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Break the mental health stigma: Mental health in the workplace

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Break the mental health stigma: Mental health in the workplace

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Editorial: Break the mental health stigma: mental health in the workplace

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Editorial on the Research Topic
Break the mental health stigma: mental health in the workplace

The workplace today is an environment where mental health issues are increasingly becoming a focus of interest and concern. However, in some organizations, there is still a stigma attached to this issue. This can lead to discriminatory actions and attitudes towards employees who live with mental disorders, both at the personal and public levels. In particular, the stigmatization of people living with mental disorders in the workplace has a number of detrimental effects such as emotional distress (feeling uncomfortable and embarrassed), lower self-esteem, difficulties in social relationships, and a lower likelihood of initiating or maintaining a psychological treatment. It can also lead to difficulties in workplace relationships and in getting support or other job benefits (1). This Research Topic aims to integrate twelve studies in order to pave the way towards breaking down the barriers of mental health stigma in the workplace. This Editorial encompasses pioneering research endeavors, from observational studies, validation studies of new assessment tools until intervention studies, and integrates the complexities of mental health in professional settings, offering insights, and solutions to foster supportive environments where individuals can thrive.

The COVID-19 pandemic has brought mental health challenges to the forefront, exacerbating previous problems and highlighting the need for comprehensive support systems. In this sense, the study by Xiong et al. shed light on the significant impact of the COVID-19 pandemic on the mental well-being among healthcare workers. From an observational design, this study provides valuable insights about the relationship between workplace factors, burnout, wellbeing, and sleep quality, highlighting the urgent need for targeted interventions to support frontline workers. In the same way, the systematic review and meta-analysis by Navinés et al. shows a substantial prevalence of burnout among medical residents during the first wave of the COVID-19 pandemic.

Furthermore, the COVID-19 pandemic has underlined the relevant role of resilience in order to cope with challenging workplaces. In this sense, Li et al. examines qualitatively the views of Chinese nurses on the factors (professional, practical, and personal) that contribute to resilience in the workplace. Additionally, addressing mental health stigma also requires a self-

critical perspective on the part of health systems, as demonstrated by studies such as the one conducted by Li et al. More specifically, this national survey sheds light on the stigmatizing attitudes towards people living with mental disorders by non-mental health nurses from general hospitals in China. Therefore, this work emphasizes the need for widespread education and social awareness to combat stigma within healthcare settings.

Moreover, the study carried out by Cheng et al. explores the complex dynamics of workplace culture and its impact on employee engagement. By examining the influence of negative workplace gossip on work engagement through the moderating role of mindfulness and superior trust, this study underscores the importance of promoting supportive and positive workplaces, avoiding dysfunctional interpersonal patterns. Additionally, the relationship between leadership profile and mental health outcomes is a key area of study. For instance, Jalil et al. explore the mediating role of meaningful work in the relationship between empowering leadership and mental health outcomes among employees from small and medium enterprises in Malaysia. This research provides valuable insights into the factors that contribute to employee well-being and organizational success.

As organizations opt for taking care of employees' mental health in the workplace, new and pioneering approaches to meet the multiple needs of workers are warranted. To illustrate, West at al. propose the integration of behavioral science and artificial intelligence to offer personalized mental health support. This pilot study demonstrates the potential of technology-driven solutions to promote access to mental health resources and foster wellbeing among employees. In the same way, Woodard et al. present a population health approach to address mental health issues in the workplace. To this end, they proactively provide regular mental health assessments of employees and, if they exceed the "at risk" threshold, a Care Concierge is offered to connect users with various resources.

Additionally, the systematic review conducted by Guo et al. highlights the psychological toll faced by interpreters in emotionally challenging situations (police interviews before domestic violence cases). This study underlines the importance of comprehensive support systems for professionals exposed to traumatic experiences in the workplace. Furthermore, Diaz et al. analyze the factors influencing the wish to die among French physicians. Results of this study show the relationship between burnout, work-related difficulties, personality traits (emotional stability, extraversion, and agreeableness) and an increased wish to die among physicians. Therefore, this study underscores the importance of addressing workplace stressors and promoting mental health support systems to mitigate the risk of suicidal ideation among healthcare professionals.

Finally, in addition to the immediate challenges posed by the COVID-19 pandemic, mental health stigma continues to be present over workplaces worldwide. Matousian et al. propose the development of a new instrument for quantifying and understanding mental health stigma in professional settings, specifically within the return-to-work process. Likewise, ensuring culturally sensitive approaches to mental health assessment is crucial for addressing the diverse needs of communities worldwide. In this sense, Odero et al. aimed to psychometrically validate two widely used screening tools for depression and anxiety (PHQ–9 and GAD–7) among nurses/midwives and Community Health Volunteers in Kenya.

In conclusion, the collective insights from the twelve contributions of this Research Topic highlight the multifaceted nature of mental health stigma in the workplace. Addressing this stigma warrants a comprehensive approach that encompasses a nuanced understanding of workplace dynamics, societal awareness, supportive leadership, as well as new assessment tools and innovative interventions. By integrating this knowledge into practical and actionable strategies, organizations can pave the way towards creating inclusive and supportive work environments that also care for the mental health of their employees.

Author contributions

EF: Conceptualization, Supervision, Validation, Writing – original draft, Writing – review & editing. DA: Supervision, Validation, Writing – original draft, Writing – review & editing.

Conflict of interest

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

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Psychometric evaluation of PHQ–9 and GAD–7 among community health volunteers and nurses/midwives in Kenya following a nation-wide telephonic survey

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Background: Nurses/midwives and Community Health Volunteers (CHVs) are exposed to chronic stressors putting them at risk of developing mental health problems. This has been exacerbated by the COVID-19 pandemic. There is limited empirical evidence of the burden of mental health problems among health care workers partly due to the lack of adequately standardized and validated measures for use among health care workers in Sub-Saharan Africa. This study aimed to perform the psychometric evaluation of the PHQ-9 and GAD-7 administered to nurses/midwives and CHVs across 47 counties in Kenya.

Methods: Between June and November 2021, a national survey on mental well-being and resilience among nurses/midwives and CHVs was conducted via telephone interviews. The survey had a total sample size of 1907 nurses/midwives and 2027 CHVs. Cronbach's alpha and MacDonalds' omega were used to evaluate the scale's internal consistency. Confirmatory Factor Analysis (CFA) was used to test the one-factor structure of the scales. Multi-group CFA was applied to evaluate the generalizability of the scales across the Swahili and English versions, and among male and female health workers. The Spearman correlation was used to assess the tools' divergent and convergent validity.

Results: The internal consistency of PHQ-9 and GAD-7 was good, with alpha and omega values above 0.7 across study samples. CFA results indicated a one-factor structure of the PHQ-9 and GAD-7 for both nurses/midwives and CHVs. Multi-group CFA showed that both scales were unidimensional across both language and sex. The PHQ-9 and GAD-7 were positively correlated with perceived stress, burnout, and post-traumatic stress disorder, indicating convergent validity. The PHQ-9 and GAD-7 were significantly negatively correlated with resilience and work engagement, supporting divergent validity.

Conclusion: The PHQ-9 and GAD-7 are unidimensional, reliable, and valid tools for screening depression and anxiety among nurses/midwives and CHVs. The tools can be administered in a similar population or study setting using either Swahili or English.

KEYWORDS

anxiety, depression, community health volunteers, PHQ-9, GAD-7, nurses/midwives, reliability, validity

1. Introduction

Human Resources for Health (HRH) remains a key determinant of a well-functioning health system and is essential in improving population and individual health (1). However, with the global shortages in health workforce compared to population needs, health workers are continually exposed to work stressors, placing them at a high risk of psychological distress. These stressors are associated with high workload, long working hours, poor supply of required resources, poor working environments, among others (2). Kenya, like many other Low-and Middle-Income Countries (LMICs), also faces these health supply challenges and is dependent on nurses, midwives, and community health volunteers to meet the health services demands (3–5).

The ongoing COVID-19 pandemic has placed additional stressors on health workers, including fears and anxieties related to personal safety, possible infection and transmission to patients and family members (6). The health workers have experienced taxing working conditions with a relatively high influx of critically ill patients and death rates, as well as random redeployment of the clinical staff into unfamiliar territories to help contain the virus spread (7). They have also undergone loss or deterioration of personal support networks due to social stigmatization and isolation that risk eroding coping mechanisms, psychosocial wellbeing and resilience (8, 9).

Studies have shown that these stressors can have negative consequences on health workers' mental health (10–14), commonly depressive symptoms and generalized anxiety (15). Depression and anxiety are usually associated as co-morbid conditions, with anxiety often contributing to occurrence of depression (16). Additionally, symptoms of psychological distress can appear as secondary presentations, including after the stressors end, and with ranging severity (17). Health workers who are experiencing psychological distress provide poor quality care to their patients due to impaired performance, reduced productivity, and increased turnover (2, 18, 19). For example, previous studies have shown frequent absenteeism and high turnover among nurses experiencing anxiety (20–23).

In Kenya, studies conducted during the COVID-19 pandemic reported that health workers were experiencing mental health problems such as depression, anxiety, insomnia and stress. Kwobah and colleagues reported 36% of HCWs experienced anxiety, 32.1% depression, 24.2% insomnia and 64.7% post-traumatic stress disorder in their online survey of mental health disorders among Kenyan health care workers in the early phase of COVID-19 (24). Another study conducted in Kenya across three different hospitals during the COVID-19 pandemic showed that health care workers experienced depression (53.6%), anxiety (44.3%), insomnia (41.1%), distress (31.0%), burnout (45.8%) (25). Additionally, a survey among nurses working in a tertiary health facility in Kenya during COVID-19 reported depression, anxiety, insomnia, distress and burnout at 45.9, 48.2, 37.0, 28.8, and 47.9% (26). The risk factors for depression and anxiety were higher among females health workers, less than 30 years of age, not being married and those with less than 10 years of work experience (27). However, none of these studies reported the reliability or validity of the measures they employed to assess the mental health of the healthcare workers. It is crucial to ascertain that the measures used in assessing healthcare workers' mental health are appropriate, given the high levels of reported mental health issues. This is because having reliable and valid tools is an essential initial step in ensuring that healthcare workers receive the necessary mental health support they need.

Community health volunteers (CHVs) in Kenya play an integral role in health systems providing linkages between the community and health system and complementing the shortages in health workers in providing community-based health services. During the COVID-19 pandemic they have been providing services such as contact tracing, isolation and mobilization (28). Their potential and ability to provide mental health support to communities has been documented in previous studies (29–33), however, little has been done to document how they themselves receive psychosocial support. A recent survey by the George Institute and the Health Systems Global Thematic Working Group on Community Health Workers found that the mental health support received by CHWs during the COVID-19 was offered by implementing partners (34). The survey aimed at assessing availability of mental health support for CHWs during the COVID-19 pandemic. Reports from survey participants showed that CHWs were experiencing mental distress and showing symptoms of anxiety, depression, increased stress, and complaints of high workload and burnout (34).

The commonly used tools to measure anxiety and depression are the 9-item Patient Health Questionnaire (PHQ-9) and the 7-item Generalized Anxiety Disorder (GAD-7), respectively. PHQ-9 has been used among different populations in Kenya including adolescents and people living with HIV (35–37), while GAD-7 has been used among adolescents and adults living with HIV, and caregivers of children in community based early child development program (38–40).

However, as Jaguga and Kwobah (41) found in their review, Kenya's mental health response is still lacking, with an unmet need for psychological support and mental health surveillance system. This highlights a need to validate the existing measures for mental health disorders among different groups in Kenya. Validation is important to check content, conceptual, semantic and idiomatic equivalence (42), ensuring use of contextually appropriate and locally validated mental health measures to contribute meaningful epidemiological data in depression and anxiety in the country, and globally. To the best of our knowledge, these measures have not been validated among healthcare workers in Kenya.

This study, therefore, set out to assess the validity of the PHQ-9 and GAD-7, both in English and a locally translated version to Swahili, among nurses, midwives, and CHVs. Swahili is a national language in Kenya and is easily understood by majority of the population alongside English. To the best of our knowledge, no other study has validated the English and Swahili versions of GAD-7 and PHQ-9 among nurses, midwives, and CHVs in Kenya. We specifically report

Abbreviations: CFA, Confirmatory factor analysis; PSS, Perceived stress scale; CHV, Community health volunteer; PC-PTSD-5, Primary care PTSD screen for DSM-5; COVID, Coronavirus disease; BRS, Brief resilience scale; GAD, Generalized anxiety disorder; OLBI, Oldenburg burnout inventory; FE, Field enumerator; UWES, Utrecht work engagement scale; HIV, Human immunodeficiency virus; KMO, Kaiser-Meyer-Olkin; HRH, Human resources for health; RMSEA, Root mean error of approximation; NCK, Nursing council of Kenya; SRMR, Standardized root mean square residual; PHQ, Patient health questionnaire; CFI, Comparative fit index; NACOSTI, National commission for science, technology and innovation; TLI, Tucker Lewis index; IERC, Institutional ethics research committee.

on internal consistency, convergent validity, divergent validity, construct validity, and measurement of invariance across languages.

2. Materials and methods

2.1. Study site and population

This study was conducted across the 47 counties in Kenya. Each of the 47 counties has a semi-autonomous public health system following devolution by the government in 2013. County governments oversee delivery of healthcare services while the national government retained the policy and regulatory functions (43, 44).

This analysis is part of a larger cross-sectional study, whose aim was to generate evidence on the mental wellbeing and resilience of nurses, midwives, and community health volunteers (CHVs) in Kenya, in the context of COVID-19. It was conducted among health workers who had worked for 6 months or longer, spoke English or Swahili, and who consented to participate in the study.

2.2. Sample and data collection procedures

2.2.1. Sample size

We used STATA/SE 14.1 to compute the sample size (45) using the formula

$$n = \left(Z_{1-\frac{\alpha}{2}} \right)^2 p(1-p)/d^2$$

where,

n is the sample size,

Z is the statistic for the level of confidence,

p is the prevalence, and.

d is the margin error.

