntary, and the questionnaire was delivered to the managers via a unique online link that included the informed consent materials, which explained the anonymous nature of the data collection and their rights as research participants, while not asking for any personal information. After accepting the informed consent, a total of 195 useful questionnaires were returned from eleven regions of Italy. The average age of respondents was 47.95 ($SD = 10.14$), and the vast majority were male: only 29% were female, 16% were missing. Over half of the participants were doctors (55%), medical technicians (16%), nurses (10%), and administrative staff (4%; 16% were missing). Finally, average organizational tenure was 14.8 years ($SD = 9.95$), and work experience was 19.4 years ($SD = 10.97$).

2.2 Measures

Organizational Justice Index was measured using the Italian version (Capone and Petrillo, 2016) of the 10-item scale from Hoy and Tarter (2004). A sample item was "*In this organization, all workers are treated fairly*." Respondents indicated their agreement with each statement from 1 (*strongly disagree*) to 5 (*strongly agree*). The reliability of the scale was $\alpha = 0.92$.

Ambivalent Identification was measured with the 6-item scale developed by Kreiner and Ashforth (2004), using the Italian version translated by Ciampa (2018) and Ciampa et al. (2019, 2021). A sample item was "*I have mixed feelings about my affiliation with this organization*." Respondents indicated their agreement with each statement from 1 (*strongly disagree*) to 5 (*strongly agree*). The reliability of the scale was $\alpha = 0.83$.

Work-related Burnout (CBI) was measured using the Italian version of the 7-item subscale from the Copenhagen Burnout Inventory (CBI; Kristensen et al., 2005; Avanzi et al., 2013). Respondents indicated how often they experienced each statement on a Likert scale from 1 (*never*) to 5 (*always*). A sample item was "*Are you exhausted in the morning at the thought of another day at work*." The reliability of the scale was $\alpha = 0.82$.

Client-related Burnout (CBI) was measured using the Italian version of the 6-item subscale also selected from the Copenhagen Burnout Inventory (CBI; Kristensen et al., 2005; Avanzi et al., 2013). Participants indicated how much they experienced each statement on a Likert scale from 1 (*not at all*) to 5 (*extremely*), according to the original scale. A sample item was "*Do you find it frustrating to work with clients?*". The reliability of the scale was $\alpha = 0.85$.

Physical Symptoms Inventory (PSI) was measured with a 13-item scale developed by Spector and Jex (1998). Items included symptoms

such as "*Headache*," "*Backache*," "*Trouble sleeping*," and so on. Participants indicated how often they experienced each symptom from 1 (*not at all*) to 5 (*every day*). The reliability of the scale was $\alpha = 0.84$.

Interpersonal Strain at Work Scale (ISW) was measured with the Italian 6-item scale (Borgogni et al., 2012), rated on a 7-point frequency scale ranging from 0 (*never*) to 6 (*daily*). A sample item was "*At work, I treat others in a cold and detached manner*." The reliability of the scale was $\alpha = 0.88$.

Control variables. Based on previous literature, several sociodemographic variables, namely, age, sex, work experience, organizational tenure, and working hours, were included in the questionnaire as control variables that may potentially influence stress outcomes and employee well-being (see, e.g., Purvanova and Muros, 2010; Boyas et al., 2013; Antao et al., 2022; Lee et al., 2022; Schroeder et al., 2022). We used one-item measures for all control variables. Working hours were measured with the question "*How many hours do you work in total during a week?*," and employees were asked to choose an option among "20–29," "30–39," "40–49," "50–59," "60–69" hours. However, preliminary data analysis showed that none of the control variables was significantly associated with the dependent variables, apart from working hours, which showed a statistically significant difference only between 30–39 h and 50–59 h on work-related burnout ($F_{(4,160)} = 3.830$, $p < 0.01$, $\eta^2 = 0.09$), but not on other dependent variables. Accordingly, the hypothesized model was performed by controlling for working hours, and then it was compared to the same model without this control variable. From the comparison it emerged that standardized coefficients of the independent variables with and without the control variable differed by less than 0.1, therefore differences were considered negligible (Becker, 2005), as suggested by Becker et al. (2016) recommendations. Accordingly, only the results without the control variable were reported.

2.3 Analytic strategy

Structural equation models with latent variables were carried out with Mplus 8 (Muthén and Muthén, 1998-2017). Due to a moderate violation of the normality of some variables, the Weighted Least Squares Mean and Variance (WLSMV) estimation was used (Asparouhov and Muthén, 2010), which does not assume normally distributed variables and provides the best option for modeling ordered data (Beauducel and Herzberg, 2006; Brown, 2006). First, the hypothesized model was performed and compared with alternative models by evaluating goodness-of-fit indices (Kline, 2011). Second, to determine the size and significance of the indirect effects, estimates were bootstrapped 10,000 times from the final structural model and analyzed their standardized estimates along with the corresponding 95% confidence intervals (MacKinnon, 2008).

3 Results

3.1 Test of measurement model

To test the measurement model, a confirmatory factor analysis was performed using WLSMV estimation, consisting of the hypothesized six latent variables (i.e., organizational justice index, ambivalent identification, work-related burnout, client-related burnout, physical symptoms, and interpersonal strain at work) and their respective item-level indicators. The fit of this model was then compared with three plausible alternative models: one that combined the four outcomes of stress into a single factor, one that combined the independent variable and the mediator into a single factor, and finally, one that combined all the variables into a single factor. Based on the model fit indices shown in Table 1 and the robust Chi-Square Difference Testing of the nested models (Asparouhov and Muthén, 2006), the best-fitting model appeared to be the hypothesized six-factor model, since the models with constrained parameters appeared statistically different from the hypothesized model, indicating that the model with less parameters should be preferable. Moreover, each indicator had statistically significant factor loadings ($p < 0.001$) on its assigned dimension, confirming that a model considering six latent variables was appropriate.

3.2 Descriptive statistics and hypothesis tests

Table 2 presents the descriptive statistics, scale reliabilities, and intercorrelations among the study variables.

To test the hypothesized model, a structural equation model (Model 1) was performed using the WLSMV method of estimation. In this model, the direct and indirect effects were posited among organizational justice and the four outcomes. This model showed an adequate fit to the data: $\chi^2_{(1065)} = 1387.152$, $p = 0.000$; CFI = 0.966; TLI = 0.964, RMSEA = 0.039, C.I. = 0.033–0.045; SRMR = 0.079. However, contrary to Hypothesis 1, there were not statistically significant effects between organizational justice and work-related burnout ($\beta = -0.07$, $p = 0.351$), as well as client-related burnout ($\beta = -0.04$, $p = 0.652$), physical symptoms ($\beta = -0.01$, $p = 0.890$), and interpersonal strain ($\beta = -0.10$, $p = 0.146$). Nevertheless, as predicted by Hypothesis 2, organizational justice exerted a negative significant effect of −0.42 ($p < 0.001$) on ambivalent identification.

Considering the non-significant effects of organizational justice on each outcome, an alternative structural equation model (Model 2) was performed, in which the direct effects of organizational justice on work-related burnout, client-related burnout, physical symptoms, and interpersonal strain were constrained to be zero, or rather, the effect of organizational justice on all outcomes would be fully mediated by ambivalent identification. This model showed an excellent fit to the data: $\chi^2_{(1069)} = 1361.166$, $p = 0.000$; CFI = 0.969; TLI = 0.967, RMSEA = 0.038, C.I. = 0.031–0.043; SRMR = 0.080. Furthermore, results from the chi-square test for difference testing between Model 1 and Model 2 were not significant ($\Delta\chi^2_{(4)} = 2.922$; $p = 0.571$). Therefore, since parsimony is desirable in structural equation modeling (Preacher, 2006), Model 2 was preferred because the two models showed an equal level of fit to the data. Results of indirect effects are reported in Table 3.

As can be seen in Figure 1, organizational justice exerted a negative significant effect of −0.41 ($p < 0.001$) on ambivalent identification, supporting Hypothesis 1. Ambivalent identification, in turn, exerted a positive significant effect on work-related burnout ($\beta = 0.43$, $p < 0.001$), client-related burnout ($\beta = 0.40$, $p < 0.001$), physical symptoms ($\beta = 0.31$, $p < 0.001$), and interpersonal strain ($\beta = 0.33$, $p < 0.001$), that is higher levels of ambivalent identification

TABLE 1 Confirmatory factor analysis results for the test of the measurement model.

Model	χ^2	df	CFI	TLI	RMSEA (90% C.I.)	SRMR	Chi-square test for difference testing	df	*p*-Value
Hypothesized 6-factor model	1387.152*	1,065	0.966	0.964	0.039 (0.033–0.045)	0.079	–	–	–
Model combining OJI and AID (5 factors)	1853.632*	1,070	0.917	0.913	0.061 (0.057–0.066)	0.101	153.464	5	0.000
Model combining WRB, CRB, PS, IS (3 factors)	2249.037*	1,077	0.876	0.870	0.075 (0.071–0.079)	0.119	263.627	12	0.000
Model combining OJI, AID, WRB, CRB, PS, IS (1 factor)	6123.326*	1,080	0.467	0.443	0.155 (0.151–0.159)	0.244	1059.986	15	0.000

OJI, Organizational Justice Index; AID, Ambivalent Identification; WRB, Work-Related Burnout; CRB, Client-Related Burnout; PS, Physical Symptoms; IS, Interpersonal Strain at work. The chi-square statistic reflects the difference test between the hypothesized tested model and the respective nested models; *$p < 0.001$.

TABLE 2 Descriptive statistics reliabilities (Cronbach's alpha) and intercorrelations of all study variables.

	M	SD	Sk	Ku	α	1	2	3	4	5
1. Organizational justice index	3.70	1.03	−0.16	−0.82	0.92	–				
2. Ambivalent identification	2.61	0.73	−0.06	−0.39	0.83	−0.39**	–			
3. Work-related burnout	2.57	0.71	0.06	−0.46	0.82	−0.19**	0.33**	–		
4. Client-related burnout	2.26	0.80	0.28	−0.87	0.85	−0.14	0.36**	0.56**	–	
5. Physical symptoms inventory	1.72	0.57	1.37	2.58	0.84	−0.12	0.24**	0.43**	0.36**	–
6. Interpersonal strain at work	1.93	0.79	1.91	5.88	0.88	−0.05	0.27**	0.28**	0.39**	0.18*

M, mean; SD, standard deviation; Sk, skewness; Ku, kurtosis; α, Cronbach's alpha; *$p < 0.05$, **$p < 0.01$.

TABLE 3 Results of the indirect effects.

Total and specific indirect effects	β	*SE*	95% C.I.
OJI → AID → Work-related burnout	−0.174*	0.048	[−0.278; −0.088]
OJI → AID → Client-related burnout	−0.161*	0.046	[−0.266; −0.073]
OJI → AID → Physical Symptoms Inventory	−0.128*	0.036	[−0.214; −0.068]
OJI → AID → Interpersonal Strain at work	−0.132*	0.038	[−0.214; −0.058]

Total, total effects, and specific indirect effects are equal since it is a full mediation model. OJI, Organizational Justice Index, AID, Ambivalent Identification. SE, standard error. 95% confidence intervals (95% CIs) are based on a $N = 10{,}000$ sample bootstrapping method; *$p < 0.001$.

were associated to higher levels of stress on a moderate extent. Overall, the model explained the 17% of ambivalent identification variance and the 18% of work-related burnout variance, the 16% of client-related burnout variance, the 10% of physical symptoms variance, and the 11% of interpersonal strain variance. Results of the indirect specific effects of organizational justice to stress outcomes through the mediator are presented in Table 3.