We estimated the prevalence of mental health problems among health care workers to be 24.73% based on a survey conducted in Italy 2020 (46). We used a 95% confidence level, a 2% margin of error and obtained a sample size of 1788. After accounting for a 10% non-response rate, a sample of 1900 nurses and midwives and 1900 CHVs was sufficient.

2.2.2. Recruitment of nurses and midwives

There is a national registry of all registered nurses and midwives in Kenya held by the Nursing Council of Kenya (NCK). We used this existing database to apportion the sample size (n = 1900) to each county using proportionate to size sampling (47). In this way, the sample size per county was proportional to the total number of nurses and midwives that the county had based on the NCK register at that point in time. NCK could not provide us with the personal information we needed (names, phone numbers, email addresses) to contact the nurses/midwives due to the Data Protection Act, 2019. Therefore, we sent a text message to all the nurses/midwives in the NCK database at the time (N = 45,942) inviting them to participate in the study; we received responses from 4,547 nurses and midwives, out of whom 4,377 consented to being contacted to participate in the study. As such, consent to participate in the study came from the participants themselves, not the NCK. The study team followed up with those who had consented to be contacted via phone calls to schedule the interview. At the scheduled time, a Field Enumerator (FE), called and conducted the interview.

Out of those who responded and expressed their willingness to participate in the study, individual nurses and midwives were recruited into the study through sampling by replacement while maintaining the aspect of proportionality to the number of nurses and midwives in each county. In cases where the selected nurse or midwife was missing or had changed their mind about participating or was not available, another nurse was randomly selected from the remaining pool of nurses in the county.

2.2.3. Recruitment of community health volunteers

There was no comprehensive register of all CHVs in the country available to us, therefore, we distributed the target number of CHVs (n = 1900) proportionately across all the 47 counties, such that we targeted to interview an equal number of CHVs in each county (41 CHVs). Approval to get in touch with the CHVs was sought from each county, and the County Community Health Focal Persons helped us disseminate information about the study through the sub-county focal persons and the community health assistants. The contact details of CHVs who were willing to participate were forwarded to the study team who went ahead to call, schedule, and conduct interviews.

2.2.4. Data collection

Data collection was carried out via telephone calls. During the interviews, the study information sheet was read out by trained research assistants to the eligible participants. They shared information about the project, risks and benefits to participants, details about what to expect if they agreed to participate and the project's contact information. All potential informants were given the chance to decline participation if they wanted to since participation was voluntary. The interviewer also sought consent to audio record the telephonic interviews. Once verbal consent was obtained, the interviewer signed a copy of the consent form as proof and an acknowledgement that they followed standard procedures of obtaining informed consent.

2.3. Measures

2.3.1. Sociodemographic tool

The sociodemographic questionnaire captured data on age, level of education, marital status, religiosity and social support, years of experience, type and level of health facility, number of working hours, salary receipt on time, regularity of receiving salary, availability of health insurance.

2.3.2. Mental health measures

The following tools were used to assess levels of mental distress among the nurses, midwives, and community health workers.

2.3.3. Patient health questionnaire-9

PHQ-9 was used to assess depressive symptoms. It comprises a Likert scale of "0" (not at all) to "3" (nearly every day) applied to the 9 items in the measure. Respondents were asked how often they had been bothered by each of the symptoms over the previous 2 weeks, and

a score ranging from 0 to 27 derived from summation of their responses. A cut-off score of ≥10 was used to define a positive screen for depressive symptoms, which is consistent with previous studies from Kenya (35–37).

2.3.4. Generalized anxiety disorder-7

GAD-7 was used to assess symptoms of generalized anxiety over the previous 2 weeks in this study. GAD-7 is a seven-item screening measure, scored on a four-point Likert scale ranging from zero (not at all) to three (nearly every day). Scores of 5–9, 10–14, 15–19, and 20–27 were used to indicate mild, moderate, moderately severe, and severe levels of generalized anxiety, respectively, consistent with other studies from Kenya (38–40).

2.3.5. Perceived stress scale-10

The PSS-10 is used to assess current stress levels among a study population. The field team read out to health workers in this study a list of 10 symptoms and asked them to rate their stress levels based on a scale of zero to four. Some of the items were reverse coded during analysis. Total score ranged from 0 to 40, with score higher than 27 indicating high perceived stress. The PSS-10 has been used in Kenya among maternity health care providers (48) and medical students (26), pregnant women with adverse childhood experiences (49), among other populations, but to our knowledge has not been validated.

2.3.6. Primary care PTSD screen for DSM-5

This is a 5-item tool designed to assess probable PTSD in primary care settings. The measure first asks a single question on exposure to traumatic events, if the respondent answers with a "no" then the assessment is complete with a score of zero. If they respond with a "yes" then the respondent goes ahead to respond to the five items in the measure, scored dichotomously as zero or one (0 = No; 1 = Yes). Total scores range from 0 to 5. Those who responded positively to 3 out of 5 were considered to have probable PTSD, which is the recommended cut-off (50).

2.3.7. Brief resilience scale

The Brief Resilience Scale (BRS) scale is used to assess how one can adapt and bounce back when they experience stressful events. The Brief Resilience Scale (BRS) has been used among adolescents, young adults, and adults from different settings and has shown good validity and reliability across different languages (51–55).

2.3.8. Oldenburg burnout inventory

Burnout has been measured extensively among students and employees using different measures, including the Oldenburg Burnout Inventory (56). The measure has a series of 16 statements: 8 measuring disengagement and 8 measuring exhaustion. The respondents were asked to rate the items on a 4-point Likert scale indicating their level of agreement or disagreement with the items. The scores were then summed up on a scale ranging from 16 to 64.

2.3.9. Utrecht work engagement scale – 9

The UWES-9 was used to assess health workers' engagement in work. UWES-9 is a nine-item screening measure, scored on a 7-point Likert scale ranging from zero (never) to 6 (always). The measure has three subscales of vigor, dedication, and absorption. The measure has been used among rescue workers in Portugal (57), community health workers in Sierra Leone (58), and nurses in Vietnam (59) all showing good validity and reliability. However, more work needs to be done to assess validity and reliability of the UWES-9 in Sub Saharan Africa (SSA).

2.4. Data analysis

The data were analyzed using R statistical software version 4.1.2 (60). The data sets for CHVs and nurses/midwives were analyzed separately. The sociodemographic variables (sex, age, level of education, marital status, psychosocial support from religion, work duration, type of health facility, working hours a day, monthly income, and health insurance) were summarized using descriptive statistics. The frequency and proportion were used for categorical variables, while the mean and standard deviation were used for continuous variables.

The internal consistency of PHQ-9 and GAD-7 was computed using Cronbach's alpha (α) and Macdonald's omega (ω) (61). The scales show good internal consistency if the values of Cronbach's α and Macdonald's ω are above 0.7 (62). Additionally, the item's score contributing to the scale was assessed using corrected item-total correlations (CITCS) and a value greater than 0.4 indicated the item had been homogeneous in measuring the scale (63). Convergent validity was assessed by correlating the PHQ-9 and GAD-7 total scores, respectively, with the Perceived Stress Scale-10 (PSS-10) total score, Oldenburg Burnout Inventory (OBI) total score, and posttraumatic stress disorder total score. Divergent validity was evaluated by correlating the PHQ-9 and GAD-7 total scores, respectively, with the Brief Resilience Scale (BRS) total score, Utrecht Work Engagement Scale-9 (UWES-9) total score. Spearman correlation coefficients were used for both convergent and divergent validity. The correlation coefficients values of <0.3, 0.3 to 0.5, and above 0.5, indicated weak, moderate, and strong correlation, respectively.

The Kaiser-Meyer-Olkin (KMO) Test for sampling adequacy was used to assess whether the data sets were appropriate for factor analysis, and a value of KMO estimate above 0.7 was acceptable (64). The relationship between the items was assessed using Bartlett's test of sphericity. The construct validity of PHQ-9 and GAD-9 was assessed using confirmatory factor analysis (CFA) (65). The CFA model goodness of fit was assessed using the fit indices; the Root Mean Error of Approximation (RMSEA) < 0.08 acceptable fit and < 0.05 good fit, the Standardized Root Mean Square Residual (SRMR) < 0.06, and the Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI) > 0.95 indicating excellent fit (66).

Measurement of invariance was used to evaluate whether the PHQ-9 and GAD-7 had an invariant one factor across the languages (Kiswahili, English and both) and across sex (males vs. females). Note, the data sets from CHVs and nurses were combined for the measurement invariance analysis. In this analysis, a sequence of invariance models was tested; a configural invariance model, metric invariance model, and scalar invariance model. The invariance models were contrasted, metric versus configural and scalar versus metric using CFI, and the $\Delta CFI \leq 0.01$ indicated unidimensionality of the PHQ-9 factor and GAD-7 factor across the languages. For all results, a 5% level of significance was used.

2.5. Ethical considerations

The study received approval from Aga Khan University's Institutional Ethics Review Committee (IERC) for Kenya (IERC number 2021/IERC-32) and the National Commission for Science, Technology and Innovation (NACOSTI/P/21/10034). All study participants provided verbal consent captured in the audio recording of the interview, since data collection was conducted via telephonic interviews.

3. Results

3.1. Participants sample characteristics

The study comprised a total sample of 2027 CHVs and 1907 nurses/midwives. The participants' socio-demographic and psychosocial characteristics are shown in Table 1. The mean age of CHVs was 43.93 (SD = 11.05), most were females (52.8%), and 44.5% had secondary education or higher. More than half of CHVs were married (79.0%), received psychosocial support from religion (53.9%), had worked for less than 10 years (68.5%), and were not receiving a salary (90.2%). The mean age for nurses/midwives was 34.12 (SD = 10.28), most nurses were females (59.9%), and 19.9% had a bachelor's degree in nursing or higher. Most nurses worked in public health facilities (53.9%), had work experience of fewer than 10 years (72.0%), and worked 8 to 11 h a day (64.9%). Of the total samples of nurses, 27.5% did not receive psychosocial support from religion, and 8.6% had no health insurance.

3.2. Reliability

The results of internal consistency are depicted in Table 2. The results revealed that the PHQ-9 had a good internal consistency with Cronbach's α and MacDonald's ω values above 0.7 for CHVs, and nurses/midwives, respectively. Similarly, the GAD-7 had a good internal consistency with α and ω values above 0.7 for both groups (Table 2). The item test corrected correlation of GAD-7 ranged from 0.66–0.73 for CHVs and 0.64–0.72 for nurses/midwives, while PHQ-9 ranged from 0.53–0.67 for CHVs and 0.53–0.67 for nurse/midwives. These results indicate that all the items had a good contribution in measuring PHQ-9 scale and GAD-7 scale, respectively, since all the item corrected correlations were above 0.4. Further, the results revealed that if the item was deleted, the alphas values were not greater than the overall alpha of the PHQ-9 and GAD-7, respectively.

3.3. Convergent validity

Table 3 summarizes the divergent and convergent results. The PHQ-9 was strongly correlated with GAD-7 ($r = 0.75$, $p < 0.001$) in CHVs and ($r = 0.75$, $p < 0.001$) in nurses/midwives. PHQ-9 had a significant and moderate positive correlation with PSS-10 ($r = 0.41$, $p < 0.001$) for CHVs, and PSS-10 ($r = 0.47$, $p < 0.001$), PTSD ($r = 0.32$, $p < 0.001$), and OBI ($r = 0.41$, $p < 0.001$) for nurses/midwives. There was also a significant and moderate positive correlation between GAD-7

TABLE 1 Participants' sociodemographic psychosocial characteristics.

	Community health workers	Nurses and midwives
	n (%)	*n* (%)
Over-all	2027	1907
Sex		
Female	1,070 (52.8)	1,143 (59.9)
Male	957 (47.2)	764 (40.1)
Age *means (SD)*	43.93 ± 11.05	34.12 ± 10.28
Education level		
Secondary school	896 (44.2)	–
Nursing/midwifery (certificate)	3 (0.1)	73 (3.8)
Nursing/midwifery (Diploma)	5 (0.2)	1,381 (72.4)
BSc nursing	–	346 (18.1)
MSc nursing	–	35 (1.8)
Other	1,123 (55.4)	72 (3.8)
Marital status		
Single	213 (10.5)	774 (40.6)
Married	1,601 (79.0)	1,082 (56.7)
Divorced/Separated	62 (3.1)	28 (1.5)
Widowed/Widower	151 (7.4)	23 (1.2)
Psychosocial support from religion		
Yes	1,092 (53.9)	1,290 (67.6)
No	775 (38.2)	524 (27.5)
Missing	160 (7.9)	93 (4.9)
Work duration		
<10 years	1,388 (68.5)	1,373 (72)
11–20 years	557 (27.5)	263 (13.8)
21–30 years	53 (2.6)	175 (9.2)
31–40 years	7 (0.3)	63 (3.3)
>40 years	5 (0.2)	5 (0.3)
Missing	17 (0.8)	28 (1.5)
Health facility management		
Public	–	1,028 (53.9)
Private	–	689 (36.1)
Faith based organization	–	145 (7.6)
Others	–	45 (2.4)
Working hours/day		
<8	1883 (92.9)	195 (10.2)
8–11	112 (5.5)	1,237 (64.9)
12–16	23 (1.1)	453 (23.8)
>16	9 (0.4)	22 (1.2)

(Continued)

TABLE 1 (Continued)

	Community health workers	Nurses and midwives
Receive salary		
Every month	138 (6.8)	1829 (95.9)
Every 3 months	19 (0.9)	9 (0.5)
Every 2 months	5 (0.2)	1 (0.1)
Unknown (no established pattern)	33 (1.6)	25 (1.3)
Other	3 (0.1)	33 (1.7)
Missing	1829 (90.2)	10 (0.5)
Receive salary on time		
Yes	48 (2.4)	1,002 (52.5)
No	99 (4.9)	473 (24.8)
Sometimes	51 (2.5)	422 (22.1)
Missing	1829 (90.2)	10 (0.5)
Health insurance		
Yes	785 (38.7)	1743 (91.4)
No	1,242 (61.3)	164 (8.6)

and PSS-10 ($r = 0.36$, $p < 0.001$), PTSD ($r = 0.30$, $p < 0.001$) for CHVs and PSS-10 ($r = 0.48$, $p < 0.001$), OBI ($r = 0.41$, $p < 0.001$), and PTSD ($r = 0.32$, $p < 0.001$) for nurse/midwives. Furthermore, the PHQ-9 had a significant and weak correlation with OBI ($r = 0.26$, $p < 0.001$) and PTSD ($r = 0.26$, $p < 0.001$) for CHVs.

3.4. Divergent validity

The results revealed a significant and weak negative correlation for PHQ-9 with BRS ($r = -0.19$, $p < 0.001$), UWES ($r = -0.10$, $p = <0.001$) for CHVs, and BRS ($r = -0.29$, $p < 0.001$), and UWES ($r = -0.15$, $p < 0.001$) for nurses/midwives. Also, there was a significant and weak negative correlation for GAD-7 with BRS ($r = -0.19$, $p < 0.001$), and UWES ($r = -0.14$, $p < 0.001$) for CHVs, and BRS ($r = -0.30$, $p < 0.001$), and UWES ($r = -0.16$, $p < 0.001$) for nurses/midwives.

3.5. Construct validity

Confirmatory factor analysis (CFA) was employed to assess the unidimensionality of PHQ-9 and GAD-7. Before performing the CFA, the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity were used to assess the data sets' suitability for factor analysis. The findings revealed a KMO estimate value of 0.89 for PHQ-9 (CHVs), 0.89 for GAD-7 (CHVs), 0.86 for PHQ-9 (nurses/midwives), and 0.88 for GAD-7 (nurses/midwives), as well as a significant Bartlett's test result ($p < 0.001$) for PHQ-9 and GAD-7 in both groups. These findings suggest that the data sets were adequate for factor analysis.

Table 4 summarizes the confirmatory analysis results for PHQ-9 and GAD-7. The findings revealed that the PHQ-9 and GAD-7 had a good one factor structure for CHVs and nurses/midwives, respectively, with all goodness of fit indices falling within the recommended

TABLE 2 Internal consistency for GAD-7 and PHQ-9.

	Cronbach's alpha (95% CI)	MacDonald's omega (95% CI)
Community health workers		
PHQ-9	0.78 (0.77–0.80)	0.77 (0.76–0.80)
GAD-7	0.82 (0.81–0.84)	0.82 (0.80–0.84)
Nurses and midwives		
PHQ-9	0.74 (0.73–0.76)	0.75 (0.73–0.77)
GAD-7	0.80 (0.81–0.82)	0.81 (0.80–0.83)

thresholds. The factor loadings were all significant and ranged from 0.42 to 0.61 for PHQ-9 (CHVs), 0.58 to 0.69 for GAD-7 (CHVs), 0.39 to 0.56 for PHQ-9 (nurses/midwives), and 0.58 to 0.65 for GAD-7 (nurses/midwives). The factor loadings' results were greater than the recommended threshold value of 0.35, indicating that the PHQ-9 and GAD-7 factors explained each item well, respectively.

3.6. Measurement invariance across languages (Kiswahili, English, and both) and across sex (males vs. females)

The results of the measurement of invariance are shown in Table 5. The model's results where intercepts, factor loadings, and variances were set to be free but had the same factor and number of items across the two groups, language and sex, (configural invariance model) indicated the PHQ-9 and GAD-7 factors fitted the data well, respectively. Additionally, constraining all items to load equally across the two groups (metric invariance model) revealed that the PHQ-9 and GAD-7 factors had a good fit, respectively. Further, constraining the intercepts to be equal across two groups (scalar invariance model), the results showed that the PHQ-9 and GAD-7 factors had an excellent fit. The change of CFI (ΔCFI) was used to contrast the sequential invariance models. The results indicated that comparing the metric invariance model versus the configural invariance model, the ΔCFI was 0.003 (languages) and < 0.001 (sex) for PHQ-9 and 0.002 (languages) and 0.001 (sex) for GAD-7.For scalar invariance model versus metric invariance model, the ΔCFI was 0.019 (languages) and 0.003 (sex) for PHQ-9 and 0.011 (languages) and 0.001 (sex) for GAD-7. The ΔCFI results for all model comparisons were less than 0.02, indicating that the PHQ-9 and GAD-7 scales had an invariant factor structure across the languages and sex, respectively.

4. Discussion

4.1. Summary of current study findings

Studies validating tools to assess depression or anxiety in SSA among health workers are limited. This study aimed to estimate the reliability and validity of the Swahili and English versions of the PHQ-9 and GAD-7 in measuring depression and generalized anxiety among community health volunteers and nurses/midwives in Kenya. The results show that the PHQ-9 and GAD-7 had excellent internal

TABLE 3 Divergent and convergent validity of PHQ-9 and GAD-7.

	Community Health workers		Nurses and midwives	
	PHQ-9	GAD-7	PHQ-9	GAD-7
Convergent validity				
Patient Health Questionnaire (PHQ-9)	1	0.75*	1	0.75*
Generalized Anxiety Disorder (GAD-7)	0.75*	1	0.75*	1
Perceived Stress Scale-10 (PSS-10)	0.41*	0.36*	0.47*	0.48*
Oldenburg Burnout Inventory (OLBI)	0.26*	0.29*	0.41*	0.41*
Posttraumatic stress disorder (PTSD)	0.26*	0.30*	0.32*	0.31*
Divergent validity				
Brief Resilience Scale (BRS)	−0.19*	−0.19*	−0.29*	−0.30*
Utrecht Work Engagement Scale (UWES) – 9	−0.10*	−0.14*	−0.15*	−0.16*

*p value < 0.05.

TABLE 4 Confirmatory Factor Analysis for PHQ-9 and GAD-7.

Fit Indices	Chi-square statistic	RMSEA	SRMR	TLI	CFI
Community health workers					
PHQ-9	χ^2 (5, $n = 2027$) = 13.24, $p = 0.021$	0.000	0.019	1.001	1.000
GAD-7	χ^2 (14, $n = 2027$) = 26.34, $p = 0.023$	0.021	0.027	0.996	0.997
Nurses and midwives					
PHQ-9	χ^2 (27, $n = 1907$) = 52.67, $p = 0.002$	0.022	0.030	0.989	0.992
GAD-7	χ^2 (14, $n = 1907$) = 28.71, $p < 0.001$	0.013	0.023	0.998	0.999

consistency in both CHVs and nurses/midwives. The factor structure of PHQ-9 and GAD-7 had significant factor loadings above 0.35 and acceptable fit indices, indicating depression and generalized anxiety constructs are valid in CHVs' and nurses'/midwives' populations, respectively. Additionally, the measurement invariance results revealed that the unidimensionality of PHQ-9 and GAD-7 was constant across the languages (Kiswahili, English and both) and across sex (males vs. females), respectively. These findings indicate that the PHQ-9 and GAD-7 are reliable and valid tools for assessing depression and generalized anxiety among CHVs and nurses/midwives.

4.2. Internal consistency

The internal consistency results of PHQ-9 were excellent, with Cronbach's α and MacDonald's ω values above 0.7 in both groups, and this supported the usefulness and reliability of PHQ-9. These findings are comparable with the results from previous studies in which alpha values were above 0.7 when PHQ-9 was validated in a similar working environment, 0.89 among medical students in Omani (67) and 0.80 among primary care attendants in Botswana (68). Similarly, the PHQ-9 was found to be reliable in other populations, 0.84 among both HIV-infected and uninfected populations in Kenya (37), 0.85 among patients with heart failure (69), and 0.87 among psychiatric patients in the United States (70). Consequently, the results of the study revealed good internal consistency of GAD-7 in both groups, which confirms results from past studies, 0.89 in the general population in Germany (71), 0.82 in the HIV population in Kenya (39), and 0.88 among patients in Portuguese (72).

4.3. Divergent and convergent validity

The significant and positive strong correlation between the depression and anxiety scores provided evidence of convergent validity, and these results concur with other studies' findings between anxiety and depression (73, 74). Both depression and anxiety scores were positively correlated with burnout among nurses, which is consistent with findings from a study that sought to assess the relationship between coping styles and burnout and mental health among medical practitioners (75). The results also showed that perceived stress was correlated with depression and anxiety. The results obtained by Gorgich et al. showed that the high level of stress among nurses increases mental health problems (76). Also, other studies have shown a significant positive relationship between stress and mental health problems among health workers (77, 78). Additionally, depression and anxiety were positively related to a post-traumatic stress disorder, which affirms the finding of a study conducted in Istanbul among healthcare workers, which showed that PTSD was associated with a high level of depression and anxiety (79). For example, health workers working in high-risk environments are at risk of psychological distress, which can repeatedly occur, resulting in trauma that can lead to mental health problems (80, 81).

On the other hand, our findings showed that a high level of resilience was negatively associated with depression and anxiety. Gao et al. reported that nurses with higher resilience were less likely to experience mental health problems (82). Consequently, the results

TABLE 5 Measurement of invariance across Kiswahili vs. English tool versions and across males vs. females (for both CHVs and nurses/midwives).

	Fit Indices	PHQ-9	GAD-7
Confirmatory Factory Analysis	Chi-square statistic	χ^2 (27, n = 3,930) = 59.35, p < 0.001	χ^2 (14, n = 3,930) = 38.15, p < 0.001
	RMSEA (90% CI)	0.017 (0.011–0.024)	0.021 (0.021–0.013)
	SRMR	0.022	0.024
	TLI	0.994	0.996
	CFI	0.996	0.997
Tool version (Swahili vs. English)			
Configural invariance	Chi-square statistic	χ^2 (81, n = 3,930) = 95.91, p = 0.123	χ^2 (42, n = 3,930) = 46.65, p = 0.287
	RMSEA (90% CI)	0.012 (0.000–0.020)	0.009 (0.000–0.022)
	SRMR	0.025	0.023
	TLI	0.997	0.999
	CFI	0.998	0.999
Metric invariance	Chi-square statistic	χ^2 (97, n = 3,930) = 131.35, p = 0.012	χ^2 (54, n = 3,930) = 76.98, p = 0.022
	RMSEA (90% CI)	0.016 (0.008–0.023)	0.018 (0.007–0.027)
	SRMR	0.029	0.029
	TLI	0.995	0.997
	CFI	0.995	0.997
	ΔCFI	0.003	0.002
Scalar invariance	Chi-square statistic	χ^2 (113, n = 3,930) = 276.73, p < 0.001	χ^2 (16, n = 3,930) = 175.88, p < 0.001
	RMSEA (90% CI)	0.033 (0.028–0.038)	0.036 (0.029–0.042)
	SRMR	0.038	0.038
	TLI	0.979	0.987
	CFI	0.978	0.986
	ΔCFI	0.017	0.013
Sex (males vs. females)			
Configural invariance	Chi-square statistic	χ^2 (54, n = 3,930) = 73.17, p = 0.042	χ^2 (28, n = 3,930) = 45.65, p = 0.019
	RMSEA (90% CI)	0.013 (0.003–0.021)	0.018 (0.007–0.027)
	SRMR	0.022	0.023
	TLI	0.997	0.997
	CFI	0.997	0.998
Metric invariance	Chi-square statistic	χ^2 (62, n = 3,930) = 83.50, p = 0.036	χ^2 (34, n = 3,930) = 59.04, p = 0.005
	RMSEA (90% CI)	0.013 (0.004–0.020)	0.019
	SRMR	0.024	0.026
	TLI	0.997	0.996
	CFI	0.997	0.997
	ΔCFI	<0.001	0.001
Scalar invariance	Chi-square statistic	χ^2 (70, n = 3,930) = 113.13, p = 0.001	χ^2 (40, n = 3,930) = 75.94, p = 0.001
	RMSEA (90% CI)	0.018 (0.011–0.024)	0.021
	SRMR	0.027	0.029
	TLI	0.994	0.995
	CFI	0.994	0.996
	ΔCFI	0.003	0.001

showed that the Utrecht Work Engagement Scale score was negatively related to depression and anxiety, and this is because health workers who work with enthusiasm and commitment are more likely to persevere in the face of adversity, which has been linked to lower mental health problems (83).

4.4. Construct validity

The CFA results from this study demonstrated that the PHQ-9 and GAD-7 scales are unidimensional in measuring the depression and anxiety constructs, respectively. Further, the measurement of invariance (configural, metric, and scalar) results across the languages (i.e., English, Kiswahili, or both) and sex (males vs. females) indicated that the unidimensional of PHQ-9 and GAD-7 scale was invariant across languages and sex, respectively. These findings suggest that depression or anxiety among male or female CHVs or nurses/midwives can be assessed through English, Kiswahili, or both languages using PHQ-9 and GAD-7 scales, respectively. Also, based on the finding of one structure of PHQ-9 and GAD-7 across nurses/midwives and CHVs indicates that depression and anxiety manifest the same way across the two populations. The one-factor structure of PHQ-9 is comparable with other previous studies conducted in the US among a diverse college population (African American, Asian American, European, American, Latino/American) (84), among HIV-affected and community controls populations in Kenya (37), and among outpatients departments in the major referral hospital in Ethiopia (85). Consequently, our results coincide with international studies of the one structure of the GAD-7 (71, 86, 87). We did not find another study that had validated PHQ-9 and GAD-7 among health workers, and we hope that these results provide a basis for further

work to ensure there is a tool kit that can be used to evaluate the psychosocial wellbeing and mental health of health care workers.

5. Strengths and limitations

The study's main strength was the large enough sample size for psychometric analysis, which resulted in reliable results. Furthermore, this is the first study to assess the validity of mental health tools among nurses/midwives and CHVs from all 47 counties in Kenya, ensuring a representative sample of this population. The tools were administered in both Swahili and English, which improved data quality by allowing participants to select either language. Finally, the availability of tools for conducting both convergent and divergent validity strengthens our findings by contrasting them with GAD-7 and PHQ-9. However, the study had some limitations. First, the sensitivity and specificity analysis were not reported because the study lacked a gold standard tool for assessing depression or anxiety. Second, no test–retest data were collected due to the busy schedule of health workers. Finally, we may have had selection bias since we only interviewed nurses/midwives who opted into the study, and had no data to compare whether their characteristics differed significantly from those who did not opt in.