4 Discussion

The present findings show that employees working in unfair organizational contexts can develop ambivalent identification toward their organizations, which, in turn, can lead to stress reactions in terms of work-related burnout, client-related burnout, physical symptoms, and interpersonal strain at work. These findings emphasize the significant role of ambivalent identification, demonstrating how organizational (in)justice can lead to substantial impairments of psychological well-being. In line with previous findings, these results highlight the link between ambivalent identification and negative outcomes (Ciampa et al., 2019, 2021), supporting the notion that ambivalence represents a detrimental form of identification (Pratt, 2000). Overall, these results contribute to the research literature in two ways. First, although organizational justice was previously linked to employee stress and health, only a few studies explored the psychological mechanisms to explain this relationship (e.g., Judge and Colquitt, 2004), and none of them adopted a comprehensive theoretical framework that considers organizational contexts as social environments, emphasizing the context-dependent nature of groups and their function of social comparison (Turner et al., 1994; Hogg and Terry, 2000). The fact that ambivalent identification fully mediates the relationship between organizational justice and stress further confirms the importance of considering the role of social identities and their potential effects on employee health. Second, this represents the first

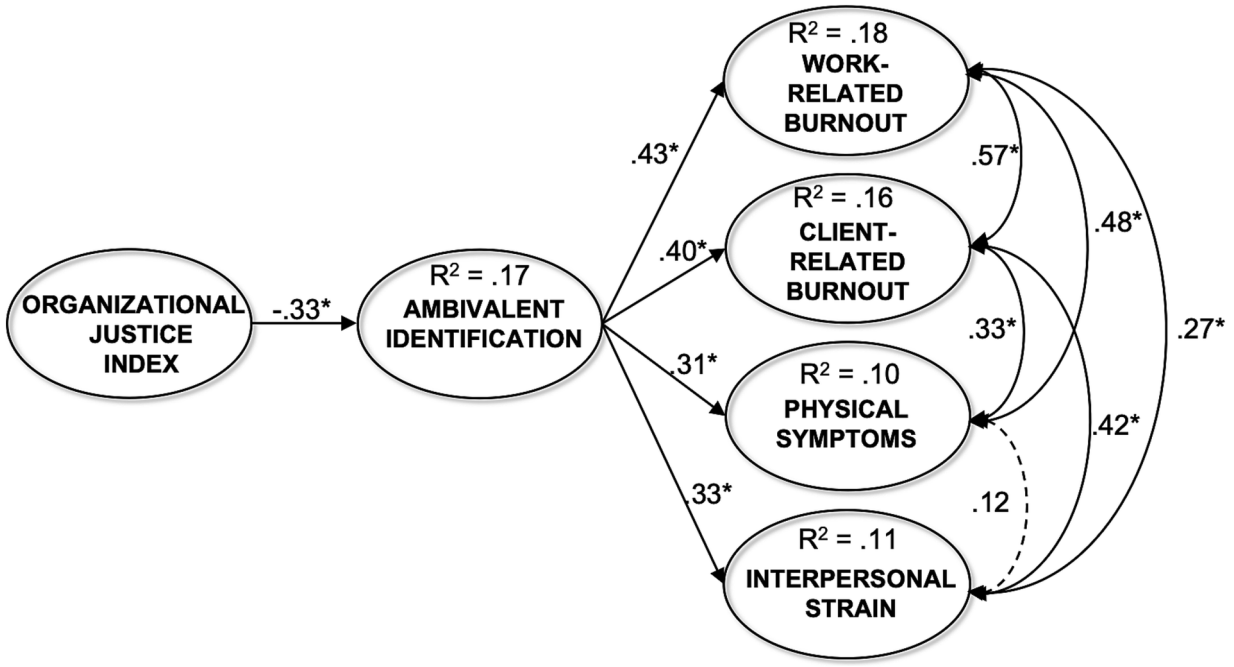

FIGURE 1
Results from the final structural equation model (Model 2). Coefficients are reported in a standardized form; *$p < 0.001$. The dotted line is a non-significant effect.

empirical study considering organizational justice as a predictor of ambivalent identification. Although Ashforth et al. (2014) suggested numerous possibilities for future research questions about organizational triggers of ambivalence, proposing a comprehensive conceptual framework for their relationships, this is the first empirical attempt in that direction.

Some limitations should also be taken into account. First, despite the novelty of adopting a social identity perspective along with the ambivalence model in examining the link between organizational justice and stress, the data were gathered from a single source via self-report measures; this is a general potential limitation regarding the reliability of the measurements and their relationships. However, considering the nature of identification processes, it is recommended the use of self-report questionnaires for capturing individuals' self-definition in terms of their unique traits and features (Ciampa et al., 2019). Therefore, future studies could include other sources of information regarding at least stress and health outcomes. A second limitation of the study is related to the cross-sectional nature of the data collection since this research design does not provide evidence of causality. This limitation could be addressed by replicating the present study using, ideally, longitudinal and experimental designs. However, the social identity model of stress (Haslam, 2004) and the multilevel perspective of ambivalence by Ashforth et al. (2014) are both in line with the causal direction suggested in the present study, which is the first that considers organizational justice as a trigger of ambivalent identification. A third limitation of the study relates to the generalizability of the findings. Because a convenience sampling method was used to collect the data, it was not possible to obtain more detailed information on the response rate or to control for variables that may have affected the response rate. Accordingly, although the participants were selected from among healthcare professionals, these findings cannot be strictly generalized to healthcare contexts without first extending the present results. Moreover, it is surprising that more than half of the participants in this study were doctors (55%), as the literature generally shows lower participation of doctors in research studies (see, e.g., Hummers-Pradier et al., 2008), mostly compared to nurses. Furthermore, given the size of the sample, these results indicate a trend that should be confirmed in future studies in the healthcare sector in order to generalize these findings, and these hypotheses could also be extended to other types of organizations.

Despite these limitations, this study contributes to future research questions: further research would benefit from the consideration of using different outcomes of stress and well-being, but also additional outcomes concerning cognitions and behaviors. Moreover, a different research design, such as a multilevel perspective, could explore the associations between ambivalence and organizational or group-level consequences, as proposed by Ashforth et al. (2014) model. Finally, future research should investigate organizational factors that determine, maintain, or facilitate ambivalent identification processes, broadening Kreiner and Ashforth's (2004) empirical research which primarily focused on individual predictors, like intrarole conflict and breach of psychological contract. A fruitful investigation could also explore whether different facets of organizational justice, such as distributive, procedural, interpersonal, and informational justice (see, e.g., Greenberg and Colquitt, 2013) are differently related to ambivalent identification. The present study also offers practical implications. First, it can inform about the importance of reducing potential feelings of ambivalence toward the organization by implementing actions to minimize employees' perceptions of unfair treatments within the organization. Organizations can allocate

resources to develop strong positive identifications, adopting the social identity approach suggested by Haslam (2004). For example, improving a better communication climate (Smidts et al., 2001) and promoting equitable job conditions, like reducing short-term contracts (Johnson and Ashforth, 2008), or adopting the 5R program (Haslam et al., 2017) to foster stronger organizational and team identities, can help leaders and practitioners to reduce ambivalence toward the organization and its negative effects.

Data availability statement

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

Ethics statement

All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional research committee (Department of Psychology, Sapienza University of Rome) and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The participants provided their written informed consent to participate in this study.

Author contributions

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

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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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References

Antao, H. S., Sacadura-Leite, E., Correia, A. I., and Figueira, M. L. (2022). Burnout in hospital healthcare workers after the second COVID-19 wave: job tenure as a potential protective factor. *Front. Psychol.* 13:942727. doi: 10.3389/fpsyg.2022.942727

Ashforth, B. E., and Mael, F. (1989). Social identity theory and the organization. *Acad. Manag. Rev.* 14, 20–39. doi: 10.2307/258189

Ashforth, B. E., Rogers, K. M., Pratt, M. G., and Pradies, C. (2014). Ambivalence in organizations: a multilevel approach. *Organ. Sci.* 25, 1453–1478. doi: 10.1287/orsc.2014.0909

Asparouhov, T., and Muthén, B. (2006). Robust Chi Square difference testing with mean and variance adjusted test statistics (Mplus web notes: No. 10). Available at: http://statmodel.com/download/webnotes/webnote10.pdf

Asparouhov, T., and Muthén, B. (2010). Simple second-order chi-square correction (Mplus web notes no. 21). Available at: https://www.statmodel.com/download/WLSMV_new_chi21.pdf

Avanzi, L., Balducci, C., and Fraccaroli, F. (2013). Contributo alla validazione italiana del Copenhagen burnout inventory (CBI) [contribution to the Italian validation of the Copenhagen burnout inventory (CBI)]. *Psicologia della Salute* 2, 120–135. doi: 10.3280/PDS2013-002008

Beauducel, A., and Herzberg, P. Y. (2006). On the performance of maximum likelihood versus means and variance adjusted weighted least squares estimation in CFA. *Struct. Equ. Model.* 13, 186–203. doi: 10.1207/s15328007sem1302_2

Becker, T. E. (2005). Potential problems in the statistical control of variables in organizational research: a qualitative analysis with recommendations. *Organ. Res. Methods* 8, 274–289. doi: 10.1177/1094428105278021

Becker, T. E., Atinc, G., Breaugh, J. A., Carlson, K. D., Edwards, J. R., and Spector, P. E. (2016). Statistical control in correlational studies: 10 essential recommendations for organizational researchers. *J. Organ. Behav.* 37, 157–167. doi: 10.1002/job.2053

Borgogni, L., Consiglio, C., Alessandri, G., and Schaufeli, W. B. (2012). "Don't throw the baby out with the bathwater!" interpersonal strain at work and burnout. *Eur. J. Work Organ. Psy.* 21, 875–898. doi: 10.1080/1359432X.2011.598653

Boyas, J. F., Wind, L. H., and Ruiz, E. (2013). Organizational tenure among child welfare workers, burnout, stress, and intent to leave: does employment-based social capital make a difference? *Child. Youth Serv. Rev.* 35, 1657–1669. doi: 10.1016/j.childyouth.2013.07.008

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. Guilford Press. New York City

Cachón-Alonso, L., and Elovainio, M. (2022). Organizational justice and health: reviewing two decades of studies. *J. Theor. Soc. Psychol.* 2022, 1–13. doi: 10.1155/2022/3218883

Capone, V., and Petrillo, G. (2016). Teachers' perceptions of fairness, well-being and burnout: a contribution to the validation of the organizational justice index by Hoy and Tarter. *Int. J. Educ. Manag.* 30, 864–880. doi: 10.1108/IJEM-02-2015-0013

Ciampa, V. (2018). Different forms of (dis)affection with the organization: the positive influence of organizational identification on employees [doctoral dissertation, University of Trento]. University of Trento Research Repository. Available at: https://hdl.handle.net/11572/367595

Ciampa, V., Sirowatka, M., Schuh, S. C., Fraccaroli, F., and van Dick, R. (2021). Ambivalent identification as a moderator of the link between organizational identification and counterproductive work behaviors. *J. Bus. Ethics* 169, 119–134. doi: 10.1007/s10551-019-04262-0

Ciampa, V., Steffens, N. K., Schuh, S. C., Fraccaroli, F., and Van Dick, R. (2019). Identity and stress: an application of the expanded model of organisational identification in predicting strain at work. *Work Stress* 33, 351–365. doi: 10.1080/02678373.2018.1521884

Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., and Ng, K. Y. (2001). Justice at the millennium: a meta-analytic review of 25 years of organizational justice research. *J. Appl. Psychol.* 86, 425–445. doi: 10.1037/0021-9010.86.3.425

Conlon, D. E., Meyer, C. J., and Nowakowski, J. M. (2005). "How does organizational justice affect performance, withdrawal, and counterproductive behavior?" in *Handbook*

of organizational justice. eds. J. Greenberg and J. A. Colquitt (Mahwah, NJ: Lawrence Erlbaum Associates Publishers), 301–327.

Cropanzano, R. S., and Ambrose, M. L. (2015). "Organizational justice: where we have been and where we are going" in *The Oxford handbook of justice in the workplace*. eds. R. S. Cropanzano and M. L. Ambrose (Washington, DC: American Psychological Association), 3–13.

Cropanzano, R., and Wright, T. A. (2011). "The impact of organizational justice on occupational health" in *Handbook of occupational health psychology*. eds. J. C. Quick and L. E. Tetrick. *2nd* ed (Washington, DC: American Psychological Association), 205–219.

Eib, C., Bernhard-Oettel, C., Magnusson Hanson, L. L., and Leineweber, C. (2018). Organizational justice and health: studying mental preoccupation with work and social support as mediators for lagged and reversed relationships. *J. Occup. Health Psychol.* 23, 553–567. doi: 10.1037/ocp0000115

Elovainio, M., Ferrie, J. E., Gimeno, D., De Vogli, R., Shipley, M., Brunner, E. J., et al. (2009). Organizational justice and sleeping problems: the Whitehall II study. *Psychosom. Med.* 71, 334–340. doi: 10.1097/PSY.0b013e3181960665

Elovainio, M., Kivimäki, M., and Vahtera, J. (2002). Organizational justice: evidence of a new psychosocial predictor of health. *Am. J. Public Health* 92, 105–108. doi: 10.2105/AJPH.92.1.105

Fischer, R. (2013). Belonging, status, or self-protection? Examining justice motives in a three-level cultural meta-analysis of organizational justice effects. *Cross-Cult. Res.* 47, 3–41. doi: 10.1177/1069397112470424

Fischer, R., Abubakar, A., and Nyaboke Arasa, J. (2014). Organizational justice and mental health: a multi-level test of justice interactions. *Int. J. Psychol.* 49, 108–114. doi: 10.1002/ijop.12005

Fox, S., Spector, P. E., and Miles, D. (2001). Counterproductive work behavior (CWB) in response to job stressors and organizational justice: some mediator and moderator tests for autonomy and emotions. *J. Vocat. Behav.* 59, 291–309. doi: 10.1006/jvbe.2001.1803

Greenberg, J. (1987). A taxonomy of organizational justice theories. *Acad. Manag. Rev.* 12, 9–22. doi: 10.2307/257990

Greenberg, J., and Colquitt, J. A. (Eds.). (2013). *Handbook of organizational justice*. Psychology Press. London

Haslam, S. A. (2004). *Psychology in organizations*. SAGE Publications. Thousand Oaks, CA.