6. Conclusion

The present study evaluated the reliability and validity of PHQ-9 and GAD-7 among nurses/midwives, and CHVs in Kenya. Our results provide evidence for one-factor structure in PHQ-9 and GAD-7, which is also generalizable across Swahili and English languages and across sex (males and females). Therefore, this study provides a simple, reliable and valid set of tools for national wide usage to screen depression and anxiety among our sample population.

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 authors.

Ethics statement

The studies involving human participants were reviewed and approved by Institutional Scientific and Ethics Review Committee, Aga Khan University. The Ethics Committee waived the requirement of written informed consent for participation.

Author contributions

AA, CS, and EN-M: conceptualization and methodology. SO, BMN, RO, AA, CS, and EN-M: investigation. RO, PM, and SO: data management. SO, PM, and AA: formal analysis. SO, BMN, AA, CS, and EN-M: project administration and supervision. SO and PM: writing-original draft preparation. SO, PM, BMN, RO, CS, EN-M, and AA: writing-review and editing. All authors read, provided feedback, approved, 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

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How to measure mental illness stigma at work: development and validation of the workplace mental illness stigma scale

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Introduction: The study objective was to design a new theoretically driven multidimensional scale for the use in the empirical measurement of stigmatizing attitudes towards persons with mental illness within the return-to-work process as this integral part of vocational reintegration has been widely neglected by scholars so far.

Methods: Therefore, we developed and validated a 21-item instrument to comprehensively measure the three-factorial structure of stigmatizing attitudes (affect, cognition, behavior) across two studies (overall N = 251).

Results: In both studies the new scale proved to be highly internally consistent, and its proposed three-factor structure was equally supported across the two studies. Convergent and discriminant validity were demonstrated by moderate and high correlations or zero correlations with pertinent measures. Furthermore, construct validity of the new scale was supported by significant positive associations with relevant personality characteristics within stigma research.

Discussion: The WMISS is the first instrument to measure mental health stigma specifically within the return-to-work-process and demonstrates strong psychometric properties. Inclusion of this scale in future research can help facilitate understanding of mental illness stigma within the occupational sector and assist with targeted intervention development.

KEYWORDS

mental health stigma, workplace reintegration, attitudes, discrimination, mental health at the workplace, return-to-work

Mental illness stigma in the workplace

One of the most challenged societal sectors with respect to mental disorders and its stigmatization is the professional and working life. Specifically, the average level of sick leave due to a mental health problem amounts to 30 days per year in Germany, whereas diseases of the muscular-skeletal system entail about 18 days of incapacity to work (1). Moreover, since the 1990s the days of sick leave due to a physical illness have declined, while sickness absence and early retirements as a result of mental ill-health have continuously grown in Germany, a trend, which is also globally observable (2–4). These figures are especially worrisome since work plays an integral part in our lives. Gainful employment provides a daily routine, meaningful tasks and boosts self-confidence and enhances quality of life. Thus, work conveys a sense of self-worth and fosters societal integration and support (5). It contributes to economic prosperity, but also to personal and social fulfillment. Besides, work itself functions as a major source of mental health and is a socially integrating determinant which is highly valued. In addition, maintaining or returning to employment can be a key stepping-stone in the recovery process of employees who

have suffered from poor mental health [e.g., (6–8)]. Precisely in such cases, it is of preeminent importance to ensure a safe and conducive working environment for people with mental health issues which promotes a considerate reintegration into the workforce. But unfortunately, mental health consumers still face a wide range of employment barriers and stigmatization as well as potential harassment within the workplace (9, 10). Past research has shown that unemployment rates among severely mentally ill individuals remain inordinately high, typically between 80 and 90% [e.g., (11–14)]. Concerns about the employability of individuals with mental illness were shown among the general population, as well as on the managerial and employee level (15).

In fact, a decent body of research on recruitment and employment of mental health consumers already exists: In a mixed methods design, Biggs et al. (16) reported, that while employment agencies would consider putting forward individuals with a mental health condition to employers, managers had reservations about hiring them due to mistrust and need of supervision. Surveys of US employers demonstrated that half of them were hesitant to hire someone with past psychiatric history or currently undergoing treatment for depression, with rates of reluctance to hire someone being even higher when the employee was said to have a history of substance abuse (17). In a nationwide interview-based assessment of mental health consumers in the United States concerning their experiences of stigmatization, Wahl (18) revealed that approximately one in three consumers had been turned down for a job for which they were qualified after their mental illness diagnosis was disclosed. This is concordant with recent results yielded from a field experiment, in which fictious applicants indicating a history of mental disorder received fewer callbacks than candidates with a history of physical injury (19). Compared to applicants with a physical condition, (20) showed that aspirants with a label of a depression disorder, had significantly less prospects of employment. Human resource managers responded notably biased for executive positions, 58% stating they would never employ someone with a diagnosis of depression for an executive job, compared to only 3% for a similar job candidate with diabetes. This stigmatization was grounded on the assumption of potential impaired work performance, rather than expectations of future absenteeism (20). Similar findings emanated from focus group interviews with 16 individuals with varying mental illnesses, showing that nearly all the participants concluded that their mental health condition had cost them previous job opportunities (21). Thus, disclosure of a mental illness in the labor market seems to cause direct detriment to the career possibilities of mental health patients, undermining their employability and jeopardizing career advancement (22, 23). Mental health consumers often prefer keeping their condition a secret, justifying long absences from work with fictional or fake diagnoses (24). Accordingly, they cannot then request rightful workplace accommodations which would ease their transition into the labor market and grant effective treatment.

But what happens when employees return to their workplace after a mental health diagnosis? Little attention has been paid to the return-to-work process of employees with mental disorders compared to people with physical disabilities (25). Yet, it seems that it is as difficult staying in the workforce as it is entering the labor pool, since mentally ill workers are confronted with a wide range of challenges and stigma, underemployment as being among the most pervasive obstacles. Underemployment refers to a situation in which individuals are forced to work in jobs inferior to their skills and qualifications or below adequate wages. Statistics indicate that 68% of workers with a mental health problem return to positions with reduced responsibility, work fewer hours and are paid less than before (26, 27). The annual income of employees with a depressive disorder is even decreased by approximately 10% compared to unaffected individuals (28). Additionally, mentally ill employees encounter interpersonal and social difficulties and discrimination, both at collegial and at executive level. They report about little or no psychosocial support and enhanced supervision (18, 24). Often, workers with a mental health condition become marginalized and targets for critical or negative remarks from workmates who had been previously helpful and accommodating (18, 24, 29).

Stereotypic beliefs about co-workers with mental health issues also influence attitudes about their performance capabilities and personality traits. Employees with depression and bipolar disorder were perceived to be low in warmth and competence, whereas workers with anxiety disorder were perceived as low in competence (30). Concerns about safety, incompetence and social compatibility with other co-workers were similarly identified as barriers to hiring and working with people with a mental health condition in a more recent interview-based study with employers and co-workers (31). These findings, too, dovetail well with qualitative research in the manifestations of stigma in the labor force. To that end, Russinova et al. (32) compiled an extensive taxonomy of prejudicial and discriminatory practices at the workplace gathered from a national sample of individuals with serious mental illnesses. Qualitative analyzes generated a continuum of more subtle to more blatant, but also anticipated, forms of psychiatric illness stigmatization experienced by mental health consumers that could be divided into two contextual domains: work performance and collegial interactions. Stigmatizing actions toward individuals with psychiatric conditions which do not aim at their work performance or job duties, but rather are enacted on an interactional-collegial level, appearing as similar to incivility, are especially toxic, since they erode one's sense of identity and impede the integration into the social fabric of the working environment (33).

Further, stereotypic conceptions also affect how co-workers and employers feel about employees with mental illnesses. In a vignette-based study, participants who viewed the employee as responsible for his mental health condition, reacted to him in an angry way resulting in lesser approval of supported employment (34). Oftentimes, negative cognitions and feelings toward employees with a mental health condition precipitate discriminatory action. For example, feelings of fear toward individuals with mental illness predicted avoidance behaviors and stereotypic assumptions predicted work-related social distancing intentions (30, 34). These findings are consonant with data maintained from the United States Equal Employment Opportunity Commission (EEOC), supporting instances of formal and informal discrimination toward this employment population.

A review of charges filed under the Americans with Disabilities Act (ADA) found that the percentage of charges citing a psychiatric disability has increased over the period of 2005–2014 (10). Among these cases, harassment is cited more often on charges mentioning a psychiatric disability (22% of charges) as compared to ADA charges overall during this period (15%), highlighting that one of the most prominent conflict areas, which employees with a mental health condition encounter, are interpersonal-related stress factors with colleagues. Case studies of ADA charges revealed disability-specific mistreatment, such as being mandated to share information about a

disability status beyond what is required for an accommodation request as well as enduring attempts of marginalization and isolation by taking away clients or setting meetings when the individual was unable to attend as well as references to their psychiatric disability in a disparaging and ridiculing manner (10). Also, job accommodations supporting employees with mental ill-health can be met by negative affective reactions from co-workers, perceiving the situation as unfair to themselves (35). Equally an expert study consulting mental illness-related labor and advocacy groups revealed that only 26.2% of experts indicated that employees could speak openly about mental health issues, and 81.5% of experts agreed that a large or medium unmet need for support for employees with mental health issues exists (36).

Taken together, it shows that employer and coworker attitudes are vital for beneficial workplace experiences for these employees and the success of reintegration programs, both the extent to which mentally ill employees are accepted into the occupational life as well as the extent to which equitable workplace accommodations are provided. Also, because mental health issues are one of the most common disabilities, it is essential to create a welcoming and inclusive workplace culture that may positively impact all employees, not just the ones with disabilities. Addressing negative attitudes and misconceptions about mental illnesses in the working environment would be the first step to foster successful mental illness literacy among the work force and establish an encouraging climate. In that respect, Corbiere et al. (37) classified presence of supportive colleagues, peer support networks, increased communication between the union and employees, and regular contact between employees and their company during sick leave as imperative elements for building an organizational culture supportive of successful return to work.

In light of the personal and economical costs to both organizations and individuals as well as the high prevalence of mental diseases globally, it is important that employees who are sick listed with mental health problems are facilitated in their return to work. In order to design valuable and tailor-made interventions, it is necessary to gather a better understanding of the reintegration process of people with mental health issues. Work-related stress factors such as mental illness stigmatization in the workplace might be especially deleterious within this crucial transitional process. To our knowledge, no instruments are available that capture mental illness stigma regarding the return-to-work process of employees with mental health problems. However, a measure that addresses and highlights stigmatizing attitudes toward people with mental health problems upon returning to work is not only relevant for empirical research but also of great use for the evaluation of the effects of workplace intervention programs.

Mechanisms of stigma and assessment of stigma

The process of stigmatization itself is closely intertwined with the tripartite view of attitudinal research. In that sense attitude structures contain cognitive, affective, and behavioral components (38, 39). Stigmatizing attitudes are likewise in line with this affective-cognitive-behavioral framework originating from social-psychological conceptualizations and therefore encompass stereotypes, prejudices, and discrimination. Stereotypes are global cognitive knowledge representations, which consist of unfavorable and adverse assumptions, evaluations and opinions about a certain social group and are collectively applied to individuals of that group of people (40). These cognitive correlates of stigmatization usually involve characterizations of incompetence, dangerousness and weakness concerning one group compared to another. Prejudices, however, are defined as the negative emotional reactions toward certain social groups and their members resulting from stigmatizing attitudes. The negative affective responses can range from pity to fear up to annoyance and anger regarding the stigmatized group. They, in turn, can lead to patronizing, hostile and avoidant behavior toward this group of people, which is the discriminatory aspect of stigmatizing processes. Discriminatory practices comprise a broad spectrum of disadvantaging behavioral actions, such as differential treatment of one group relative to another by withholding assistance and support toward the stigmatized group and, in the worst case, restricting them from life opportunities and rights. Further, the existence of power imbalance plays a paramount role in situations, in which stigmatization occurs. Thus, social, economic, and political power is necessary to stigmatize putative deviant members of a society (41). Stigmatization, hence, involves the confluence of different interrelated dimensions - stereotype, prejudice, and discrimination–but also the occurrence of power inequality which allows stigmatizing attitudes to be applied and acted upon. It is important to identify and understand these different core features of public stigma to effectively design targeted empirical research and plan specific interventions for stigma reduction campaigns.

However, assessment of mental illness stigma is heterogenous in measurements as well as in theoretical underpinnings and has mostly centered around attitudes of the general population toward individuals with mental health issues in general. One of the first scales was the Opinions about Mental Illness (OMI) scale (42), developed further by Taylor and Dear (43), resulting in the Community Attitudes to Mental Illness Inventory (CAMI). The CAMI measures attitudes in the general public and encompasses 40 items covering four sub-scales on authoritarianism, benevolence, social restrictiveness and community mental health ideology. Psychometric analyzes yielded adequate results in various samples in the United States and Canada. The inventory has been widely employed and translated into several languages, including Spanish, Italian, and German (44–46). Most of the questionnaires in stigma research incorporate common cognitive statements and opinions about mental illnesses in general, either gaged through personal or perceived stigma in society [e.g. (47–49),]. As a result, emotional and affective responses of the stigmatizer toward individuals with mental health issues are currently underassessed in stigma research (50). The Emotional Reaction to Mental Illness Scale developed by Angermeyer and Matschinger (51) is one of few scales which explicitly assesses affective reactions toward persons with mental illnesses, utilizing two vignette descriptions, one depicting schizophrenia and the other major depression. The final version contains four items of the three dimensions aggressive emotions (e.g., anger, irritation), prosocial reactions (desire to help, sympathy) and feelings of anxiety (uneasiness, fear). Link (52) constructed a 12-items questionnaire which determines the respondent's perceptions of what most other people believe regarding devaluation and discrimination of people with mental illnesses in job, friendships, and romantic relationships. The scale has been mainly administered among people with mental health issues but can also be applied in other populations. The 9-item short form of the AQ-27,

the Attribution Questionnaire (AQ-27), was created by Corrigan et al. (53) by extracting 9 items from the AQ-27 with the highest factor loadings measuring the domains of blame, anger, pity, help, dangerousness, fear, avoidance, segregation, and coercion. In a series of studies Griffiths and her colleagues generated measurements for stigma concerning depression and general anxiety disorders, identifying statements specific to stigmatizing beliefs about these illnesses (54, 55). The Prejudice toward People with Mental Illness Scale (PPMI), in turn, focuses on the concept of prejudice as an antecedent of discriminatory behavior and pinpoints four underlying factors: fear/avoidance, malevolence, authoritarianism, and unpredictability (56). As the only instrument to date to assess microaggressions perpetrated toward persons with mental illness, the mental illness microaggressions scale (MIMS-P) comprises 17 items resulting in three sub-scales, referring to Assumption of Inferiority, Patronization and Fear of Mental Illness (57). Behavioral inclinations toward people with mental illness have most commonly been determined by using measures of social distance, which assess a respondent's desire to interact with a target person in different forms of relationships [e.g., (30, 58); Link et al., 1999 (59)]. The vast majority of measures assessing mental health stigma represent global opinions about mental illnesses and do not cover specific life areas or social situations, such as the professional and occupational sector. An instrument to assess attitudes toward individuals with disabilities in the workplace was developed by Popovich et al. (60) consisting of scales regarding beliefs about what constitutes a disability, affective reactions to working with individuals with disabilities and opinions about the reasonableness of common workplace accommodations. The Workplace Inclusion Questionnaire (WIQ) specifically addresses attitudes regarding workplace inclusion which vary across different case stories including descriptions of individuals with musculoskeletal and mental disorders (61). Taken together, most stigma measures focus on a general stigmatization context, underrepresent specific mental disorders and lack of the affective component underlying the attitudinal framework.

The present study

This research focuses on the multifaceted and multidimensional elements of mental illness stigma in the workplace. We want to provide a comprehensive examination of the various components that comprise stigma by creating a targeted multidimensional mental illness stigma scale in the workplace. To eliminate disadvantages and social misconceptions about individuals with mental ill-health in the vocational reintegration process, we must first have a clear picture of the structure and substance of stigmatizing attitudes toward people with mental health issues. Thus, the aim of this study was to close the aforementioned gap in workplace stigmatization research concerning the return-to-work process as well as to develop and validate a measure referring to mental illness stigma in the workplace within the cognitive-affective-behavioral scheme, assessing emotional reactions, cognitive structures and behavioral consequences, all resulting in stigmatizing attitudes. To that end, two studies were conducted: Study 1 focused on the measurement development including item generation and analyzes as well as exploratory factor and validity analyzes, Study 2 utilized confirmatory factor analysis to evaluate the fit of the measures and expand the knowledge on validity of the new scale.

Study 1: item generation and content validation

Based on the three-pronged approach within the attitudinal framework and aiming to meet the requirement of multidimensionality as recommended by Antonak and Livneh (2000) (62) as well as in concordance with the multidimensional attitudes scale toward persons with disabilities (63), we represented each of the three dimensions of stigmatizing attitudes separately. Furthermore, in the development of our questionnaire, we incorporated items from established scales measuring different aspects of workplace attitudes toward various employment populations as well as items employed within mental health stigma research in order to generate an exhaustive image of workplace attitudes regarding mentally ill employees. This resulted in an initial item pool of 83 items.

Methods

Participants

Data of $N = 104$ could be collected. Respondents ranged in age between 18 and 61, with an average age of 24.44 years (SD = 7.09). Over 60% of the participants were female and 55.7% had completed general qualification for university entrance. One participant did not state their age, and two respondents did not state their exposure to mental illness. Exclusion of these data was refrained from, as a systematic bias was not to be expected. With over 62%, the majority of the participants were college students. Overall, 72% reported they had experiences with mental illness.

Vignettes

The three subscales were preceded by a vignette depicting a scenario in the working environment to have participants project their own feelings, thoughts, and behavioral intentions onto the indicated situation. Vignette-design studies are one of the most common methodological techniques in stigma research and show wide-ranging applicability (50). Using this approach, we intended to provide an elaborate stimulus to the respondents by painting a concrete real-life scenario at work which could evoke different responses. The vignette described the mental health condition of a female co-worker, who was either suffering from a major depression disorder or a general anxiety disorder. Symptoms were outlined, which met the criteria of a general anxiety disorder or major depression disorder and could be observed in the workplace setting prior to the absence of the co-worker due to her mental illness. At the end of the vignette, the female co-worker returns to work after her eight-week sickness leave and discloses her mental illness to a colleague (see Appendix A). The decision fell on these two disorders, as they show the highest prevalence in the working population as well as lead to long periods of illness with subsequent reintegration to employment (2, 64). The portrayal of a female co-worker in the vignette was designed to control stigmatization due to gender and is in accordance with data indicating an overrepresentation of the female population regarding the elected mental health conditions (1).

Affects subscale

As there is a paucity of measures assessing emotional responses within mental illness stigma research, we conducted a comprehensive

literature search in order to depict the affective component of our scale as thoroughly and broadly as possible. As a result, 39 items were originally framed for the affective subscale, encapsulating positive and negative prejudicial attitudes. The items originated mainly from the circumplex model of affect (65) as well as the Positive and Negative Affect Schedule (66) and were additionally complemented by affective adverbs deemed relevant to the workplace setting by an expert group consisting of three other researchers in the field of IO psychology. The choice fell on these two questionnaires since they map prototypical emotions and affective states and are both reliable and validated measures as well as have been widely employed. The circumplex model (65) pictures the structure of affective experience on two bipolar axes, one ranging from pleasure to unpleasure, characterized as valency, and the other from activation to deactivation, defined as arousal, which together describe each elementary affective condition. Emotions derived from the circumplex model of affect included, *inter alia*, anger, irritability, tension, fatigue, and calmness. The PANAS (66) encompasses a two-factorial structure resulting in positive and negative affectivity. Further items taken from the PANAS scale delineated hostility, determination, fear, and excitement. Supplementary items considered to be important to the study of stigmatizing attitudes toward individuals with mental illness in the workplace were discussed and assessed within the expert panel and finally added to the subscale. All affective items chosen were selected to be uniformly distributed around the dimensions of valency and arousal, referring to the circumplex model. German versions of the questionnaires were used (67). Following the vignette, the respondents were presented with the open sentence "*In such a situation, I feel… (e.g., disturbed)*." Afterwards they were asked to gage the likelihood of each emotion they experiencing in a situation as described in the vignette on a five-point Likert scale ranging from 1 (*very unlikely*) to 5 (*very likely*). To obtain a spontaneous and intuitive response from the participants, we decided to present the emotional items as adverbs and not as nouns.

Cognitions subscale

Since attitudinal measurements of occupational aspects regarding mentally ill employees are sparse, the cognitive dimension of attitude was drawn primarily from five different questionnaires and studies assessing work-related attitudes toward various employment groups (e.g., toward older workers) resulting in 27 items, forming the cognitive component of our scale. Via an expert panel suitable items from each questionnaire used were thoroughly discussed and selected for our cognitive sub-scale. Other items were excluded due to their redundancy. If necessary, items were translated into German via back-translation technique and rephrased to relate to our specific return-to-work context of mentally ill employees. Correspondingly, 14 items from the "Attitudes toward older workers" scale by Kluge and Krings (68) were chosen, further six items were derived from a survey by Popovich et al. (60), which assessed attitudes toward individuals with physical and mental disabilities in the workplace and four items were drawn from a list of character traits and job skills regarding female and male applicants from a study by Steffens and Mehl (69). Cognitive statements extracted from these questionnaires and surveys determine opinions and beliefs toward specific employment populations about their performance abilities, adaptive capacities as well as social skills in the working environment which we regarded equally important when assessing work-related attitudes toward individuals with mental illness in the return-to-work process. Finally, two items originated from mental health surveys about general attitudes toward mentally ill people, which were transferred to the professional context of our scale (48, 70). The final sub-scale records work-related cognitions toward mentally ill co-workers concerning their professional and social competence as well as performance. Following the emotions sub-scale, participants were presented with the open sentence "*Mrs M. … (e.g., needs more assistance than other colleagues)*" and the subsequent 27 cognitive statements referring to the mentally ill co-worker described in the vignette. Respondents were asked to rate the likelihood of each cognition that might occur to themselves in a situation depicted in the vignette on a five-point Likert-scale ranging from 1 (*very unlikely*) to 5 (*very likely*).

Behaviors subscale

The behavioral subscale follows the train of thought of social distance by Bogardus (71). The social distance approach assesses a respondent's readiness to engage in various types of relationships with a target person with items differing in the closeness of the association a respondent is asked to self-disclose. This concept has been a staple in social science research and has been adapted to different frameworks as well as target groups. Consequently, five items referred to the social distance conceptualization and were modified to fit the context of vocational reintegration. In addition, seven items were obtained from the aforementioned survey by Popovich et al. (60) as well as further two items from the questionnaire by Kluge and Krings (68). If necessary, items were back-translated and adjusted to suit our scale. Furthermore, three items were newly formulated to amplify the assessment of prosocial and approach behavior to attain a more complete picture of the behavioral possibilities. Thus, the behaviors subscale comprised originally 17 items tapping into various social interactions as well as prosocial intentions within the workplace environment. Following the cognitions subscale, participants were presented with the open sentence "*I would … (e.g., take a job where I would have to work closely with her)*" and the subsequent 17 behavioral options the respondents could choose to show or decline toward the mentally ill co-worker described in the vignette on a five-point Likert-scale ranging from 1 (*very unlikely*) to 5 (*very likely*).

Procedure

The study received ethical approval of the ethics committee of the authors' university. The questionnaire was developed as an online tool via SoSci Survey to reach as many people as possible (72). Participants were recruited by a mailing list of a German university and through the snowball technique. First participants read a short cover story stating that the study was about improving working conditions to get as many unbiased and authentic answers as possible. After respondents had given their informed consent to participate and had read the technical explanation of the procedure, they completed the questionnaire. Afterwards, a full disclosure of the true research interest of the questionnaire was provided.

Other measures and their hypothesized relationships with the new scale

To evaluate the construct validity of a new measure, ideally its relationship with an already exiting measure of the construct should

be determined. In the absence of the latter, we explored the association between our new scale and a general stigma scale regarding mental illness to investigate the convergent validity of the new instrument. As to discriminant validity, it was expected that the new scale would not be correlated with socially desirable responding, a construct presumed to be unrelated to stigmatizing attitudes toward mental illnesses (57). Since experience with mental illness as well as self-esteem have been consistently linked to stigma related to mental illness, we analyzed the relationship between the new measure and exposure to mental illness and the respondent's reported self-esteem indicating its criterion/concurrent validity (40, 51, 73). The measures are outlined below.

Measures

Community attitudes to mental illness inventory

Taylor and Dear (43) employed the Opinions about Mental Illness as a conceptual basis for the development of the CAMI scale and reported satisfactory internal reliability for their measure. The instrument includes 40 five-point Likert scaled items, resulting in the four sub-scales authoritarianism, benevolence, social restrictiveness, and community mental health ideology (e.g., "One of the main causes of mental illness is a lack of self-discipline and will-power"). Its major strength lies in its assessment of a broad range of generic attitudes toward mentally ill people as well as the exploration of opinions about mental health treatment facilities. The current study utilized the German version of the scale, which showed close correspondence between the German version and the original inventory with regards to socio-demographic measures as well as factor dimensionality (44). A higher score on this scale represents a greater level of negative attitudes toward mentally ill people. It was anticipated that there would be a positive correlation between the new measure and the CAMI. A significant relationship between the CAMI and the new scale would equally provide support for the convergent validity of our new scale. In the present sample alpha reliability was high, with a Cronbach's alpha value of 0.92.

Balanced inventory of desirable responding

Social desirability bias has been shown to be operative in the assessment of stigma and of less acceptable as well as less normative societal attitudes, which in turn may restrict potential findings (50). Thus, it should be examined whether less stigmatization toward the mentally ill is a result of authentic positive attitudes toward mentally ill people or whether it is merely an effect of socially desirable responding. To that end the 3-item 7-point Likert scaled Impression Management subscale of the original Balanced Inventory of Desirable Responding (74) in German (75) was administered to the participants of the current study (e.g., "I received too much change from a salesperson without telling him or her"). Winkler and his colleagues reported acceptable internal reliability as well as external validity for the subscales of the short version (75). It was hypothesized that there would be no significant associations between the new measure and the BIDR-Impression Management subscale since social desirability is assumed to be unrelated to attitudes toward mental illnesses (57). Streiner (76) argued that inter-item correlations should be considered, especially for short scales, because alpha depends on the length of the scale and the breadth of the measure. Clark and Watson (77) suggest that for scales measuring broad traits, an average inter-item correlation of at least 0.15 should be achieved. Note that the mean inter-item correlation was 0.27 for impression management in our sample.

Revised self-esteem scale

This 10-item German measure, using a 4-point Likert scale, was partially revised by Von Collani and Herzberg (78) and is based on Rosenberg's Self-Esteem Scale (79). It determines a person's global evaluation of his or her worthiness as a human being [e.g., "On the whole, I am satisfied with myself"] and shows satisfactory internal reliability. The theoretical reasoning underlying the selection of self-esteem as an indicator for the criterion validity of the new scale are the six levels of origins resulting in stigmatization by Haghighat (2001) (80). Accordingly, on a psychological level the process of stigmatization is based on social comparisons, which constitute our concept of self and others. By degrading others, especially minorities and seemingly societal deviators, those with low self-esteem can boost their own self-confidence and well-being. Hence, the presence of a stigmatized person or someone who is less fortunate provides psychological gains for the stigmatizer. Indeed, low self-esteem has been repeatedly found to be associated with negative evaluations of people with disabilities (81, 82). Thus, an inverse association between self-esteem and negative attitudes toward individuals with mental illness was expected. Respondents with higher scores on the self-esteem scale will tend to hold fewer negative attitudes toward people with mental disorders described in the vignette. In the present sample alpha reliability was high, with a Cronbach's alpha value of 0.89.