Haslam, S. A., Steffens, N. K., Peters, K., Boyce, R. A., Mallett, C. J., and Fransen, K. (2017). A social identity approach to leadership development: the 5R program. *J. Pers. Psychol.* 16, 113–124. doi: 10.1027/1866-5888/a000176

Head, J., Kivimäki, M., Siegrist, J., Ferrie, J. E., Vahtera, J., Shipley, M. J., et al. (2007). Effort–reward imbalance and relational injustice at work predict sickness absence: the Whitehall II study. *J. Psychosom. Res.* 63, 433–440. doi: 10.1016/j.jpsychores.2007.06.021

Herr, R. M., Birmingham, W. C., van Harreveld, F., van Vianen, A. E., Fischer, J. E., and Bosch, J. A. (2022). The relationship between ambivalence towards supervisor's behavior and employee's mental health. *Sci. Rep.* 12:9555. doi: 10.1038/s41598-022-13533-2

Hogg, M. A., and Terry, D. I. (2000). Social identity and self-categorization processes in organizational contexts. *Acad. Manag. Rev.* 25, 121–140. doi: 10.2307/259266

Hoy, W. K., and Tarter, C. J. (2004). Organizational justice in schools: no justice without trust. *Int. J. Educ. Manag.* 18, 250–259. doi: 10.1108/09513540410538831

Hummers-Pradier, E., Scheidt-Nave, C., Martin, H., Heinemann, S., Kochen, M. M., and Himmel, W. (2008). Simply no time? Barriers to GPs' participation in primary health care research. *Family practice* 25, 105–112. doi: 10.1093/fampra/cmn015

Johnson, S. A., and Ashforth, B. E. (2008). Externalization of employment in a service environment: the role of organizational and customer identification. *J. Organ. Behav.* 29, 287–309. doi: 10.1002/job.477

Judge, T. A., and Colquitt, J. A. (2004). Organizational justice and stress: the mediating role of work-family conflict. *J. Appl. Psychol.* 89, 395–404. doi: 10.1037/0021-9010.89.3.395

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (*3rd*). New York: Guilford.

Kreiner, G. E., and Ashforth, B. E. (2004). Evidence toward an expanded model of organizational identification. *J. Organ. Behav.* 25, 1–27. doi: 10.1002/job.234

Kristensen, T. S., Borritz, M., Villadsen, E., and Christensen, K. (2005). The Copenhagen burnout inventory: a new tool for the assessment of burnout. *Work Stress* 19, 192–207. doi: 10.1080/02678370500297720

Lambert, E. G., Hogan, N. L., and Griffin, M. L. (2007). The impact of distributive and procedural justice on correctional staff job stress, job satisfaction, and organizational commitment. *J. Crim. Just.* 35, 644–656. doi: 10.1016/j.jcrimjus.2007.09.001

Leavitt, H. J. (1995). "Suppose we took groups seriously…" in *Psychological dimensions of organizational behavior*. ed. B. M. Staw. *2nd* ed (Englewood Cliffs, NJ: Prentice Hall)

Lee, J., Conder, S., and Gonzalez-Mule, E. (2022). A meta-analysis of the effects of work hours on resource depletion, resource acquisition, and strain. *Acad. Manage. Ann. Meet. Proceed.* 2022:3784. doi: 10.5465/AMBPP.2022.17415abstract

Liljegren, M., and Ekberg, K. (2009). The associations between perceived distributive, procedural, and interactional organizational justice, self-rated health and burnout. *Work* 33, 43–51. doi: 10.3233/WOR-2009-0842

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Mahwah, NJ: Erlbaum.

Moon, K.-K. (2017). Fairness at the organizational level: examining the effect of organizational justice climate on collective turnover rates and organizational performance. *Public Pers. Manage.* 46, 118–143. doi: 10.1177/0091026017702610

Murtaza, G., Roques, O., Siegrist, J., and Talpur, Q. U. A. (2023). Unfairness and stress—an examination of two alternative models: organizational-justice and effort–reward imbalance. *Int. J. Public Adm.* 46, 602–612. doi: 10.1080/01900692.2021.2009854

Muthén, L. K., and Muthén, B. O. (1998-2017) *Mplus User's Guide*. *8th*. Los Angeles, CA: Muthén & Muthén.

Ndjaboulé, R., Brisson, C., and Vézina, M. (2012). Organisational justice and mental health: a systematic review of prospective studies. *Occup. Environ. Med.* 69, 694–700. doi: 10.1136/oemed-2011-100595

Pérez-Rodríguez, V., Topa, G., and Beléndez, M. (2019). Organizational justice and work stress: the mediating role of negative, but not positive, emotions. *Personal. Individ. Differ.* 151:109392. doi: 10.1016/j.paid.2019.04.047

Pratt, M. G. (2000). The good, the bad, and the ambivalent: managing identification among Amway distributors. *Adm. Sci. Q.* 45, 456–493. doi: 10.2307/2667106

Preacher, K. J. (2006). Quantifying parsimony in structural equation modeling. *Multivar. Behav. Res.* 41, 227–259. doi: 10.1207/s15327906mbr4103_1

Purvanova, R. K., and Muros, J. P. (2010). Gender differences in burnout: a meta-analysis. *J. Vocat. Behav.* 77, 168–185. doi: 10.1016/j.jvb.2010.04.006

Rothman, N. B., Pratt, M. G., Rees, L., and Vogus, T. J. (2017). Understanding the dual nature of ambivalence: why and when ambivalence leads to good and bad outcomes. *Acad. Manag. Ann.* 11, 33–72. doi: 10.5465/annals.2014.0066

Sara, J. D., Prasad, M., Eleid, M. F., Zhang, M., Widmer, R. J., and Lerman, A. (2018). Association between work-related stress and coronary heart disease: a review of prospective studies through the job strain, effort-reward balance, and organizational justice models. *J. Am. Heart Assoc.* 7:e008073. doi: 10.1161/JAHA.117.008073

Schroeder, S., Kelly, D., and Leighton, K. (2022). Influence of years of experience and age on hospital workforce compassion satisfaction, anxiety, depression, stress, and burnout during pandemic: implications for retention. *Psychol. Health Med.* 28, 1741–1754. doi: 10.1080/13548506.2022.2159988

Silva, M., and Caetano, A. (2016). Organizational justice across cultures: a systematic review of four decades of research and some directions for the future. *Soc. Justice Res* 29, 257–287. doi: 10.1007/s11211-016-0263-0

Smidts, A., Pruyn, A. T. H., and Van Riel, C. B. (2001). The impact of employee communication and perceived external prestige on organizational identification. *Acad. Manag. J.* 44, 1051–1062. doi: 10.2307/3069448

Smith, K. K., and Berg, D. N. (1987). *Paradoxes of group life: Understanding conflict, paralysis, and movement in group dynamics*. Jossey-Bass. Hoboken, NJ.

Spector, P. E., and Jex, S. M. (1998). Development of four self-report measures of job stressors and strain: interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *J. Occup. Health Psychol.* 3, 356–367. doi: 10.1037/1076-8998.3.4.356

Steffens, N. K., Haslam, S. A., Schuh, S. C., Jetten, J., and van Dick, R. (2017). A meta-analytic review of social identification and health in organizational contexts. *Personal. Soc. Psychol. Rev.* 21, 303–335. doi: 10.1177/1088868316656701

Tajfel, H., Jaspars, J. M. F., and Fraser, C. (1984). "The social dimension in European social psychology" in *The social dimension: European developments in social psychology*. ed. H. Tajfel (Cambridge: Cambridge University Press), 1–8.

Tajfel, H., and Turner, J. C. (1979). "An integrative theory of intergroup conflict" in *The social psychology of intergroup relations*. eds. W. G. Austin and S. Worchel (Monterey, CA: Brooks/Cole), 33–47.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., and Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford: Blackwell.

Turner, J. C., Oakes, P. J., Haslam, S. A., and McGarty, C. (1994). Self and collective: cognition and social context. *Personal. Soc. Psychol. Bull.* 20, 454–463. doi: 10.1177/0146167294205002

Wu, B., Schuh, S. C., Wei, H., and Cai, Y. (2023). When positives and negatives collide: evidence for a systematic model of employees' strategies for coping with ambivalence. *J. Bus. Psychol.* 38, 473–491. doi: 10.1007/s10869-022-09818-y

Zhao, Q., and Zhou, W. (2021). Good or bad? The ambivalent leader-follower relationships. *Front. Psychol.* 12:690074. doi: 10.3389/fpsyg.2021.690074

Zhou, L., Tetgoum Kachie, A. D., Xu, X., Quansah, P. E., Epalle, T. M., Ampon-Wireko, S., et al. (2022). COVID-19: the effects of perceived organizational justice, job engagement, and perceived job alternatives on turnover intention among frontline nurses. *Front. Psychol.* 13:92027. doi: 10.3389/fpsyg.2022.920274

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Protective and risk factors associated with substance use coping among healthcare workers during the COVID-19 pandemic

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Background: Healthcare workers (HCWs) experienced high levels of stress and mental health consequences associated with the COVID-19 pandemic, which may have contributed to unhealthy coping behaviors, such as substance use coping (SUC). This study aimed to understand the extent of and predictors of SUC.

Methods: The sample consisted of 263 HCWs in North Central Florida. Univariable and multivariable logistic regression analyses investigated whether moral injury and other work risk factors, protective factors, and clinically relevant symptoms (i.e., work exhaustion, interpersonal disengagement, depression, anxiety, and/or PTSD) were associated with likelihood of SUC.

Results: Clinically relevant levels of interpersonal disengagement and anxiety increased the likelihood of SUC. Mediational analyses found that interpersonal disengagement and anxiety explained 54.3% of the relationship between Self Moral Injury and SUC and explained 80.4% of the relationship between professional fulfillment and SUC.

Conclusion: Healthcare supervisors should be aware that providers who are experiencing moral injury and less professional fulfillment may be experiencing significant interpersonal disengagement and anxiety, which could lead to SUC. Future studies should examine the effects of implementing targeted prevention and treatment interventions, along with longitudinal outcomes related to SUC behaviors.

KEYWORDS

substance use coping, healthcare workers, COVID-19, burnout, moral injury, anxiety, interpersonal disengagement, professional fulfillment substance use coping

Introduction

For decades, there has been an interest in examining how stress in the work environment relates to job performance, workload, patient care, and mental health outcomes among healthcare workers (HCWs). Research on HCWs suggests that workplace stressors (e.g., inadequate staffing, high patient-to-provider ratios, excessive workloads, time constraints, and coping with patient death) are associated with increased rates of burnout (Norman et al., 2021) and two times higher rates of anxiety and depression than the rates in the general population (Calnan et al., 2001; Mark and Smith, 2012).

The onset of the COVID-19 pandemic further increased the levels of stress and emotional exhaustion among HCWs as they faced, among other stressors, high patient mortality rates, professional task saturation, and limited access to personal protective equipment (Ahmed et al., 2021; Foli et al., 2021a,b). For example, rates of emotional exhaustion among HCW increased from 31% in 2019 (pre-pandemic) to 40% in 2022 (mid-pandemic) (Sexton et al., 2022). The effects of prolonged periods of stress on HCWs' wellbeing during the pandemic has been compared to combat stress given the potentially traumatic work environments, particularly in emergency departments (Cipolletta and Ortu, 2021). Research suggests that HCWs in COVID-19 units were exposed to more patient deaths and were more likely to report posttraumatic stress symptoms than those in other units (Mosheva et al., 2021). In addition, HCWs have faced, at increased rates, the possibility of getting infected with the SARS-CoV2 virus, the risk of spreading the virus to loved ones, limited access to personal protective equipment, and a decreased ability to provide adequate patient care (Halcomb et al., 2020; García-Martín et al., 2021). In particular, HCWs with insufficient resources experienced higher levels of interpersonal disengagement from patients and emotional distress, both of which increased the risk of decreased job performance and decreased quality of patient care (Dyrbye et al., 2019; Kakemam et al., 2021). Elevated levels of the three core dimensions of burnout- emotional exhaustion, depersonalization/interpersonal disengagement, and reduced sense of professional accomplishment- have been linked to an increase in errors made by HCWs and a perceived poor quality of patient care (Poghosyan et al., 2010; Van Bogaert et al., 2010, 2013, 2014; Hayashino et al., 2012; Nantsupawat et al., 2016; Sulaiman et al., 2017; Trockel et al., 2018; Tawfik et al., 2019; Kakemam et al., 2021). COVID-19 related work stressors have led to negative mental health effects in addition to increased risk of burnout, including anxiety, depression, emotional distress (Foli et al., 2021a,b; Galanis et al., 2021; Manzano García and Ayala Calvo, 2021; Sarabia-Cobo et al., 2021), and suicide (Kingston, 2020). As a result, there is now legislation focused on improving mental and behavioral health among HCWs (Public Law No: 117–105; 03/18/2022).

Chronic stress is a well-known risk factor for substance use and misuse, the development of substance use disorder, and relapse of a substance use disorder (Sinha, 2008; Al'absi, 2018; Ruisoto and Contador, 2019). Independent of the effects of the COVID-19 pandemic, research suggests that HCWs misuse prescription substances at an elevated rate and use illicit substances at a rate similar to that of the general population (Hughes et al., 1992; Dumitrascu et al., 2014). Less is known about the rates of substance use coping (SUC), in part because individuals may under-report substance use out of the desire to self-preserve or fear of legal or regulatory repercussions (Graham et al., 2001; Weaver et al., 2001; Dumitrascu et al., 2014). Although there are reports of increases in substance use as a means to cope with COVID-19 stressors in the general population (Czeisler et al., 2020; Panagiotidis et al., 2020; Taylor et al., 2021), little research has examined this trend in HCWs. However, a qualitative study found that nurses reported using more substances such as alcohol, marijuana, and tobacco as a coping behavior and openly discussed their increased use with one another (Foli et al., 2021a, 2021b). In addition, excessive substance use and/or misuse is associated with burnout and poorer mental health, including increased symptoms of anxiety and depression (Faltz, 1998; Oreskovich et al., 2015; McCain et al., 2017; De Junqueira et al., 2018; Patel et al., 2019; Foli et al., 2021a,b; Ziarko et al., 2022). Several protective factors have been associated with lower rates of substance use and misuse, including strong support systems, spirituality, positive social engagement, resiliency, good problem-solving skills, self-confidence, and level of education (Family and Social Services Administration, 2020).

The relationship of substance use coping and moral injury among HCWs is also unknown. Moral injury (MI) is defined as the perpetration, failure to prevent, or witnessing of an event that violates the provider's own moral code, resulting in long-term emotional, psychological, biological, spiritual, and/or social consequences (Litz et al., 2009). In the context of the COVID-19 pandemic, research has focused on rates and correlates of MI in HCWs because they may experience a moral dilemma in the context of trying to provide the best patient care while simultaneously having to make potentially life-or-death decisions with limited resources (Kröger, 2020). Using the same dataset as the current study, Dale et al. (2021) found that HCWs experienced consistently high rates of MI, and that Self MI (i.e., acting against one's own morals or failing to engage in an action consistent with one's morals and feeling troubled by it) and Others MI (i.e., seeing something inconsistent with one's morals and feeling troubled by it) were differentially associated with specific risk factors and outcomes. For example, Others MI (but not Self MI) was associated with predisposing factors such as prior mental health adversity, while Self MI was associated with greater symptoms of depression, anxiety, PTSD, and professional burnout than was Others MI. Furthermore, the Dale et al. study highlighted the need to independently consider the individual components of burnout (i.e., work exhaustion and interpersonal disengagement), as participants experiencing greater worry about the health consequences of COVID-19 reported higher levels of work exhaustion, and those more impacted by the care they were providing to the COVID-19 patients reported higher levels of interpersonal disengagement. However, while research was useful in explaining the factors that lead to moral injury and the psychiatric difficulties experienced by HCWs, it did not address the coping mechanisms that were being employed to manage these symptoms.

The aim of this study was to estimate the prevalence of SUC among HCWs and explore how SUC may relate to the components of MI (i.e., Self and Others MI) and burnout (i.e., work exhaustion and interpersonal disengagement). We explored the contributions of COVID-19 work stressors (health worry, diagnosis, work impact, and healthcare morally distressing experiences, called HMDEs) and clinically relevant symptoms (i.e., work exhaustion, interpersonal disengagement, depression, anxiety, and PTSD). We also sought to determine whether internal factors, such as personal resilience and

professional fulfillment, served as protective factors. In addition, we explored the potential benefits of perceived leadership support, as prior research (e.g., Dale et al., 2021; Norman et al., 2021) suggests that perceived leadership support may mitigate or ameliorate the symptoms of burnout in HCWs. Specifically, we hypothesized the following:

- COVID-19 stressors, moral injury, and clinically relevant symptoms (i.e., work exhaustion, interpersonal disengagement, depression, anxiety, and PTSD) would be associated with an increased likelihood of SUC.
- Greater personal resilience, professional fulfillment, and perceived leadership support would be associated with a decreased likelihood of SUC.

We also explored whether demographic and personal factors (e.g., age, gender, income, work location) impacted the likelihood of SUC. We explored the potential contributions of healthcare roles (e.g., doctor, nurse, or assistant/technician) because longitudinal research suggests that nurses working during the COVID-19 pandemic reported increased burnout and decreased fulfilment relative to doctors and other HCWs (Guastello et al., 2022). Lastly, we explored the potential effects of being in a committed/marriage-like relationship as prior research suggests that individuals in committed relationships experience less mental distress (Nayak et al., 2021), including less anxiety, depressive, and burnout symptoms (Vanderhorst and McLaren, 2005; Afifi et al., 2006; Meyer and Paul, 2011; Zhou et al., 2022; Meng and Yang, 2023).

Methods

Participant recruitment and data collection

The procedures used in this longitudinal study were approved by the Institutional Review Board of the [edited out for blind review]. This study was advertised via flyers distributed in hospitals, nursing homes, and outpatient clinics in two cities in the south of the United States. Prospective participants were eligible to participate if they worked in a healthcare setting in this region, regardless of their type of employment. Although flyers were distributed across multiple locations in two cities, the primary recruitment came from two academic medical centers affiliated with a state university system. One of the centers is a safety net hospital in a large city that receives some funding from the city to care for the indigent population, and the other center is a large tertiary care hospital in a mid-size city. A brochure detailing the study was also emailed to HCWs and other healthcare workers from the department head or administrator at these two academic hospitals. During the data collection, there was a spike in rates of COVID-19 related hospitalization at both primary sites, with the COVID-19 caseloads exceeding capacity in the large city.

Upon enrollment, participants provided informed consent and subsequently completed a core set of assessments at baseline. They were then sent repeat assessments again every month for 7 months for a total of eight possible timepoints (Table 1). Some timepoints (e.g., timepoint 2) included additional optional assessments that were available for completion. In total, there were 209 unique items across all questionnaires that could be completed by participants. Not all items were assessed at every timepoint. Each assessment took between 15 and 20 min to complete. Data were obtained at baseline, 1, 2, 3, 4, 5, 6, and 8 months. Compensation was provided for each of the completed questionnaires. Compensation increased exponentially, concurrent with the number of assessments completed, with the total possible compensation being USD 220 for completion of all possible assessments over the total eight-month period. We also included a table that describes the constructs and measures.

TABLE 1 Constructs, measures, and number of items.

Construct	Measure	Number of items
Substance use coping	Carver, 1997	2
Protective factors		
Personal resilience	Brief Resilient Coping Scale (Sinclair and Wallston, 2004)	4
Professional fulfillment	Professional fulfillment index (Trockel et al., 2018)	6
Leadership support	Leadership behavior description questionnaire (McDaniel et al., 1973)	14
Risk factors		
COVID-19 work stressors		
Health worry	Designed for study	4
Diagnosis	Designed for study	1
Work impact	Designed for study	6
Healthcare morally distressing events	Designed for study	4
Moral injury		
Self moral injury	Moral injury events scale (Nash et al., 2013)	4
Others moral injury	Moral injury events scale (Nash et al., 2013)	2
Clinically relevant symptoms		
Work exhaustion	Professional fulfillment index (Trockel et al., 2018)	4
Interpersonal disengagement	Professional fulfillment index (Trockel et al., 2018)	6
Depression	Patient health questionnaire – 8 (Kroenke et al., 2001)	8
Anxiety	Generalized anxiety disorder – 7 (Spitzer et al., 2006)	7
PTSD	PTSD checklist-5 (Price et al., 2016)	8

Although hospital workers such as patient sitters, clerical and other administrative support staff, and food service workers were eligible for participation in the larger study and included in data collection, they were not included in these analyses. The analyses described in this study focus solely on the baseline data for the participants who had direct patient contact. As reported by this research team in 2021 and presented in Table 1, more than half of the

265 HCWs were nurses, including nurse practitioners. The sample also included some medical assistants and technicians and a large number of doctoral level professionals, who were predominantly medical doctors but also dentists and psychologists. Two of these participants did not complete the substance use coping questions and were not included in this study; therefore, the sample size for these analyses was 263.

Constructs and measures

Table 1 list the constructs included in the current study. The table also reports the references for each measure and total number of items for each scale.

Substance use coping

The two-item substance use subscale of the Brief Cope scale (Carver, 1997) was used to assess SUC. The first item is *Using alcohol or other drugs to make myself feel better* and the second item is *I've been using alcohol or other drugs to help me get through it.* Both questions are answered via a 4-point Likert scale (0 = *not at all*, 1 = *a little*, 2 = *a medium amount*, 3 = *a large amount*). In the current study, we focused on the internally consistent total score ($\alpha = 0.90$). We also grouped the participants according to whether they endorsed any SUC (responded *a little bit*, *a medium amount,* or *a lot*) on either or both items or denied SUC on both items.

Protective factors

We focused on personal resilience, professional fulfillment, and perceived leadership support as potential protective factors. To assess personal resilience, the Brief Resilient Coping Scale (Sinclair and Wallston, 2004) was used. This scale consists of four items, *I look for creative ways to alter difficult situations; Regardless of what happens to me, I believe I can control my reaction to it; I believe I can grow in positive ways by dealing with difficult situations;* and *I actively look for ways to replace the losses I encounter in life.* This measure uses a 5-point Likert Scale *(*1 = *does not describe me at all,* 2 = *does not describe me,* 3 = *neutral,* 4 = *describes me, and* 5 = *describes me very well)* for the four internally consistent items ($a = 0.90$). We used the suggested grouping of 4–13 to indicate low resiliency, 14 to 16 to indicate mid resiliency, and 17–20 to indicate high resiliency (Sinclair and Wallston, 2004).

To assess professional fulfillment, the corresponding subscale of the Professional Fulfillment Index (PFI) (Trockel et al., 2018) was used, which asks HCWs how fulfilled they are via a 5-point Likert scale (0 = *not at all true* to 4 = *completely true*) for six items ($a = 0.90$). An example item on the PFI is "During the past 2 weeks my work is satisfying to me." For this measure, higher scores indicate greater professional fulfillment. For use in some *post hoc* analyses, described further below, we also we devised a "lack of professional fulfillment" score. This was achieved by reverse scoring the items to align them with the overall negative theme. This was done to enhance interpretation and ensure consistency of direction across scales in some analyses.

The Leadership Behavior Description Questionnaire (McDaniel et al., 1973) was used to assess leadership support. This 14-item measure asks participants about their perception of their hospital leadership (participant-defined, from direct supervisor through hospital administration) at making/communicating decisions and incorporating the employee's input into decision-making, as well as the employee's sense of belonging and role in the healthcare structure and team, via a 5-point Likert scale (0 = never and 4 = always) for all 14 items ($a = 0.75$).

Risk factors

We focused on COVID-19 stressors, moral injury, and clinically relevant symptomatology as potential risk factors. With regard to COVID-19 stressors, participants indicated their level of worry that they would be infected with the COVID-19 virus while providing medical care, be infected with the COVID-19 virus in their home or community, become seriously ill because of COVID-19, or infect an immediate family member if they get COVID-19. These COVID-19 health worry questions were answered via a 4-point Likert scale (0 = *not worried* to 3 = *very worried*). The scores for each of the 4 questions were summed to create the COVID-19 Health Worry total score ($a = 0.85$). Participants also indicated whether they had been diagnosed with COVID-19.

Participants also indicated the impact of COVID-19 on their functioning at work, including how impacted they were by their: exposure face-to-face with possible asymptomatic patients, exposure to people under investigation for COVID-19, direct care of patients with COVID-19, performance of procedures (e.g., intubations) in close proximity to patients with COVID-19, care of 1 or more patients who died from COVID-19, and work at the morgue with patients who died from COVID-19. These questions were answered via a 5-point Likert scale (0 = *event did not occur* to 4 = *big impact on my life*) for this 6-item measure ($a = 0.80$).

In addition, participants also responded to four questions that related to their perceived ability or inability to provide optimal care (termed health care quality in Table 1) during the COVID-19 pandemic. Specifically, they were asked whether they were able to conduct necessary assessments or procedures, provide care to patients at the appropriate frequency, refer patients for necessary procedures, and refer patients to specialists. For these items, HCWs who disagreed (e.g., reported being unable to provide appropriate care) were considered to have experienced healthcare moral distress. Total scores were calculated to represent the total number of morally distressing experiences (i.e., HMDEs).

We assessed moral injury via the Moral Injury Events Scale (Nash et al., 2013), which assesses the occurrence of, anguish associated with, and perception of betrayal associated with MI. In the current study, we excluded the questions focused on the perception of betrayal to limit the burden on the participants. Instead, we focused on the six questions assessing level of agreement via a 6-point Likert scale (0 = *strongly disagree* to 5 = *strongly agree*) about the occurrence/anguish of moral injury perpetrated by HCWs themselves and witnessed MI perpetrated by others. As previously reported (Nash et al., 2013), we focused on whether or not participants perceived a transgression of self, which we term Self MI (i.e., acting against one's own morals or failing to act

consistent with morals and feeling troubled by it; 4 items; $\alpha = 0.94$), and perceived betrayal by others, which we termed Others MI (i.e., seeing something that they believed was morally wrong and feeling troubled by it; 2 items; $\alpha = 0.88$).

With regard to current symptoms, we used the work exhaustion and the interpersonal disengagement subscales of the Professional Fulfillment Index (Trockel et al., 2018), which asks HCWs to answer questions related to their attitudes about their work via a 5-point Likert scale (0 = *not at all true* to 4 = *completely true*) to assess these components of burnout. The work exhaustion subscale (4 items; $a = 0.90$), assesses sense of dread, physical/emotional exhaustion, and lack of enthusiasm, and the interpersonal disengagement subscale (6 items; $a = 0.90$) assesses empathy and connection with others, particularly patients and colleagues. To allow for comparisons between the two scales, mean scores were calculated. As suggested in the literature, HCWs who had mean scores 1.33 or higher were considered to be experiencing clinically relevant levels of work exhaustion and/or interpersonal disengagement (Trockel et al., 2018). To determine which aspects of interpersonal disengagement were potentially associated with SUC in post-hoc analyses (i.e., disengagement from colleagues and disengagement from patients), two variables were created from the six items in this scale. Disengagement from patients included three items that measured the same construct ($\alpha = 0.88$) and disengagement from colleagues included two items that measured the same construct ($\alpha = 0.81$).

With respect to current psychiatric symptomatology, the Patient Health Questionnaire - 9 item scale (PHQ-9; Kroenke et al., 2001) was used to measure depressive symptoms ($\alpha = 0.88$). The Generalized Anxiety Disorder - 7 item scale (GAD-7; Spitzer et al., 2006) was used to measure anxiety symptoms ($\alpha = 0.92$). The 8 item PTSD Checklist-5 (PCL-5; Price et al., 2016) was used to measure PTSD symptoms ($\alpha = 0.90$). For both the PHQ-9 and GAD-7, we used the suggested clinical cutoff of 10 or greater (Spitzer et al., 2006), whereas for the PCL-5 we used the suggested clinical cutoff of 19 or greater (Price et al., 2016).