Contact/experience with mental illnesses

Previous experience or exposure to mental illnesses (either due to own mental disorder or contact with mental illness due to personal, professional, or general circumstances) was measured by a single yes/no/not specified item. Intervention research has illustrated that contact and personal experience with mental disorders helps mitigating stigmatizing processes (83, 84). Therefore, it was hypothesized that there would be a negative correlation between past exposure to mental illness and stigmatizing attitudes toward individuals with a mental disorder described in the vignette.

Demographic characteristics

After completing the previous instruments, self-reported gender, age, years of education and current work situation were recorded. To control for acquiescence, participants were asked which topic they thought the study was actually about with a single item in an open answer format. For each demographic variable, respondents had the option of refusing to provide information by choosing "unstated."

Results

Item selection and factor structure

Firstly, item discrimination indices were calculated to determine the degree of differentiation of each item within the group of respondents. Following conventional recommendations, we only retained items with discrimination indices between 0.4 and 0.7 (85). In a second step, we performed a Principal Component Analysis (PCA) with the remaining 48 items to assess the pattern of factor loadings and variance explained. The oblique rotation by means of the Promax method was employed on the premise that the factors are

assumed to correlate and as Promax rotation is the method of choice for oblique proceedings (86). Bartlett's Test of Sphericity [$\chi^2 = 3235.74$, ($df = 1,128$), $p < 0.001$] and a Kaiser-Meyer-Olkin value of 0.86 confirmed the suitability of examining the factor structure of the data. A cutoff value of 0.5 was applied to meet strict standards for adequate factor loadings for each of the items as well as content-related considerations regarding comprehensibility and redundancy of the items (87, 88). As we wanted to ensure that only parsimonious and functional items were ultimately included, each final subscale consisted of a maximum of 10 items. Thus, factor loadings with the smallest loadings on the corresponding dimension were eliminated. Following this two-step analysis, the final questionnaire was shortened to 22 items, resulting in 7 items for the affective component, 10 items for the cognitions dimension and 5 items for the behavioral component.

In consonance with our theoretical attitudinal framework, the PCA yielded three distinct factors with an eigenvalue greater than 1, explaining 57.9% of the total variance. As can be seen in Table 1, all of the items of the emotion's subscale can be located in the region of unpleasant deactivation to unpleasant activation, illustrating negative affectivity toward the mentally ill person described in the vignette. The 10 items of the cognitive factor embody a wide range of evaluations of professional skills and competences and the 5 items of the behavioral component reflect distancing or approaching behavioral possibilities. All items loaded exclusively on only one of the three factors, except for one item of the behavioral subscale which also loaded on the cognitive dimension. Due to theoretical conceptualizations, we still allocated this item to the behavioral subscale (see Table 1). As expected, all three subscales correlated significantly with each other, indicating one superordinate factor, that is stigmatizing attitude. The strongest association was found between cognitions and behavior [$r\,(102) = 0.63$, $p < 0.001$], followed by a moderate correlation between cognitions and emotions [$r\,(102) = 0.34$, $p < 0.001$] and a small association between behavior and emotions [$r\,(102) = 0.21$, $p < 0.05$]. Consequently, the three factors appear to share a similar foundation, yet each representing different dimensions of the overarching component stigmatizing attitude. The 22-item scale was found to be highly internally consistent, with a Cronbach's alpha value of 0.91. Equally, although varying in their number of items, the three subscales showed high internal consistency: The Cronbach's alphas for the Emotions subscale, the Cognitions subscale and the Behavioral subscale were 0.89, 0.90 and 0.83, respectively. Descriptive statistics for each subscale and their correlations with the overall stigma scale are presented in Table 2.

Convergent and discriminant validity

As hypothesized, results revealed that the new scale was significantly correlated with the CAMI [$r\,(102) = 0.47$, $p < 0.001$]. Since the CAMI inventory assesses global evaluations about mental illnesses and the new scale measures specific attitudes toward mental illnesses within the return-to-work process, the association between the two scales is expectedly not particularly high, indicating that the new instrument determines disparate attitudes of those gaged in the CAMI. Significant associations emerged from the correlations between the cognitive subscale and the CAMI scale, [$r\,(102) = 0.50$, $p < 0.001$], as well as between the behavioral subscale and the CAMI measure [$r\,(102) = 0.51$, $p < 0.001$]. The affective subscale and the CAMI scale showed no significant correlation, since the CAMI focuses on cognitive and behavioral tendencies toward mentally ill people rather than emotional responses [$r\,(102) = 0.11$, $p = 0.266$]. As for discriminant validity, no significant correlation was found between the new scale and the social desirability measure BIDR-Impression Management [$r\,(102) = -0.06$, $p = 0.565$] as well as between each of the subscales and the BIDR-Impression Management, equally supporting our assumptions (see Table 2).

Criterion validity

In order to investigate criterion validity of the new measure, we referenced self-esteem as a relevant external criterion. As predicted, self-esteem was found to correlate significantly and inversely with the new scale [$r\,(102) = -0.203$, $p < 0.05$]. Hence, the higher the respondent's self-esteem, the more positive his or her attitudes were toward the person with a mental illness. As for the subscales, only the correlation between the affective subscale and the self-esteem scale reached significance [$r\,(102) = -0.22$, $p < 0.05$]. This can be due to the circumstance that self-esteem taps into self-evaluations about the feelings concerning one's global self-worth (89).

Associations between exposure/experience with mental illness and the new scale

Contrary to our assumptions, there were no significant differences between exposure/contact to mental illness (yes/no) and the overall stigma score [$t\,(100) = 1.47$, $p = 0.144$]. Equally, a one-way MANOVA found no statistically significant differences between exposure/contact to mental illness on the combined subscales, $F\,(3, 98) = 1.63$, $p = 0.187$, partial $\eta^2 = 0.05$, Wilk's $\Lambda = 0.95$. However, analyzes on a descriptive level show that the mean values indicate a tendency toward a negative association.

Associations between the new scale and sociodemographic variables

We examined the relationship between basic demographic characteristics and our new scale by computing Pearson and Spearman correlations for the continuous and ordinal variables (age and level of education) and t-tests analyzes for the dichotomous variable (gender). No significant association was found between age and the new scale, neither for the overall stigma scale [$r\,(102) = -0.033$, $p = 0.742$], nor for the three subscales. The analyzes between level of education and the new measure also rendered no significant correlations, neither for the overall stigma score, Spearman's $\rho = -0.106$, $p = 0.284$, nor for the three subscales. As to gender, no significant differences were found between women and men on the overall stigmatizing scale, [$t\,(102) = -0.662$, $p = 0.403$]. However, subscale analyzes elicited gender differences on the emotional subscale. Post-hoc univariate ANOVAs were conducted for every dependent variable after a one-way MANOVA showed a statistically significant difference between the gender on the combined dependent variables, $F\,(3, 100) = 4.87$, $p < 0.05$, partial $\eta^2 = 0.13$. Results demonstrated a statistically significant difference between the scores of the female and male participants for the affective subscale, $F\,(1, 102) = 7.23$, $p < 0.05$, partial $\eta^2 = 0.07$, indicating that female participants responded higher in negative affectivity toward the mentally ill person in the vignette than male participants, but not for the other two subscales, cognitions, $F\,(1, 102) = 0.01$, $p = 0.924$, partial $\eta^2 = 0.00$ and behavior $F\,(1, 102) = 3.29$, $p = 0.073$, partial $\eta^2 = 0.03$.

TABLE 1 Factor loadings and communalities for final three-factor solution in Study 1.

Item	Affects	Cognitions	Behaviors	Communality
Nervous	0.86	−0.05	−0.01	0.71
Stressed	0.90	−0.06	−0.07	0.77
Scared	0.75	0.09	−0.05	0.60
Exhausted	0.77	−0.05	0.06	0.59
Ashamed	0.64	−0.05	0.14	0.44
Confused	0.79	0.03	−0.06	0.63
Disturbed	0.67	0.11	0.10	0.55
Ms. M. can be just as successful professionally as others. (−)	0.01	0.66	0.07	0.50
Ms. M. is not able to make important decisions.	0.06	0.79	−0.19	0.53
Ms. M. needs more assistance than other colleagues.	0.01	0.56	0.10	0.38
Ms. M. slows down the speed at which work is completed.	−0.04	0.76	0.08	0.64
Ms. M. is more difficult to train for new work tasks than other colleagues.	0.10	0.82	−0.15	0.61
Ms. M. is more prone to physical impairments (e.g., back pain, headaches, etc.).	0.26	0.54	0.06	0.50
Ms. M. is a capable employee. (−)	−0.14	0.69	0.15	0.55
Ms. M. will work just as hard as anyone else. (−)	−0.07	0.69	0.06	0.49
Ms. M. has certainly decreased in her performance.	−0.04	0.86	−0.21	0.57
Ms. M. cannot keep up with the pace of work at work.	−0.01	0.76	−0.01	0.57
I would share my office or desk with her. (−)	−0.04	−0.04	0.84	0.67
I would take a job where I would have to work closely with her. (−)	0.04	0.01	0.76	0.60
I would put her forward for promotion. (−)	0.01	0.38	0.51	0.62
I would carpool with her using my car. (−)	0.09	−0.16	0.88	0.67
I would designate her as my proxy in my absence. (−)	−0.07	0.45	0.44	0.58

Note. N = 104. (−) Reverse coded

Discussion

In this first study, we developed a multidimensional mental illness stigma questionnaire in the workplace based on the emotional-cognitive-behavioral framework within the attitudinal research. By means of item- and reliability analyzes as well as PCA the original item pool of 83 items could be reduced to a parsimonious final set of 22 items. Equally the originally proposed three factor model could be demonstrated via exploratory factor analysis. Small to moderate intercorrelations between the subscales underpin the notion of a superordinate factor stigmatization. As for convergent validity, bivariate correlations with the CAMI measure further support our new questionnaire and show its incremental validity beyond the established inventory, since it is specifically tailored to capture attitudes within the workplace regarding mentally ill co-workers on the emotional, cognitive, and behavioral level. In support of our assumptions concerning discriminant validity, there was no significant correlation between our new measure and its subscales and the social desirability scale. Regarding the criterion validity of our new scale, results show a significant inverse correlation between self-esteem and the overall stigma scale as well as the affective subscale.

Contrary to our assumptions, there was no significant association between exposure to mental illness and the stigma scale. This could be partly due to the fact that contact/exposure to mental illness was only measured with a single item without assessing the quality of the experience or exposure. As for sociodemographic variables, significant differences between male and female participants were only found on subscale level, indicating that female participants showed more negative affectivity toward the mentally ill co-worker described in the vignette than their male counterparts.

Study 2: replicating construct validity and criterion validity

In Study 2, we aimed to examine the consistency of the factors identified in the previous study by collecting a new sample and conducting Confirmatory Factor Analysis (CFA) to evaluate the fit of our new measure. Additionally, in order to replicate and extend convergent and criterion validity, we examined the relations of the new stigma questionnaire with other relevant measures and personality traits.

Methods

Participants

The participants were collected using an online questionnaire on the platform Sosci Survey and by a mailing list of students and staff from a university in Germany. In total, 147 participants took part in this study (81% were female, others were male), with an age

TABLE 2 Descriptive statistics, reliabilities (on the diagonals), and correlations for study 1 ($N = 104$).

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. WMISS	2.59	0.62	0.91						
2. Affects Subscale	2.09	0.83	0.68**	0.89					
3. Cognitions Subscale	2.77	0.76	0.89**	0.34**	0.90				
4. Behaviors Subscale	2.95	0.78	0.73**	0.21*	0.63**	0.83			
5. CAMI	1.88	0.49	0.47**	0.11	0.50**	0.51**	0.92		
6. BIDR-IM	4.55	1.21	−0.06	−0.07	0.02	−0.15	−0.11	0.27	
7. SES-R	3.00	0.55	−0.20*	−0.22*	−0.16	−0.07	−0.08	0.02	0.89

WMISS, Workplace Mental Illness Stigma Scale; CAMI, Community Attitudes Toward the Mentally Ill; BIDR-IM, Balanced Inventory of Desirable Responding-Impression Management Subscale; SES-R, Self-Esteem Scale Revised.
**$p < 0.01$, two-tailed tests. *$p < 0.05$, two-tailed tests.

distribution of 58.5% between 18 and 29 years old, 22.4% between 30 and 39 years old, 8.2% between 40 and 49 years old, 6.1% between 50 and 59 years old, and 4.8% between 60–69 years old. 42.2% had completed a university degree, 52.4% were employed. Overall, 79.6% reported having had experiences with mental illness, 42.9% described this contact or experience as partly positive and partly negative.

Procedure

First participants read a short cover story stating that the study was about improving working conditions to get as many unbiased and authentic answers as possible. After respondents had given their informed consent to participate and had read the technical explanation of the procedure, they completed the questionnaire. At the end of the study, the participants were fully debriefed and thanked.

Measures

Workplace mental illness stigma scale

Based on the results of the previous study, the WMISS contained the revised final questionnaire of 22 items, 7 items in the affective subscale, 10 items in the cognitive subscale and finally 5 items in the behavioral subscale.

Mental illness microaggressions scale

After assessing convergent validity with the CAMI in the previous study, we were interested in examining the association between our new scale and microaggression behaviors perpetrated toward persons with mental illness. Microaggressions are classified as subtler forms of discrimination which tend to be implicit prejudicial manners of communication. As there is no German scale available, we translated the MIMS-P (57) into German using the forward-backward procedure (e.g., "If someone I'm close to told me that they had a mental illness diagnosis, I would be careful in case they 'snap'"). The MIMS-P contains 17 items, shows good internal consistency, and encompasses microaggression behaviors by three subscales (Assumption of Inferiority, Patronization, Fear of Mental Illness). A positive correlation between the new stigma scale and the MIMS-P was expected. In our current study alpha reliability was satisfying, with a Cronbach's alpha value of 0.86.