Statistical analyses

Data were analyzed using IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp. In addition to descriptive statistics, univariate binary logistic regression analyses were used to determine which demographic characteristics, protective factors (i.e., personal resilience, professional fulfillment, and leadership support), and risk factors (e.g., COVID-19 work stressors, HMDEs, Self and Others MI, clinically relevant psychiatric symptoms) were individually associated with an increased likelihood of SUC. Multivariable forward conditional binary logistic regression analyses (using $p < 0.05$ in the univariable analyses as the inclusion cutoff) were used to identify factors that differentiated between HCWs who reported any SUC and those who denied SUC. Follow-up post-hoc analyses were conducted as relevant to determine whether specific subscales or components of a given measure (e.g., disengagement from patients vs. disengagement from colleagues on the PFI disengagement subscale, individual COVID-19 related items) were associated with an increased likelihood of SUC. Similarly, post-hoc analyses were conducted to determine significant associations between demographic factors and protective factors with identified clinical risk factors for SUC.

Finally, we conducted *post hoc* mediation analyses using SPSS Process model 4 to explore in more depth the relationships between SUC and variables of interest that arose from our primary analyses. As mediation analysis does not allow for the inclusion of categorical variables, we used quantitative scores for these analyses. The hypothesized mediation models were tested using a bootstrapping approach in multiple models to assess the significance of the indirect effects. The PROCESS macro model 4 with bias-corrected 95% confidence intervals ($n = 10{,}000$) was used to test the whether the indirect (i.e., mediated) effects were mediated by each of the mediators (i.e., conditional indirect effects). Significant effects are indicated by the absence of zero within the confidence intervals. The percent of total effects were calculated for each indirect effect and the remaining direct effect by dividing each coefficient effect by the total effect.

Results

A total of 263 HCWs were included in the analyses, more than half of whom were nurses (Table 2). Participants varied in age from 20 to 72 years old ($M = 37.55$, $SD = 11.07$), and primarily identified as

TABLE 2 Characteristics of healthcare providers ($N = 263$).

Characteristics	N	%	Characteristics	N	%
Gender			**Occupation**		
Female	216	82.4	Doctor	80	33.8
Male	46	17.5	Nurse	128	54.0
Race			Medical assistant	29	12.2
White	204	77.6	**Psychiatric treatment history**		
Non-White	59	22.4	Therapy	21	8.0
Married/committed relationship			Medication	27	10.3
Yes	166	63.1	Both	57	21.7
No	97	36.9	**Resilient coping**		
Education			Low	212	80.9
H.S. Degree	14	5.4	Mid	50	19.1
College Degree	134	51.0	High	0	0.0
Graduate Degree	100	38.0	**Moral injury**		
Yearly income			Perpetrated by Self	27	10.3
≤ $40,000	35	13.3	Perpetrated by Others	82	31.2
$40,001 – $60,000	43	16.3	**Scored above clinical cut-off**		
$60,001 – $80,000	44	16.74	Anxiety	66	25.1
$80,001 – $100,000	31	11.8	Depression	64	24.3
$100,001 – $200,000	63	24.0	PTSD	31	11.9
> $200,000	35	13.3	Work exhaustion	166	63.1
Work location			Interpersonal disengagement	83	31.6
Large city	161	63.9	**COVID-19 diagnosis**	24	9.2
Small city	91	36.1			

female and white. The majority had a college education or higher, and reported being in a married/committed relationship. About 40% of the sample reported prior psychiatric treatment, psychotherapy and/or medications. Table 2 reports the percent of HCWs that fell into the low, mid, and high resilient coping groups. No participants received scores indicating high resiliency and the majority of participants received scores indicating low resiliency. Table 2 also reports the percent of HCWs that reported experiencing Self and Others MI and scored above the clinical cutoff with regard to their burnout and psychiatric symptoms.

Substance use coping

With regard to the two items that asked about substance use coping, approximately one third of the participants reported *using alcohol or other drugs to feel better* (20.9% reported a little bit, 10.3% reported a medium amount, and 1.9% reported a lot). A similar percentage reported *using alcohol or other drugs to help me get through it* (19.8% reported *a little bit*, 5.3% reported *a medium amount*, 1.9% reported *a lot*). Because of the likelihood of under-reporting of substance use, individuals who endorsed any SUC on either or both items ($n = 92$, 35.0% of total sample) were place in the substance use coping group and those that denied any SUC on both items ($n = 171$, 65.0% of total sample) were placed in the no substance use group. This binarized group categorization was used as the dependent variable in the univariate and multivariable binary logistic regression analyses. Total scores ranged from 2 (reported *not at all* for both items) to 8 (report *a lot* for both items), with the mean score being 2.83 ($SD = 1.36$).

Variable impacting likelihood of substance use coping

Table 3 displays the results of the univariable binary regression analyses. Self MI was associated with a significantly increased odds of SUC (OR = 3.06, $p = 0.007$). The odds of SUC were also significantly increased for the HCWs reporting clinically relevant symptoms of interpersonal disengagement (OR = 2.55, $p < 0.001$), depression (OR = 2.53, $p = 0.002$), anxiety (OR = 4.29, $p < 0.001$), and PTSD (OR = 4.70, $p < 0.001$). The only protective factor that was associated with a significantly decreased likelihood of SUC was professional fulfillment (OR = 0.64, $p = 0.003$). As evident in Table 3, work exhaustion, Others MI, and leadership support were not significantly associated with SUC.

To address the potential collinearity amongst these predictors and determine which factors were most strongly independently associated with the likelihood of SUC, we entered all significant univariable predictors reported in Table 3 ($p < 0.05$) as potential predictors in a multivariable forward conditional binary logistic regression analysis. The final model, X^2 (2, $n = 260$) = 30.85, $p < 0.001$, which correctly classified 70.8% of HCWs, indicated that only two of the six variables, clinically relevant anxiety (OR = 3.83, $p < 0.001$) and clinically relevant interpersonal disengagement (OR = 1.98, $p = 0.020$) were associated with significantly increased odds of SUC. The other variables did not significantly contribute to the prediction and were excluded from the model.

Variables impacting likelihood of clinically relevant disengagement and anxiety

Because clinically relevant interpersonal disengagement and anxiety were the factors most strongly associated with SUC, we next explored, using post-hoc analyses, which demographic, protective, and risk factors were associated with clinically relevant interpersonal disengagement and anxiety (Tables 4, 5). No demographic factors emerged as significant predictors of interpersonal disengagement, but several protective and risk factors were significantly associated with clinically relevant interpersonal disengagement (Table 3). When these variables were entered together as potential predictors in a multivariable forward conditional logistic regression analysis, three variables emerged as significant predictors. Both COVID-19 work impact (OR = 1.11, $p < 0.001$) and Self MI (OR = 3.51, $p = 0.010$) were significantly associated with increased odds of interpersonal disengagement, while professional fulfillment was associated with decreased odds of interpersonal disengagement (OR = 0.39, $p < 0.001$). The final model, which included all three of these factors, $X^2(3, n = 258) = 62.501$, $p < 0.001$, correctly classified 74.8% of HCWs. Because professional fulfillment and interpersonal disengagement are derived from the same measure, we used *post hoc* Pearson correlation analyses to explore the overlap between these scales. The correlation between interpersonal disengagement and professional fulfillment was moderate ($r = -0.58$, $p < 0.001$), indicating that professional fulfillment only accounted for 33.9% of the variability in interpersonal disengagement.

We next examined which aspects of interpersonal disengagement were most strongly associated with SUC, and which individual items on the COVID-19 work impact and professional fulfilment scales were most associated with interpersonal disengagement, using post-hoc multivariable forward conditional logistic regression analysis. We found that only disengagement from patients was strongly associated with SUC [OR = 1.21, $p < 0.001$; 95% CI 1.09 to 1.33; X^2 (1, $n = 261 = 14.49$, $p < 0.001$)], whereas disengagement from colleagues was not a significant predictor in this model.

In the *post hoc* analyses examining the relationships of individual COVID-19 work impact and professional fulfilment items to interpersonal disengagement, no specific work impact items were individually associated, thus suggesting the importance of the cumulative impact of COVID-19. The professional fulfillment items most strongly associated with clinically significant interpersonal disengagement were: "I feel happy at work" (OR = 0.60, $p = 0.001$) and "I feel in control when dealing with difficult problems at work" (OR = 0.61, $p = 0.002$).

As expected, multiple demographic, work, and psychiatric factors were significantly associated with clinically relevant anxiety in univariable analyses (Table 5). When jointly included in multivariable forward conditional logistic regression analyses, only one variable continued to show an association with increased odds of clinically relevant anxiety: Self MI (OR = 4.00, $p = 0.002$). Three variables were associated with significantly decreased odds of clinically relevant anxiety: higher income (OR = 0.74, $p = 0.002$), resilience (OR = 0.85, $p = 0.027$), and professional fulfillment (OR = 0.61, $p = 0.006$). The final model, $X^2(4, n = 251) = 43.41$, $p < 0.001$, correctly classified 75.7% of HCWs.

We again used *post hoc* analyses to determine which individual aspects of resilience and professional fulfilment drove the association

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TABLE 3 Results of binary logistic regressions predicting likelihood of substance use coping.

Factors	Univariable results		Multivariable results	
	OR	95% CI	OR	95% CI
Demographic factors				
Age	0.99	0.96–1.01		
Male gender	0.60	0.29–1.23		
white race	1.17	0.63–2.17		
Educational level	0.90	0.61–1.33		
Income	0.96	0.83–1.12		
Married/committed relationship	0.61	0.36–1.02		
Work in large city	1.011	0.59–1.73		
Profession				
Doctor (versus eveyone else)	0.97	0.55–1.72		
Nurse (versus everyone else)	1.42	0.81–2.52		
Medical Assistant (versus everyone else)	0.66	0.34–1.28		
Protective factors				
Personal resilience	0.95	0.85–1.06		
Professional fulfillment	0.64**	0.48–0.86	NS	
Leadership support	0.99	0.97–1.01		
Work risk factors				
COVID-19 work stressors				
Health worry	1.02	0.94–1.11		
Diagnosis	0.76	0.30–1.89		
Work impact	1.03	0.98–1.08		
Healthcare morally distressing events	1.16	0.91–1.48		
Moral injury				
Self moral injury	3.06**	1.36–6.92	NS	
Others moral injury	1.20	0.70–2.06		
Clinically relevant symptoms (above clinical cutoff)				
Work exhaustion	1.60	0.93–2.76		
Interpersonal disengagement	2.55***	1.48–4.38	1.98*	1.11 to 3.52
Depression	2.53**	1.42–4.50	NS	
Anxiety	4.29***	2.39–7.71	3.83***	2.09 to 7.00
PTSD	4.70***	2.11–10.50	NS	

Multivariable forward conditional logistic regression analyses: Variables with $p \leq 0.05$ in univariable analyses were included in the multivariable model. Final model $X^2(2, n = 260) = 30.85$, $p < 0.001$. NS, not selected/significant in the final model. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

with clinically relevant anxiety by including all individual items from each scale in two separate multivariable conditional logistic regressions. The results of the first regression indicated that the resilience item most predictive of clinically significant anxiety was: "Regardless of what happens to me, I believe I can control my reaction to it" (OR = 0.43, $p < 0.001$). The results of the second regression indicated that the professional fulfillment items most predictive of clinically significant anxiety were: "I'm contributing professionally (e.g., patient care, teaching, research, and leadership) in the ways I value most" (OR = 0.66, $p = 0.003$) and "I feel in control when dealing with difficult problems at work" (OR = 0.72, $p = 0.044$).

Post hoc mediation analyses

Because Self MI and professional fulfillment were associated with clinically relevant interpersonal disengagement and anxiety, which in turn were associated with increased likelihood of SUC, we next conducted *post hoc* mediation analyses to explore the relationships between these variables. Specifically, we explored whether interpersonal disengagement and/or anxiety mediated the relationship between Self MI and SUC, and between lack of professional fulfillment and SUC. As indicated in Figure 1A, both anxiety and interpersonal disengagement mediated the relationship between Self MI and SUC,

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TABLE 4 Results of binary logistic regression predicting likelihood of interpersonal disengagement.

Factors	Univariable results		Multivariable results	
	OR	95% CI	OR	95% CI
Demographic factors				
Age	0.99	0.96–1.01		
Male gender	0.99	0.49–1.98		
White race	1.09	0.58–2.04		
Educational level	0.73	0.49–1.09		
Income	1.03	0.88–1.20		
Married/committeed	0.97	0.57–1.67		
Work in large city	1.08	0.62–1.88		
Profession				
Doctor	0.84	0.46–1.52		
Nurse	1.76	0.98–3.17		
Medical assistant	0.85	0.43–1.67		
Protective factors				
Personal resilience	0.92	0.82–1.04		
Professional fulfillment	0.36***	0.25–0.51	0.39***	0.27 to 0.56
Leadership support	0.95***	0.93–0.97	NS	
Work risk factors				
COVID-19 work stressors				
Health worry	1.05	0.96–1.16		
Diagnosis	2.13	0.90–5.06		
Work impact	1.12***	1.07–1.18	1.11***	1.05 to 1.17
Healthcare morally distressing events	1.51**	1.17–1.94	NS	
Moral injury				
Self moral injury	5.17***	2.21–12.09	3.51**	1.35 to 9.12
Others moral injury	2.08**	1.20–3.60	NS	

Multivariable forward conditional logistic regression analyses: NS, not selected variables for final model, $X^2(3, n = 258) = 62.50$, $p < 0.001$. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

$F(1, 258) = 11.673$, $p = 0.001$. Anxiety explained 29.7% of the relationship between Self MI and SUC, whereas interpersonal disengagement explained 24.6% of the relationship between Self MI and SUC. The proportion of total effect of Self MI on SUC operating indirectly through interpersonal disengagement and anxiety was 54.3%; the remaining direct effect of Self MI on SUC was not statistically significant.

Similarly, both anxiety and interpersonal disengagement mediated the relationship between lack of professional fulfillment and SUC, $F(1, 254) = 9.669$, $p = 0.002$ (Figure 1B). Anxiety and interpersonal disengagement each explained 40.2% of this relationship. Thus, the proportion of total effect of lack of professional fulfillment on SUC operating indirectly through interpersonal disengagement and anxiety was 80.4%; the remaining direct effect of lack of professional fulfillment on SUC was not statistically significant.

Discussion

We found that 35% of HCWs in our study who were surveyed during the COVID-19 pandemic endorsed the use of substances to cope. Even though the overall rates of SUC were relatively low, this finding is nevertheless concerning, as previous work has suggested that HCWs tend to under-report their true rates of SUC (Graham et al., 2001; Weaver et al., 2001; Dumitrascu et al., 2014). As hypothesized, we found that professional fulfillment was associated with lower odds of SUC, while Self MI was associated with higher odds of SUC. Consistent with prior studies (Peterson et al., 2008a,b; Foli et al., 2021a,b), we also found that the likelihood of SUC was higher among HCWs reporting clinically relevant symptoms of depression, anxiety, PTSD, and interpersonal disengagement, although only anxiety and interpersonal disengagement were independently associated with SUC in multivariable analyses.

Although previous studies have linked burnout with SUC (Oreskovich et al., 2015; McCain et al., 2017; Patel et al., 2019), our study found that it was the interpersonal disengagement component of burnout in particular that was associated with an increased likelihood of SUC, while work exhaustion and lack of professional fulfilment were not strongly associated with SUC. This finding is surprising as the rates of work exhaustion (63.1%) were almost twice as high as the rates of interpersonal disengagement (31.6%). We also found that interpersonal disengagement from patients, and not

TABLE 5 Univariable and multivariable binary logistic regression predicting likelihood of clinically relevant anxiety.

Factors	Univariable results		Multivariable results	
	OR	95% CI	OR	95% CI
Demographic factors				
Age	0.96*	0.93–0.99	NS	
Male gender	0.57	0.25–1.30		
White race	0.51*	0.27–0.96	NS	
Educational level	0.56*	0.36–0.88	NS	
Income	0.71***	0.60–0.85	0.74**	0.61 to 0.089
Married/committed	0.48**	0.27–0.85	NS	
Work in large city	1.04	0.57–1.89		
Profession				
Doctor	0.23***	0.10–0.52	NS	
Nurse	0.64	0.88–3.03		
Medical assistant	1.49	0.77–2.91		
Protective factors				
Personal resilience	0.82**	0.72–0.93	0.85*	0.74 to 0.98
Professional fulfillment	0.88***	0.84–0.93	0.61**	0.43 to 0.87
Leadership support	0.98	0.95–1.00		
Work risk factors				
COVID-19 work stressors				
Health worry	1.14*	1.02–1.26	NS	
Diagnosis	1.59	0.65–3.90		
Work impact	1.03	0.98–1.08		
Healthcare morally distressing events	1.39*	1.08–1.79		
Moral injury				
Self moral injury	4.53***	2.00–10.30	4.00**	1.64 to 9.77
Others moral injury	1.95*	1.09–3.49	NS	

Multivariable forward conditional logistic regression analyses: NS, not selected variables for final model, $X^2(4, n = 251) = 43.41$, $p < 0.001$. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

interpersonal disengagement from colleagues, was more strongly associated with SUC. These findings are concerning because disengagement from patients may result in clinical errors that reduce patient care (Kakemam et al., 2021).

We subsequently sought to understand the factors associated with an increased likelihood of interpersonal disengagement and anxiety and found that interpersonal disengagement was not impacted by demographic factors or personal resilience, but was instead associated with work factors. Specifically, the likelihood of interpersonal disengagement was increased in HCWs who experienced Self MI and was also associated with the cumulative impact of caring for COVID-19 patients.

Specifically, we found that demographic characteristics only indirectly impacted SUC coping by impacting the likelihood of clinically relevant anxiety. When variables were entered individually as predictors, we found that individuals who were of younger age, lower income, not in a committed relationship, and not at a doctoral level were more likely to report clinically relevant anxiety. Interestingly, many of these variables relate to the concept of control. Older age, higher income, personal resilience, and professional fulfillment were the protective factors most strongly associated with a decreased likelihood of clinically relevant anxiety. These findings are consistent with prior research suggesting that level of education is negatively correlated to the likelihood of clinically relevant anxiety (Mirza and Jenkins, 2004; Bjelland et al., 2008) and that nurses report greater anxiety than doctors (Hacimusalar et al., 2020).

However, the identified protective demographic factors did not offset the negative impact of Self MI. Our research group has previously reported an association between Self MI and anxiety in this sample, and in this study, we further extend this work to show that Self MI remains a significant predictor of clinically relevant anxiety, even after considering the impact of additional potential risk and protective factors. Consistent with prior research (Kameg et al., 2021), we also found that professional fulfillment was a protective factor for anxiety.

Our results suggest the importance of considering professional fulfillment in the context of SUC among HCWs, as it was associated with decreased likelihood of clinically relevant interpersonal disengagement and anxiety. When examining which aspects of professional fulfillment were most predictive, happiness at work was associated with more interpersonal engagement, contributing professionally was associated with less anxiety, and feeling in control when dealing with work problems was associated with less

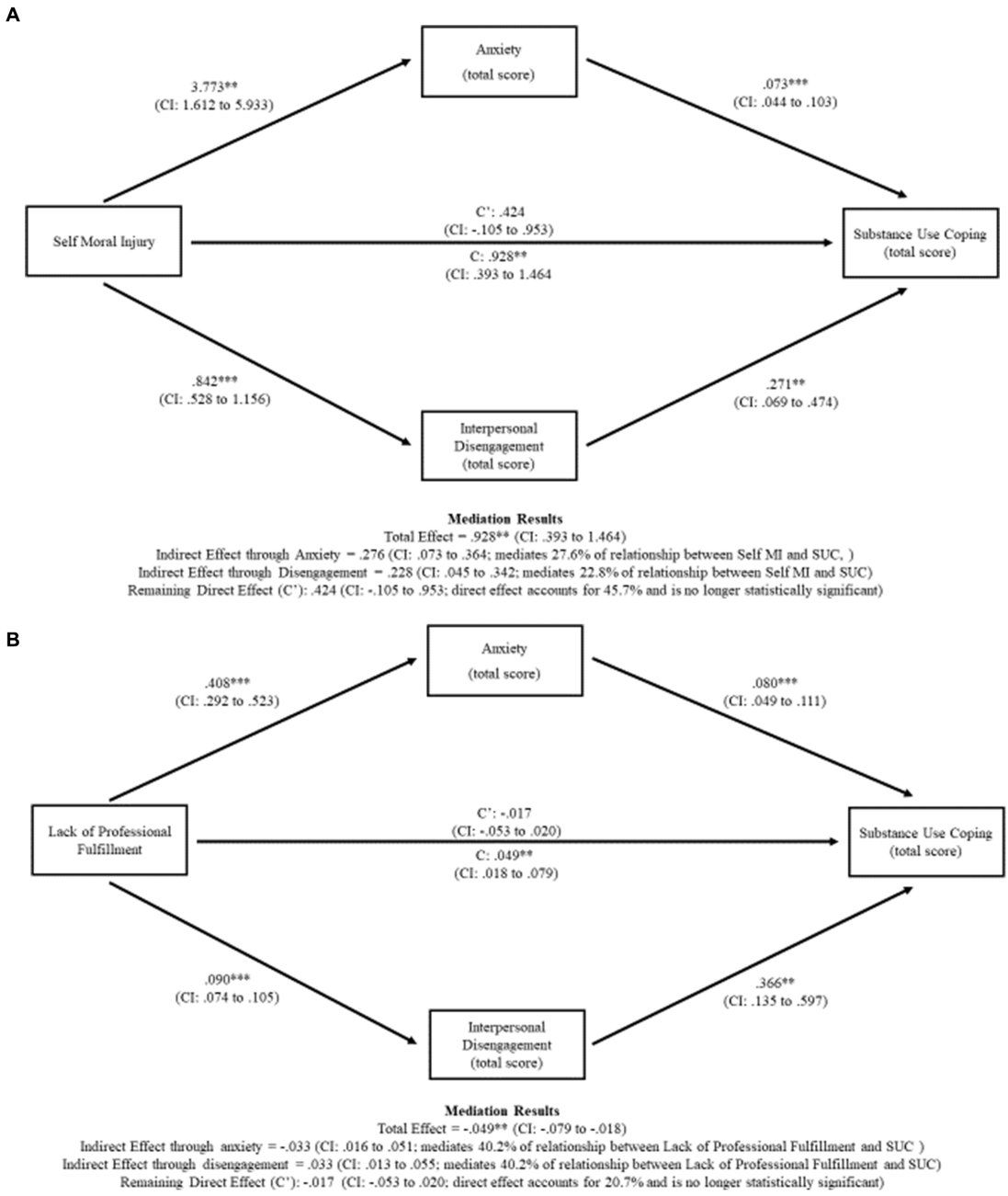

FIGURE 1
(A) Anxiety and interpersonal disengagement mediate the relationship between self-moral injury and substance use coping. **(B)** Anxiety and interpersonal disengagement mediate the relationship between lack of professional fulfillment and substance use coping.

interpersonal disengagement and anxiety. Similarly, as reported in Dale et al. (2021), we found that it was important to consider the components of MI individually, as Self MI, but not Other MI, was associated with increased likelihood of SUC, although these effects were not direct, as both interpersonal disengagement and anxiety mediated the relationship between Self MI and SUC. These findings provide insights regarding the factors that should be considered in efforts to decrease the rates of substance use coping among HCWs.

We found that the other protective factors of personal resilience and leadership support only indirectly impacted SUC coping by impacting the likelihood of clinically relevant anxiety and interpersonal disengagement. Consistent with prior research (Peñacoba et al., 2021; Setiawati et al., 2021), we found that personal resilience decreased the likelihood of clinically relevant anxiety, which is not surprising as anxiety is likely to be impacted by personal characteristics. When examining which aspects of resilience were most predictive of anxiety, it was the ability to control one's reactions that was associated with less anxiety. We also found that perceived leadership support decreased the likelihood of interpersonal disengagement, but that it was not a significant predictor after controlling for professional fulfillment. Although we did not explore this further in our analysis, it may be that perceived leadership support impacts the level of professional fulfillment, which then decreases the likelihood of interpersonal disengagement.

Limitations

While our study reports unique and timely findings, several limitations should be considered. First, the study used a convenience sample, recruited via emails, flyers, and brochures, and we are not able to estimate how many HCWs who viewed the materials chose to not participate or determine the representativeness of the final sample. Our participants come from a specific region of the US and may not be generalizable to other regions in the country. Additionally, the participants were primarily female, and while gender did not significantly predict the outcomes of interest, it may have influenced the findings. Future studies should replicate our findings using different sampling strategies and targeted work settings in order to obtain a more representative sampling of groups of healthcare workers.

The study was cross-sectional and therefore causal assertions cannot be made. Our data included self-report measures that asked about sensitive information, which may have been impacted by respondent biases. Although the study was confidential, respondents may have had a desire to maintain social desirability or avoid any repercussions, which could have impacted their reporting of substance use coping and symptoms of burnout. Future studies should include objective measures of workforce stress such as absenteeism, staff turnover, and disciplinary action.

We used only two questions to assess SUC, both tapping the same underlying construct, which allowed us to binarize participants into those who engaged in SUC and those who did not, but did not allow for a more in-depth assessment of patterns, frequency, and types of SUC. Similarly, we are not able to comment on whether the substance use assessed in our study was indicative of a substance use disorder because we did not evaluate for severity of substance use. Future studies should examine biomarkers of substance use and misuse, along with more specific measures of substance use quantity, frequency and behavioral consequences (i.e., AUDIT, Saunders et al., 1993; or TAPS, McNeely et al., 2016) to get a better understanding of the relationship between risk and protective factors and at-risk substance use among HCWs.

Finally, the healthcare morally distressing experiences we focused on related to quality of care (e.g., not being able to see patients frequently enough) were important but not life threatening. It may be that the inclusion of other patient care experiences (e.g., shortages of ICU beds, triaging of patients to other facilities, and withholding care due to lack of resources) would have produced a more robust measure that would be more linked to the negative outcomes studied, such as interpersonal disengagement and SUC. Future studies should continue to determine which experiences are most morally distressing to HCWs.

Contributions and implications of study

For patients to receive the highest level of care, it is imperative to ensure that HCWs are functioning well physically and emotionally. It is concerning when providers report using substances for coping, especially as they may be underreporting their use. It is also concerning that SUC was more likely to occur in HCWs experiencing interpersonal disengagement and anxiety, which in turn were associated with their belief that they perpetrated a moral injury and/or were not experiencing professional fulfillment.