Need for cognitive closure (German Short Scale)

The need for cognitive closure (NFC) is defined as a personality trait which affects cognitive processing, with individuals high in NFC tending to eschew uncertainty. The desire to reduce confusing and ambiguous information usually results in effort minimizing cognitive strategies, i.e., employing quickly accessible and stereotypical information in judgment formation (90). Indeed, NFC has been linked to a large scope of racial and gender prejudices (91). The inclination to utilize the most readily available information even hinders the likelihood of perspective taking when reading about a person with whom one is not identified with, as one's own viewpoint is likely to be the most rapidly present (92). Accordingly, we proposed a positive relationship between the need for cognitive closure and stigmatization on the affective, cognitive, and behavioral level. The 16-items German Short Scale for Need for Cognitive Closure (e.g., "I do not like it when a person's statement is ambiguous.") with an acceptable internal consistency was used in the Study 2 (93). In our current sample alpha reliability was satisfying, with a Cronbach's alpha value of 0.85.

Social Dominance Orientation (German Short Scale)

Social dominance orientation (SDO) refers to a belief system with a preference for inequality among social groups and hence a favoring of a hierarchical society (94). This tendency has been associated with biased attitudes against a range of stigmatized targets, including minorities (95) and higher-weight individuals (96). Consequently, a positive relationship between social dominance orientation and the WMISS was expected. Social dominance orientation was assessed by the 3-items German short scale KSDO-3 (e.g., "Every society needs groups that are at the top and others that are at the bottom.") which shows acceptable reliability (97). In the present sample alpha reliability was acceptable, with a Cronbach's alpha value of 0.61.

Balanced inventory of desirable responding

With the intention of replicating and corroborating our findings of Study 1, socially desirable responding behavior was measured with the same Impression Management subscale of the BIDR as in Study 1. No significant correlation was hypothesized for the relationship between socially desirable responding and the WMISS. The mean inter-item correlation of the impression management subscale was 0.22 in our second study.

Demographic characteristics

Participants' information about their age, gender, years of education as well as professional background were collected.

Contact/experience with mental illnesses and quality of contact

Previous experience or exposure to mental illnesses (either due to own mental disorder or contact with mental illness due to personal, professional, or general circumstances) was measured by a single yes/no/not specified item. Equally a single item for the assessment of quality of contact was used, participants should classify their experienced contact as positive, negative, or partly positive/partly negative.

Results

Several fit indices were examined, including standardized root mean square residual (SRMR), the standard fit index (NFI), the comparative fit index (CFI) and the root-mean-square error of approximation (RMSEA). Values of 0.90 or higher are indicators of good fit for the NFI and CFI; values between 0.05 to 0.09 are generally thought to be reasonable for the RMSEA; while values lower than 0.05 indicate an acceptable fit for the SRMR (98).

The indices of the original model did not reach the benchmarks for acceptable fit: χ^2 (206) = 432.92, $p < 0.001$, SRMR = 0.11, NFI = 0.75, CFI = 0.85, RMSEA = 0.08. After careful consideration and theoretical reasoning, we referred to the modification indices and added five pairs of error covariances (KG01, KG02, KG03, DI18, DI20, DI21, DI22), as they were reversely coded and within the same subscale. The overall fit improved: χ^2 (201) = 334.35, $p < 0.001$, SRMR = 0.11, NFI = 0.81, CFI = 0.91, RMSEA =0.07 (see Table 3).

Additionally, the 3-factor subscale structure with a superordinate factor proved to be superior in fit to a model that estimated only a single undifferentiated stigma factor: $\Delta\chi^2$ (8, $N = 147$) = 688.19, $p < 0.001$, SRMR = 0.22, NFI = 0.41, CFI = 0.46, RMSEA = 0.16 (see Table 3). Moreover, all items loaded significantly and moderately to strongly on their respective factors.

Similar to Study 1, the 22-items scale was found to be highly internally consistent, with a Cronbach's alpha value of 0.89. Equally, the three subscales demonstrated high internal consistency: The Cronbach's alphas for the Emotions subscale, the Cognitions subscale and the Behavioral subscale were 0.91, 0.84 and 0.84, respectively (see Table 4).

Convergent and discriminant validity

As expected, the new WMISS correlated significantly and strongly with the MIMS-P, [r (145) = 0.56, $p < 0.01$]. Correspondingly all subscales showed moderate to strong correlations with the MIMS-P (see Table 4). For discriminant validity the relationship between the WMISS and socially desirable responding behavior was reassessed. As hypothesized, the new scale and its subscales did not show any significant relationship with the BIDR-Impression Management subscale, [r (145) = −0.09, $p = 0.292$]. All subscale correlations are shown in Table 4.

Criterion validity

The new measure was correlated with a set of personality variables in order to further examine its criterion validity. As expected, the WMISS correlated positively and significantly with the need for cognitive closure, [r (145) = 0.33, $p < 0.01$] and social dominance orientation, [r (145) = 0.24, $p < 0.01$]. For all subscale correlations see Table 4.

TABLE 3 Fit indices for the workplace mental illness stigma scale in study 2.

	χ^2	*df*	CFI	TLI	RMSEA	RMSEA CI	SRMR	$\Delta\chi^2$	Δdf	*p*
Model A'										
Modified Three-factor model	334.35	201	0.91	0.90	0.07	[0.05, 0.08]	0.09	—	—	—
Model A										
Three-factor model	432.92	206	0.85	0.83	0.09	[0.08, 0.09]	0.09	98.57	5	<0.01
Model B										
Single-factor model	1022.53	209	0.46	0.40	0.16	[0.15, 0.17]	0.18	688.18	8	<0.01

$N = 147$. Model A and Model B are compared to Model A' (proposed model).

TABLE 4 Descriptive statistics, reliabilities (on the diagonals), and correlations for study 2 ($N = 147$).

Variable	*M*	SD	1	2	3	4	5	6	7	8
1. WMISS	2.77	0.63	0.89							
2. Affects Subscale	2.54	1.03	0.73**	0.91						
3. Cognitions Subscale	2.91	0.72	0.84**	0.32**	0.84					
4. Behaviors Subscale	2.81	0.82	0.64**	0.14	0.52**	0.84				
5. MIMS-P	2.10	0.47	0.56**	0.36**	0.50**	0.42**	0.86			
6. NFC	3.35	0.69	0.33**	0.31**	0.27**	0.11	0.43**	0.85		
7. SDO	1.99	0.79	0.24**	0.03	0.25**	0.34**	0.33**	0.17*	0.61	
8. BIDR-IM	3.62	0.95	−0.09	−0.06	−0.03	−0.13	−0.19*	−0.11	−0.15	0.22

WMISS, Workplace Mental Illness Stigma Scale; MIMS-P, Mental Illness Microaggression Scale-Perpetrator Version; NFC, Need for Cognitive Closure Scale; SDO, Social Dominance Orientation Scale; BIDR-IM, Balanced Inventory of Desirable Responding-Impression Management Subscale.
**$p < 0.01$, two-tailed tests. *$p < 0.05$, two-tailed tests.

Associations between the WMISS and contact with mental illness/ quality of contact

Contrary to our expectations, a one-way ANOVA and a one-way MANOVA, respectively revealed no significant difference between the different groups of experienced contact or exposure to mental illness on the overall stigma scores, $F(2, 144) = 0.13$, $p = 0.881$, nor on the subscale scores, $F(6, 284) = 0.21$, $p = 0.973$. Likewise, quality of contact, as assessed in three categories (positive, negative, and partly positive, partly negative) neither affected significantly the overall stigma scores, $F(3, 113) = 1.54$, $p = 0.208$, nor the subscale scores, $F(2, 270.30) = 1.07$, $p = 0.387$.

Associations between the WMISS and sociodemographic variables

Similar to Study 1, no significant correlations were found between level of education and overall stigma scores or subscale scores. Also results showed no significant association between age and overall stigma scores and its subscale scores, except for the behavioral subscale, with a small positive correlation, Spearman's $\rho = 0.17$, $p < 0.05$. No significant difference emerged from the analysis of female and male participants regarding their overall stigma scores, $t(145) = -1.53$, $p = 0.129$, nor their subscale scores, $F(3, 143) = 1.92$, $p = 0.129$. With regards to occupational status, results showed no significant differences between employed and non-working participants for their overall stigma scores, $t(142) = 1.13$, $p = 0.262$, and for their subscale scores, $F(3, 140) = 1.09$, $p = 0.358$.

Discussion

Study 2 provides further evidence for the proposed factor structure of the WMISS. The CFA results substantiated Study 1 and supported the three-factor model with stigma being the superordinate factor in comparison to an undifferentiated one-factor model.

Additionally, Study 2 yielded further support for the new measure's convergent and discriminant validity. The WMISS and its subscales correlated significantly and moderately to strongly with the MIMS-P. As in Study 1, the new measure and its subscales did not show any significant relationship with the BIDR-Impression Management subscale, corroborating its discriminant validity. Besides, findings in Study 2 were in line with the new scale's suggested association with additional relevant personality variables, indicating criterion validity. The WMISS correlated moderately and significantly with the need for cognitive closure and social dominance orientation.

As to contact with mental illness and quality of contact with mental illness, analysis showed no significant difference in the tendency of stigmatization. This is surprising, since contact theory states that positive contact leads to tolerance and acceptance between groups (99). Nonetheless it could be that level of contact and intimacy is equally as important, for it makes a difference whether one comes into contact with mental illness by a relative or by a stranger. No age and education differences were found, replicating findings from the previous study. Similarly, analyzes rendered no differences between the occupational status and stigmatization. However, also no gender differences were found on overall and subscale level, which is contradictory to Study 1. Yet, this goes to show that gender differences concerning stigmatization need to be researched further, since findings are heterogenous and incoherent.

Taken together, our second study provided support for the proposed three-factor model as well as for the convergent and discriminant validity of the newly developed measure by looking at their correlations with conceptually similar as well as theoretically unrelated concepts. Still further research is needed to explore the new questionnaire's predictive and incremental validity.

General discussion

In our present research we sought to devise a new multidimensional workplace stigmatization measure with sound theoretical foundations and reasonable psychometric properties. Derived from the affective-cognitive-behavioral framework of attitude (39), we created, *a priori*, an instrument consisting of three dimensions, representing the overall common core of stigmatizing attitude. After item selection, the initial item pool of 83 items was reduced to a parsimonious set of 22 items. Statistical analyzes yielded small to moderate and strong correlations between the subscales, revealing, on the one hand, disparate and separate components, and on the other hand, illustrating a mutual overarching factor. In both studies the new WMISS proved to be highly internally consistent, and its proposed three-factor structure was equally supported across the two studies. More precisely, the three-factor model with a superordinate construct showed a significantly better fit to the data than alternative models with an undifferentiated factor. Convergent and discriminant validity were demonstrated by moderate and high correlations (e.g., CAMI) or zero correlations (BIDR) with pertinent measures. Furthermore, construct validity of the new scale was supported by significant positive associations with two personality characteristics, namely need for cognitive closure and social dominance orientation, which is also in line with previous research, linking these personality traits to biased and discriminatory behavior (95). Moreover, inverse correlations between self-esteem and the WMISS were found for the overall stigma score as well as for the affective subscale, supporting the notion, that individuals with a lower self-esteem tend to hold more stigmatizing attitudes toward seemingly deviant people than individuals with a higher self-esteem (81, 82).

Surprisingly, neither self-reported exposure to mental illness nor the quality of this exposure or experience seemed to impact stigmatization. However, several studies support the social contact hypothesis in reducing stigma against individuals with mental health issues by facilitating inter-group relations [e.g., (100, 101)]. In our study contact and quality of contact was measured by using a single "yes/no" or "negative/positive/partly positive, partly negative" item. It could be that exposure to mental illness requires a more detailed assessment of its form of social contact and experience, since it makes all the difference whether one experienced mental illness himself/herself, through a relative or colleague. The level of contact report which lists 12 situations in which intimacy of contact with mental illness is varied could be a useful tool to expand knowledge in that regard and should be considered for future research (102).

Theoretical and practical implications

To our knowledge, this is the first multidimensional mental illness stigma scale which centers around the occupational setting and the return of mentally ill employers to their workplace. The newly developed WMISS not only closes a remarkable gap in research on stigmatizing attitudes toward the mentally ill but also

offers promising prospects for workplace reintegration programs. Thus far, instruments on stigmatizing attitudes have neglected the multidimensional aspect of attitudinal conceptualizations and have mostly focused on the cognitive and behavioral part of stigmatization, while overlooking the affective component of stigmatizing attitudes (50). However, the consideration of a multidimensional approach is especially crucial when studying attitudes toward mentally ill people since any measure will inevitably not reflect a comprehensive picture of attitudes when assessing only one or two dimensions of the attitudinal framework (39). As pointed out by Findler et al. (63) with regards to people with disabilities, this might even lead to false conclusions being drawn, when, for instance, only concentrating on discriminating behavioral actions, which are generally less likely to be admitted, while at the same time disregarding negative affective responses concerning mentally ill people and thus depicting a more favorable attitude toward them. Statistical support for the multidimensional perspective is also demonstrated, when evaluating the correlational analyzes between the CAMI and the subscales of the WMISS: The CAMI questionnaire captures mostly cognitive and behavioral elements of stigmatizing attitudes perpetrated against mentally ill individuals, hence only the cognitive and behavioral subscales of our new scale were found to be strongly associated with the CAMI, while the affective subscale showed no significant correlation with the latter. Besides most mental illness stigma measures were framed within a more general context of stigmatization, which could potentially result in less valuable implications when its outcomes are to be applied to a specific setting. This is especially important when it comes to outlining intervention strategies. A questionnaire which assesses stigmatizing attitudes within a specific life area can provide fruitful insights not only into understanding marginalization and discrimination regarding a distinct context but might also function as a helpful tool for targeted and effective intervention programs and their subsequent evaluation. For example, mental disorder de-stigmatization campaigns within the occupational sector require a different modus operandi than broad-based anti-discrimination initiatives, as employees with mental health issues face particular workplace barriers which oftentimes revolve around their abilities, stamina and social skills (10). Specifically, the WMISS could be a beneficial instrument in accompanying and evaluating occupational re-integration programs within the HR sector of companies in order to support job accommodations for people with mental illness, but also as an initial assessment tool for capturing attitudes of colleagues regarding mental illnesses and analyzing mental illness literacy within an organization. Furthermore, most research to date in the field of mental illness stigma has concentrated on severe mental disorders, e.g., schizophrenia, substance abuse disorders [e.g., (11, 12, 83)]. Yet, comparatively little attention has been paid to stigma surrounding depression and generalized anxiety disorder. This is especially alarming given that both depression and generalized anxiety disorder are highly prevalent in the public, crippling in their consequences for those affected and cause long periods of illness and lengthy sickness-related absences from work (64). Our instrument spotlights these two disorders and helps to identify how employees with a depression disorder or generalized anxiety disorder are perceived and treated by their co-workers. This is a crucial step in improving the quality of work experiences of mentally ill employees and refining interventions to create a more supportive and inclusive working environment.