It is also striking how much the experience of self MI, although a relatively uncommon occurrence (10% of our sample), increased the likelihood of both interpersonal disengagement and anxiety, even in the context of protective factors such as professional fulfillment. This finding has implications for healthcare systems and supervisors, who should be encouraged to provide support to their employees to decrease moral injury and find ways to increase professional fulfillment.

In particular, HCWs in high risk or high acuity work settings must have support systems in place to prevent interpersonal disengagement, and reduce the risks of SUC. In these settings, it may be important to have systems in place to assess how the HCWs are being impacted by the care they are providing to these patients (Peterson et al., 2008a,b; Davidson et al., 2018). For example, it may be beneficial to use encrypted, anonymous, proactive risk screening to identifying HCWs who are struggling and in need of support.

Interventions targeting these individual and at-risk groups, such as HCWs who are making less income, experiencing moral injury, interpersonal disengagement, and anxiety are also of critical importance. Because mindfulness and meditation have been linked to reduced rates of burnout among HCWs (Goodman and Schorling, 2012; Heeter et al., 2017; Patel et al., 2019), these interventions may be useful in decreasing the levels of anxiety and interpersonal disengagement in HCWs. Although useful, mindfulness strategies are difficult to scale and may not be always be well received by populations that may benefit from them, such as HCWs. Other interventions with possible utility for treating some of the outcomes associated with SUC, such as burnout, moral injury, and anxiety, include eye-movement desensitization and reprocessing (Moench and Billsten, 2021), acceptance and commitment therapy (Otared et al., 2021), app-based technology for monitoring mental health and sleep (Gnanapragasam et al., 2023), and emotional skills training (Ferreres-Galán et al., 2022). It may also be useful to develop prevention strategies that allow HCWs to process the stressors as they are occurring with their colleagues and supervisors. Specifically, they may benefit from peer partnering, distress tracking, psychoeducation, peer support groups, psychological debriefing, and community building activities, which have been proposed as interventions that should be tested high stress work settings (Ellis and Korman, 2022). As suggested by our group and others (Guastello et al., 2022; Meredith et al., 2022), engagement of healthcare leadership in assessing and improving working conditions, and increasing communication and integration across systems can improve both employee engagement and sense of professional fulfillment/accomplishment.

This study shows that HCW sometimes engage in SUC. However, it is not known if this potentially maladaptive substance use results in significant impact on health outcomes. Further research on this and preventive interventions to reduce SUC and potential substance related health consequences is warranted.

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 University of Florida Institutional Review Board. 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

VB, MS, LD, SC, and CM: conceptualization. VB, LD, SC, and CM: methodology. VB, LD, AG, and NS: formal analysis. VB, MS, LD, SC, CM, and BA: writing—original draft preparation. VB, MS, LD, AD, KL, AH, BA, SC, and CM: writing—review and editing. LD and SC: visualization. SC and CM: supervision. CM: project administration. AG: funding acquisition. All authors have read and agreed to the published version of the manuscript.

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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.

Publisher's note

References

Afifi, T. O., Cox, B. J., and Enns, M. W. (2006). Mental health profiles among married, never-married, and separated/divorced mothers in a nationally representative sample. *Soc. Psychiatry Psychiatry. Epidemiol.* 41, 122–129. doi: 10.1007/s00127-005-0005-3

Ahmed, F., Zhao, F., Faraz, N. A., and Qin, Y. J. (2021). How inclusive leadership paves way for psychological well-being of employees during trauma and crisis: a three-wave longitudinal mediation study. *J. Adv. Nurs.* 77, 819–831. doi: 10.1111/jan.14637

Al'absi, M. (2018). Stress and addiction: when a robust stress response indicates resiliency. *Psychosom. Med.* 80, 2–16. doi: 10.1097/PSY.0000000000000520

Bjelland, I., Krokstad, S., Mykletun, A., Dahl, A. A., Tell, G. S., and Tambs, K. (2008). Does a higher educational level protect against anxiety and depression? The HUNT study. *Soc. Sci. Med.* 66, 1334–1345. doi: 10.1016/j.socscimed.2007.12.019

Calnan, M., Wainwright, D., Forsythe, M., Wall, B., and Almond, S. (2001). Mental health and stress in the workplace: the case of general practice in the UK. *Soc. Sci. Med.* 52, 499–507. doi: 10.1016/s0277-9536(00)00155-6

Carver, C. S. (1997). You want to measure coping but your protocol's too long: consider the brief COPE. *Int. J. Behav. Med.* 4, 92–100. doi: 10.1207/s15327558ijbm0401_6

Cipolletta, S., and Ortu, M. C. (2021). COVID-19: common constructions of the pandemic and their implications. *J. Constr. Psychol.* 34, 278–294. doi: 10.1080/10720537.2020.1818653

Czeisler, M. É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., et al. (2020). Mental health, substance use, and suicidal ideation during the COVID-19 pandemic - United States, June 24-30, 2020. *MMWR Morb. Mortal. Wkly Rep.* 69, 1049–1057. doi: 10.15585/mmwr.mm6932a1

Dale, L. P., Cuffe, S. P., Sambuco, N., Guastello, A. D., Leon, K. G., Nunez, L. V., et al. (2021). Morally distressing experiences, moral injury, and burnout in Florida healthcare providers during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* 18:12319. doi: 10.3390/ijerph182312319

Davidson, J. E., Zisook, S., Kirby, B., DeMichele, G., and Norcross, W. (2018). Suicide prevention: a healer education and referral program for nurses. *J. Nurs. Adm.* 48, 85–92. doi: 10.1097/NNA.0000000000000582

Junqueira, M. A. B.De, Santos, M. A. D., Araújo, L. B.De, Ferreira, M. C. MDe, Giuliani, C. D., and Pillon, S. C. (2018). Depressive symptoms and drug use among nursing staff professionals. *Esc. Anna Nery*, 22, 1–9. doi: 10.1590/2177-9465-ean-2018-0129

Dumitrascu, C. I., Mannes, P. Z., Gamble, L. J., and Selzer, J. A. (2014). Substance use among physicians and medical students. *Med. Student Res. J.* 3, 26–35.

Dyrbye, L. N., Shanafelt, T. D., Johnson, P. O., Johnson, L. A., Satele, D., and West, C. P. (2019). A cross-sectional study exploring the relationship between burnout, absenteeism, and job performance among American nurses. *BMC Nurs.* 18:57. doi: 10.1186/s12912-019-0382-7

Ellis, J., and Korman, M. B. (2022). Development of an evidence-informed solution to emotional distress in public safety personnel and healthcare workers: the social support, tracking distress, education, and discussion community (STEADY). *Program. Healthcare (Basel).* 10. doi: 10.3390/healthcare10091777

Faltz, B. (1998). "Substance abuse disorders" in *Psychiatric nursing: Contemporary practice*. eds. M. A. Boyd and M. A. Nihart (Philadelphia, PA: Lippincott), 708–715.

Family and Social Services Administration. (2020). Risk and protective factors for substance use. Available at: https://www.in.gov/fssa/dmha/substance-misuse-prevention-and-mental-health-promotion/risk-and-protective-factors-for-substance-use/ (Accessed May 23, 2023).

Ferreres-Galán, V., Navarro-Haro, M. V., Peris-Baquero, Ó., Guillén-Marín, S., de Luna-Hermoso, J., and Osma, J. (2022). Assessment of acceptability and initial effectiveness of a unified protocol prevention program to train emotional regulation skills in female nursing professionals during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* 19:9. doi: 10.3390/ijerph19095715

Foli, K. J., Forster, A., Cheng, C., Zhang, L., and Chiu, Y.-C. (2021a). Voices from the COVID-19 frontline: nurses' trauma and coping. *J. Adv. Nurs.* 77, 3853–3866. doi: 10.1111/jan.14988

Foli, K. J., Zhang, L., and Reddick, B. (2021b). Predictors of substance use in registered nurses: the role of psychological trauma. *West. J. Nurs. Res.*:193945920987123. 43. doi: 10.1177/0193945920987123

Galanis, P., Vraka, I., Fragkou, D., Bilali, A., and Kaitelidou, D. (2021). Nurses' burnout and associated risk factors during the COVID-19 pandemic: a systematic review and meta-analysis. *J. Adv. Nurs.* 77, 3286–3302. doi: 10.1111/jan.14839

García-Martín, M., Roman, P., Rodriguez-Arrastia, M., Diaz-Cortes, M. D. M., Soriano-Martin, P. J., and Ropero-Padilla, C. (2021). Novice nurse's transitioning to emergency nurse during COVID-19 pandemic: a qualitative study. *J. Nurs. Manag.* 29, 258–267. doi: 10.1111/jonm.13148

Gnanapragasam, S. N., Tinch-Taylor, R., Scott, H. R., Hegarty, S., Souliou, E., Bhundia, R., et al. (2023). Multicentre, England-wide randomised controlled trial of the 'Foundations' smartphone application in improving mental health and well-being in a healthcare worker population. *Br. J. Psychiatry* 222, 58–66. doi: 10.1192/bjp.2022.103

Goodman, M. J., and Schorling, J. B. (2012). A mindfulness course decreases burnout and improves well-being among healthcare providers. *Int. J. Psychiatry Med.* 43, 119–128. doi: 10.2190/PM.43.2.b

Graham, H. L., Maslin, J., Copello, A., Birchwood, M., Mueser, K., McGovern, D., et al. (2001). Drug and alcohol problems amongst individuals with severe mental health problems in an inner city area of the UK. *Soc. Psychiatry Psychiatr. Epidemiol.* 36, 448–455. doi: 10.1007/s001270170023

Guastello, A. D., Brunson, J. C., Sambuco, N., Dale, L. P., Tracy, N. A., Allen, B. R., et al. (2022). Predictors of professional burnout and fulfilment in a longitudinal analysis on nurses and healthcare workers in the COVID-19 pandemic. *J. Clin. Nurs.* doi: 10.1111/jocn.16463

Hacimusalar, Y., Kahve, A. C., Yasar, A. B., and Aydin, M. S. (2020). Anxiety and hopelessness levels in COVID-19 pandemic: a comparative study of healthcare professionals and other community sample in Turkey. *J. Psychiatr. Res.* 129, 181–188. doi: 10.1016/j.jpsychires.2020.07.024

Halcomb, E., McInnes, S., Williams, A., Ashley, C., James, S., Fernandez, R., et al. (2020). The experiences of primary healthcare nurses during the COVID-19 pandemic in Australia. *J. Nurs. Scholarsh.* 52, 553–563. doi: 10.1111/jnu.12589

Hayashino, Y., Utsugi-Ozaki, M., Feldman, M. D., and Fukuhara, S. (2012). Hope modified the association between distress and incidence of self-perceived medical errors among practicing physicians: prospective cohort study. *PLoS One* 7:e35585. doi: 10.1371/journal.pone.0035585

Heeter, C., Lehto, R., Allbritton, M., Day, T., and Wiseman, M. (2017). Effects of a technology-assisted meditation program on healthcare providers' interoceptive awareness, compassion fatigue, and burnout. *J. Hosp. Palliat. Nurs.* 19, 314–322. doi: 10.1097/NJH.0000000000000349

Hughes, P. H., Brandenburg, N., Baldwin, D. C., Storr, C. L., Williams, K. M., Anthony, J. C., et al. (1992). Prevalence of substance use among US physicians. *JAMA* 267, 2333–2339. doi: 10.1001/jama.1992.03480170059029

Kakemam, E., Chegini, Z., Rouhi, A., Ahmadi, F., and Majidi, S. (2021). Burnout and its relationship to self-reported quality of patient care and adverse events during COVID-19: a cross-sectional online survey among nurses. *J. Nurs. Manag.* 29, 1974–1982. doi: 10.1111/jonm.13359

Kameg, B. N., Fradkin, D., Lee, H., and Mitchell, A. (2021). Mental wellness among psychiatric-mental health nurses during the COVID-19 pandemic. *Arch. Psychiatr. Nurs.* 35, 401–406. doi: 10.1016/j.apnu.2021.05.003

Kingston, A. M. (2020). Break the silence: physician suicide in the time of COVID-19. *Mo. Med.* 117, 426–429.

Kroenke, K., Spitzer, R. L., and Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *J. Gen. Intern. Med.* 16, 606–613. doi: 10.1046/j.1525-1497.2001.016009606.x

Kröger, C. (2020). Shattered social identity and moral injuries: work-related conditions in health care professionals during the COVID-19 pandemic. *Psychol. Trauma Theory Res. Pract. Policy* 12, S156–S158. doi: 10.1037/tra0000715

Litz, B. T., Stein, N., Delaney, E., Lebowitz, L., Nash, W. P., Silva, C., et al. (2009). Moral injury and moral repair in war veterans: a preliminary model and intervention strategy. *Clin. Psychol. Rev.* 29, 695–706. doi: 10.1016/j.cpr.2009.07.003

Manzano García, G., and Ayala Calvo, J. C. (2021). The threat of COVID-19 and its influence on nursing staff burnout. *J. Adv. Nurs.* 77, 832–844. doi: 10.1111/jan.14642

Mark, G., and Smith, A. P. (2012). Effects of occupational stress, job characteristics, coping, and attributional style on the mental health and job satisfaction of university employees. *Anxiety Stress Coping* 25, 63–78. doi: 10.1080/10615806.2010.548088

McCain, R. S., McKinley, N., Dempster, M., Campbell, W. J., and Kirk, S. J. (2017). A study of the relationship between resilience, burnout and coping strategies in doctors. *Postgrad. Med. J.* 94, 43–47. doi: 10.1136/postgradmedj-2016-134683

McDaniel, S. P., Pelton, W. J., and Overstreet, G. A. (1973). Managerial characteristics of dentists. 3. Leader behavior description questionnaire. *J. Dent. Educ.* 37, 29–31. doi: 10.1002/j.0022-0337.1973.37.5.tb00685.x

McNeely, J., Wu, L. T., Subramaniam, G., Sharma, G., Cathers, L. A., Svikis, D., et al. (2016). Performance of the tobacco, alcohol, prescription medication, and other substance use (TAPS) tool for substance use screening in primary care patients. *Ann. Intern. Med.* 165, 690–699. doi: 10.7326/M16-0317

Meng, X., and Yang, D. (2023). Marital status differences in the association of work motivation with burnout: a network perspective. *Curr. Psychol.* doi: 10.1007/s12144-022-04124-5

Meredith, L. S., Bouskill, K., Chang, J., Larkin, J., and Motala, A. (2022). Predictors of burnout among US healthcare providers: a systematic review. *BMJ Open* 12:e054243. doi: 10.1136/bmjopen-2021-054243

Meyer, D., and Paul, R. (2011). A cross-National Examination of marriage and early life stressors as correlates of depression, anxiety, and stress. *Fam. J.* 19, 274–280. doi: 10.1177/1066480711406678

Mirza, I., and Jenkins, R. (2004). Risk factors, prevalence, and treatment of anxiety and depressive disorders in Pakistan: systematic review. *BMJ* 328:794. doi: 10.1136/bmj.328.7443.794

Moench, J., and Billsten, O. (2021). Randomized controlled trial: self-care traumatic episode protocol (STEP), computerized EMDR treatment of COVID-19 related stress. *J. EMDR Pract. Res.* 15, 99–113. doi: 10.1891/EMDR-D-20-00047

Mosheva, M., Gross, R., Hertz-Palmor, N., Hasson-Ohayon, I., Kaplan, R., Cleper, R., et al. (2021). The association between witnessing patient death and mental health outcomes in frontline COVID-19 healthcare workers. *Depress. Anxiety* 38, 468–479. doi: 10.1002/da.23140

Nantsupawat, A., Nantsupawat, R., Kunaviktikul, W., Turale, S., and Poghosyan, L. (2016). Nurse burnout, nurse-reported quality of care, and patient outcomes in Thai hospitals. *Honor Soc. Nurs.* 48, 83–90. doi: 10.1111/jnu.12187

Nash, W. P., Marino Carper, T. L., Mills, M. A., Au, T., Goldsmith, A., and Litz, B. T. (2013). Psychometric evaluation of the moral injury events scale. *Mil. Med.* 178, 646–652. doi: 10.7205/MILMED-D-13-00017

Nayak, B. S., Sahu, P. K., Ramsaroop, K., Maharaj, S., Mootoo, W., Khan, S., et al. (2021). Prevalence and factors associated with depression, anxiety and stress among healthcare workers of Trinidad and Tobago during COVID-19 pandemic: a cross-sectional study. *BMJ Open* 11:e044397. doi: 10.1136/bmjopen-2020-044397

Norman, S. B., Feingold, J. H., Kaye-Kauderer, H., Kaplan, C. A., Hurtado, A., Kachadourian, L., et al. (2021). Moral distress in frontline healthcare workers in the initial epicenter of the COVID-19 pandemic in the United States: relationship to PTSD symptoms, burnout, and psychosocial functioning. *Depress. Anxiety* 38, 1007–1017. doi: 10.1002/da.23205

Oreskovich, M. R., Shanafelt, T., Dyrbye, L. N., Tan, L., Sotile, W., Satele, D., et al. (2015). The prevalence of substance use disorders in American physicians. *Am. J. Addict.* 24, 30–38. doi: 10.1111/ajad.12173

Otared, N., Moharrampour, N. G., Vojoudi, B., and Najafabadi, A. J. (2021). A group-based online acceptance and commitment therapy treatment for depression, anxiety symptoms and quality of life in healthcare workers during COVID-19 pandemic: a randomized controlled trial. *Int. J. Psychol. Psychol. Ther.* 21, 399–411.

Panagiotidis, P., Rantis, K., Holeva, V., Parlapani, E., and Diakogiannis, I. (2020). Changes in alcohol use habits in the general population, during the COVID-19 lockdown in Greece. *Alcohol Alcohol. Oxf. Oxfs.* 55, 702–704. doi: 10.1093/alcalc/agaa092

Patel, R. S., Sekhri, S., Bhimanadham, N. N., Imran, S., and Hossain, S. (2019). A review on strategies to manage physician burnout. *Cureus* 11:e4805. doi: 10.7759/cureus.4805

Peñacoba, C., Velasco, L., Catalá, P., Gil-Almagro, F., García-Hedrera, F. J., and Carmona-Monge, F. J. (2021). Resilience and anxiety among intensive care unit professionals during the COVID-19 pandemic. *Nurs. Crit. Care* 26, 501–509. doi: 10.1111/nicc.12694

Peterson, U., Bergström, G., Samuelsson, M., Asberg, M., and Nygren, A. (2008a). Reflecting peer-support groups in the prevention of stress and burnout: randomized controlled trial. *J. Adv. Nurs.* 63, 506–516. doi: 10.1111/j.1365-2648.2008.04743.x

Peterson, U., Demerouti, E., Bergström, G., Samuelsson, M., Asberg, M., and Nygren, A. (2008b). Burnout and physical and mental health among Swedish healthcare workers. *J. Adv. Nurs.* 62, 84–95. doi: 10.1111/j.1365-2648.2007.04580.x

Poghosyan, L., Clarke, S. P., Finlayson, M., and Aiken, L. H. (2010). Nurse burnout and quality of care: cross-National Investigation in six countries. *Res. Nurs. Health* 33, 288–298. doi: 10.1002/nur.20383

Price, M., Szafranski, D. D., van Stolk-Cooke, K., and Gros, D. F. (2016). Investigation of abbreviated 4 and 8 item versions of the PTSD checklist 5. *Psychiatry Res.* 239, 124–130. doi: 10.1016/j.psychres.2016.03.014

Ruisoto, P., and Contador, I. (2019). The role of stress in drug addiction. An integrative review. *Physiol. Behav.* 202, 62–68. doi: 10.1016/j.physbeh.2019.01.022

Sarabia-Cobo, C., Pérez, V., de Lorena, P., Hermosilla-Grijalbo, C., Sáenz-Jalón, M., Fernández-Rodríguez, A., et al. (2021). Experiences of geriatric nurses in nursing home settings across four countries in the face of the COVID-19 pandemic. *J. Adv. Nurs.* 77, 869–878. doi: 10.1111/jan.14626

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., and Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption--II. *Addict. Abingdon Engl.* 88, 791–804. doi: 10.1111/j.1360-0443.1993.tb02093.x

Setiawati, Y., Wahyuhadi, J., Joestandari, F., Maramis, M. M., and Atika, A. (2021). Anxiety and resilience of healthcare workers during COVID-19 pandemic in Indonesia. *J. Multidiscip. Healthc.* 14, 1–8. doi: 10.2147/JMDH.S276655

Sexton, J. B., Adair, K. C., Proulx, J., Profit, J., Cui, X., Bae, J., et al. (2022). Emotional exhaustion among US health care workers before and during the COVID-19 pandemic, 2019-2021. *JAMA Netw. Open* 5:e2232748. doi: 10.1001/jamanetworkopen.2022.32748

Sinclair, V. G., and Wallston, K. A. (2004). The development and psychometric evaluation of the brief resilient coping scale. *Assessment* 11, 94–101. doi: 10.1177/1073191103258144

Sinha, R. (2008). Chronic stress, drug use, and vulnerability to addiction. *Ann. N. Y. Acad. Sci.* 1141, 105–130. doi: 10.1196/annals.1441.030

Spitzer, R. L., Kroenke, K., Williams, J. B. W., and Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch. Intern. Med.* 166, 1092–1097. doi: 10.1001/archinte.166.10.1092

Sulaiman, C. F. C., Henn, P., Smith, S., and O'Tuathaigh, C. M. P. (2017). Burnout syndrome among non-consultant hospital doctors in Ireland: relationship with self-reported patient care. Int. J. Qual. Health care. *J. Int. Soc. Qual. Health Care* 29, 679–684. doi: 10.1093/intqhc/mzx087

Tawfik, D. S., Scheid, A., Profit, J., Shanafelt, T., Trockel, M., Adair, K. C., et al. (2019). Evidence relating health care provider burnout and quality of care: a systematic review and Meta-analysis. *Ann. Intern. Med.* 171, 555–567. doi: 10.7326/M19-1152

Taylor, S., Paluszek, M. M., Rachor, G. S., McKay, D., and Asmundson, G. J. G. (2021). Substance use and abuse, COVID-19-related distress, and disregard for social distancing: a network analysis. *Addict. Behav.* 114:106754. doi: 10.1016/j.addbeh.2020.106754

Trockel, M., Bohman, B., Lesure, E., Hamidi, M. S., Welle, D., Roberts, L., et al. (2018). A brief instrument to assess both burnout and professional fulfillment in physicians: reliability and validity, including correlation with self-reported medical errors, in a sample of resident and practicing physicians. *Acad. Psychiatry J. Am. Assoc. Dir. Psychiatr. Resid. Train. Assoc. Acad. Psychiatry* 42, 11–24. doi: 10.1007/s40596-017-0849-3

Van Bogaert, P., Clarke, S., Roelant, E., Meulemans, H., and Van de Heyning, P. (2010). Impacts of unit-level nurse practice environment and burnout on nurse-reported outcomes: a multilevel modelling approach. *J. Clin. Nurs.* 19, 1664–1674. doi: 10.1111/j.1365-2702.2009.03128.x

Van Bogaert, P., Kowalski, C., Weeks, S. M., Van Heusden, D., and Clarke, S. P. (2013). The relationship between nurse practice environment, nurse work characteristics, burnout and job outcome and quality of nursing care: a cross-sectional survey. *Int. J. Nurs. Stud.* 50, 1667–1677. doi: 10.1016/j.ijnurstu.2013.05.010

Van Bogaert, P., Timmermans, O., Weeks, S. M., van Heusden, D., Wouters, K., and Franck, E. (2014). Nursing unit teams matter: impact of unit-level nurse practice environment, nurse work characteristics, and burnout on nurse reported job outcomes, and quality of care, and patient adverse events--a cross-sectional survey. *Int. J. Nurs. Stud.* 51, 1123–1134. doi: 10.1016/j.ijnurstu.2013.12.009

Vanderhorst, R. K., and McLaren, S. (2005). Social relationships as predictors of depression and suicidal ideation in older adults. *Aging Ment. Health* 9, 517–525. doi: 10.1080/13607860500193062

Weaver, T., Rutter, D., Madden, P., Ward, J., Stimson, G., and Renton, A. (2001). Results of a screening survey for co-morbid substance misuse amongst patients in treatment for psychotic disorders: prevalence and service needs in an inner London borough. *Soc. Psychiatry Psychiatr. Epidemiol.* 36, 399–406. doi: 10.1007/s001270170030

Zhou, T., Xu, C., Wang, C., Sha, S., Wang, Z., Zhou, Y., et al. (2022). Burnout and well-being of healthcare workers in the post-pandemic period of COVID-19: a perspective from the job demands-resources model. *BMC Health Serv. Res.* 22:284. doi: 10.1186/s12913-022-07608-z

Ziarko, M., Jasielska, A., Stanisławska-Kubiak, M., Daroszewski, P., Samborski, W., and Mojs, E. (2022). Mental health outcomes associated with COVID-19 pandemic in a Group of Health Care Professionals. *J. Behav. Health Serv. Res.* 49, 22–31. doi: 10.1007/s11414-021-09761-5

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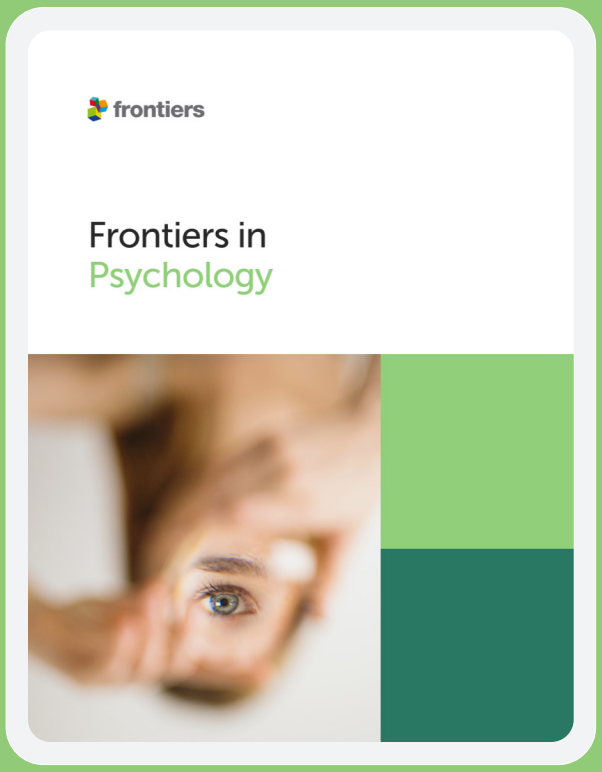

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