Strengths, limitations, and future research

The findings of the two studies in this paper provide evidence for the new scale's factor structure, internal consistency, convergent and discriminant validity as well as criterion validity. One of the major strengths of the present research is the theory-driven adoption of the multi-dimensional perspective of stigmatizing attitudes and its implementation by constructing a vast and extensive initial item pool of 83 items. In this context, particular consideration was given to the comprehensive composition of the affective dimension of the new scale, as stigma-related feelings have long been a missing component in the assessment of stigma-associated processes (50). Yet another strong point of our research lies in the new instrument's validation by means of two different samples, which increases generalization of the results.

However, still further research is needed to establish the new scale as a sound measure for the assessment of mental illness stigma within the occupational setting. One of the primary limitations of the current study is the relatively small sample size and its homogenous composition. Notably the sample comprised more women than men, higher educated participants than lower educated respondents and more younger participants than middle-aged or older respondents. In addition, in both studies over 70% of the participants reported having had exposure to mental illness. Besides, we only validated the German set of items of the WMISS. Future research should therefore further investigate the new scale's psychometric properties in different populations and in international samples.

Another potential shortcoming of our studies might be that both of our samples were collected via online tools which can unavoidably lead to self-selection processes, so that only participants with certain personality traits or those who have access to online panels would take part in the studies. Hence, in future studies various formats of recruitment should be considered to expand the representativeness of the research.

Finally, our instrument solely depends on the respondent's self-reports, resulting in a potential underestimation of the individual's level of stigmatizing attitudes. In addition, it is important to note that vignette-based studies only depict hypothetical and abstract real-life situations, neglecting non-verbal cues and unconscious information processing through observable signals. Future research could address this drawback by combing non-vignette experimental studies with self-report measures. Thus, the additional assessment of implicit measures, such as behavioral or physiological outcomes in real-life scenarios, will shed further light on the incremental and predictive validity of the WMISS. In fact, previous research has illustrated the significant association between explicit attitudinal evaluations and physical proximity with regards to mental health stigma (103).

A possible extension of our research may also lie in the development of vignettes for other mental illnesses as well as in the depiction of male employees with a mental health status to expand the scope of the WMISS for the workplace setting and to examine labeling effects between the different mental disorders and genders. Additional value for the new inventory could certainly also be generated through the comparison of perceptions and experiences of mentally ill employees concerning workplace stigmatization with our new scale as

well as their potential tendencies of self-stigmatization within the occupational context.

Conclusion

Our newly developed multidimensional WMISS allows researchers and professionals to assess stigma associated with mental disorders within the working environment reliably and thoroughly based on the profound theoretical foundation of attitudinal research. The results obtained in the two studies are indicative of the instrument's factor structure, reliability, and validity. Hence, the WMISS is a promising measure for use in future studies in further exploring mental illness stigma in the occupational sector as well as designing targeted and tailored intervention programs aimed at modifying attitudes regarding mental illnesses.

Data availability statement

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

Ethics statement

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

Author contributions

NM and KO structured the main ideas and developed the research question. NM developed the design of the studies, conducted the surveys, performed the analyzes, and wrote the first draft. All authors read and approved the final manuscript.

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/fpsyt.2023.1225838/full#supplementary-material

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Does meaningful work mediate the relationship between empowering leadership and mental health? Evidence from Malaysian SME employees

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Introduction: In Malaysia, small and medium enterprises (SMEs) account for more than half of all employment and 98.7% of all businesses. There is little research on empowering behaviors in SMEs, despite leadership empowerment being often practiced. Therefore, the study aims to investigate how empowering leadership affects employees' mental health. The study also reveals meaningful work's role in mediating the relationship between empowering leadership and employees' mental health.

Methods: A stratified random sample approach was used to collect data from 516 employees of Malaysian SMEs. The data was analyzed, and the hypothesis was tested using structural equation modeling (AMOS 21.0) with bootstrap confidence intervals computed to evaluate the mediating effect.

Results: The results demonstrate that empowering leadership significantly improves employees' mental health. Furthermore, the association between empowering leadership and mental health is partially mediated by meaningful work.

Discussion: This study contributes to the present empowering leadership-meaningful work-mental health model for SME employees, which reduces stress and anxiety at the workplace and positively impacts psychological empowerment and their capacity to control their overall emotions in instances of success.

KEYWORDS

empowering leadership, meaningful work, mental health, SMEs, structural equation modeling, Malaysia

1. Introduction

Work has taken on a more important role in our everyday lives, which has an impact on all aspects of a person's life, including their health (Kim et al., 2018). The health of employees, which includes both psychological and physical aspects, has a significant influence on an organization's performance (Salas-Vallina et al., 2021) and its ability to survive through impacting turnover (Bufquin et al., 2021), organizational citizenship behavior (Yu et al., 2021), absenteeism (Brunner et al., 2019), job performance (Tisu et al., 2020), and increasing medical and healthcare expenses (Song and Baicker, 2019). Beyond just having a financial impact, employment experiences may also influence parts of life outside of work (Akkermans et al., 2020).

Employee health policies and programs implemented by organizations are also seen as a sign that the company values its workers (Hu et al., 2021). Furthermore, it may

help the company present the image of being an employer who cares about the wellbeing of its employees, which would attract recruits and keep a good workforce (Tripathi and Bharadwaja, 2020). The present study focuses on mental wellness and evaluates it based on small and medium enterprises (SMEs) employees' overall mental health.

According to research by Martin et al. (2009), <25% of SME managers/owners had a clear policy on mental health, yet they felt that depression was a topic appropriate for discussion in the workplace. Lindström (2004) has suggested that "SMEs need special attention because their knowledge, competence, and financial resources to carry out interventions are limited" (p. 95). Stress management, mental health literacy, and employee support programs are examples of strategies that are often used by the leadership of the corporate sector but are challenging to execute and rarely used by SME owners or managers (De Angelis et al., 2020). Small businesses may provide a great environment for the implications of employee wellbeing, and it is a significant determining element in SMEs (Gerhardt et al., 2019). This is because SMEs have a limited number of employees and are usually closer to their leadership (owners/managers).

Leadership behavior is an important factor that can at least partially mitigate the detrimental effects of working circumstances on employees' attitudes (Farahnak et al., 2020). More specifically, leadership behavior plays a crucial role in creating a healthier working environment that has been positively linked to employees' wellbeing daily (Inceoglu et al., 2018). The importance of successful leadership behaviors for encouraging favorable employee attitudes has been thoroughly researched. Positively, the strongest protective factor for employees' mental health is empowering leadership behavior that shares power (Park et al., 2017).

Sharing power is a key component of empowering leadership to raise employee engagement and motivation (Alotaibi et al., 2020). It is vital to examine how constructive kinds of leadership, such as empowering leadership, affect the mental health of employees because of the critical role that leaders play in the social impact process inside businesses (Tripathi and Bharadwaja, 2020). Despite the growing body of research on the topic, very few researchers have focused on the effect of empowering leadership on employees' psychological health. Through studying the relationships between empowering leadership and employees' mental health, the current study aims to close this gap.

Recent research (such as Ghadi et al., 2013; Lee et al., 2017; Kim and Beehr, 2018) contends that the direct connection between empowering leadership and workplace psychology has varying intensities depending on the situation. They claim that such direct effects are not straightforward and might come about through assisting employees in understanding the meaningfulness of their work. The notion of meaningful work has been reported in many studies. As per Arnold et al. (2007), "meaningful work is all about finding a purpose in work that is greater than the extrinsic outcome of the work" (p. 195). According to Ghadi et al. (2013), employees' main objective is to be encouraged to search for work that is meaningful, rewarding, and inspiring. This viewpoint is clear in some of the earlier research on motivational theories (Kim and Beehr, 2018).

In contrast, according to Maslow's Hierarchy of Need, when one's basic needs for psychological support, physical safety, and social connection are addressed, one should work on higher-level desires, which include moving from "belonging" to "esteem" to "self-actualization" (Hale et al., 2019). It has been demonstrated that achieving these higher-level needs is intimately related to finding personal significance in one's employment (Ştefan et al., 2020). Once these demands are satisfied, people will look for a job that fulfills their life purpose, is more meaningful, and improves their psychological wellbeing (Ghadi et al., 2013). People, therefore, look for meaningful work that enhances their mental health (Allan et al., 2018). The relationship between meaningful work and mental health, Hackman and Oldham (1976) found that meaningful work, together with autonomy and feedback, improves mental health.

From this perspective, we contend that empowering leadership and meaningful work will be crucial to improving mental health. According to previous studies, SME employees' mental health is crucial due to their low compensation and rising healthcare costs (Cunningham et al., 2021; Park and Kim, 2021). Research on this subject in emerging economies has been encouraged since empowered leadership and meaningful work are important for SME employees. However, there has been a scarcity of research on the effects of empowering leadership and meaningful work on employees' mental health in the SME sector, particularly in Malaysia. Therefore, the main purpose of the study is to fill that gap.

Moreover, our research aims to empirically test the connection between empowering leadership and employee mental health as well as the mediating effect of meaningful work between them, both of which are lacking in prior research. Therefore, the following research questions are covered in this study;

RQ1: Does empowering leadership have an impact on Malaysian SME employees' mental health?

RQ2: In Malaysia, does meaningful work mediate the association between empowering leadership and employee mental health?

The following is a description of the paper's structure. Section 2 reviews the relevant literature, empirical studies, and develops hypotheses. Section 3 describe and design of research methodologies. Section 4 explain the findings of the analysis. Section 5 discusses the findings and conclusion of the study. Section 6 discuss implications of the study, and Section 7 represents limitations and recommendations.

2. Literature review and hypothesis development

2.1. Social exchange theory

According to Blau (1964), the social exchange theory describes how exchange interactions are sustained by the trustworthiness of rewards exchanged inside an organization. The idea of social exchange has undergone significant modification in a number of leadership studies (such as Settoon et al., 1996; Hooper and Martin, 2008; Eisenberger et al., 2014; Gooty and Yammarino, 2016). Employees respond positively to leadership acts that respect the reciprocity criterion since social exchange entails unclear commitments and future anticipated benefits (Gouldner, 1960; Blau, 1964). The theory contends that when owners or managers provide their employees with autonomy and assistance,

the employees are more likely to show their appreciation for the owners or managers through their positive behavior and attitude. Employees who have developed strong bonds with their owners/managers (Kossek et al., 2011), for instance, frequently report higher levels of perceived social support, wellbeing, and productivity (Graen and Uhl-Bien, 1995; Eisenberger et al., 2014; Li and Liao, 2014).

This research contends that employees who perceive their leaders as helpful sources of power and resources are those who have been empowered by their leaders—SME owners or managers—through empowering activities. This claim is based on the social exchange theory's point of view. Employees who work for a reliable resource provider will consequently possess psychological inventiveness and a sense of support and value, which in turn causes them to feel satisfied and to give back by performing well in order to preserve positive working relationships with their managers/owners and firms.

2.2. Empowering leadership

According to Srivastava et al. (2006), empowering leadership is described as activities that share authority among team members and increase their intrinsic motivation levels. Empowering leaders display four sorts of behavior: they emphasize the importance of the task (Qian et al., 2018); allow for involvement in decision-making (Naqshbandi et al., 2018); exude confidence in the quality of performance (Huang et al., 2010); and remove any administrative restrictions (Amundsen and Martinsen, 2015). Based on the research of Conger and Kanungo (1988), these leadership empowerment techniques are not only about giving followers' power but also considered an important factor in motivating members. A team leader, therefore, must empower team members, include them in decision-making, have faith in their ability to enhance productivity, and make administrative regulations and processes simple in order to empower them and increase their motivation level (Park et al., 2017).

Recent empirical research has determined that empowering leadership has a positive association with organizational outcomes, including job satisfaction (Liu et al., 2021), task performance (Kundu et al., 2019), organizational citizenship behavior (Shahab et al., 2018), and commitment (Kim and Beehr, 2020). However, very little research has investigated how empowering leadership affects the psychology of employees at work. We also investigate the mediating effect of meaningful work between empowering leadership and workers' mental health because we believe it is crucial to recognize how leaders affect their employees' mental wellbeing.

2.3. Mental health

In the last few decades, the number of people suffering from mental illnesses has increased (Vuorre et al., 2021). According to Kessler et al. (2009), at least 18% of the world's population may experience mental illness at some point in their life. Individuals' mental health difficulties have been studied by psychiatric researchers. According to Kotera et al. (2019), poor mental health can lead to feelings of guilt and an incapacity to care for oneself or others.

According to Muris (2016), self-compassion is described as the understanding that mental illnesses are only human experiences, and it implies empathy for both oneself and those who suffer from mental illnesses. The study of Brouwers (2020) explains that people with mental illnesses are less efficient and interact less with their coworkers. Similarly, Joshi and Sharma (2020) describe how people who suffer from mental difficulties are more prone to losing their sense of self-worth and belonging. Furthermore, in a variety of business and personal contexts, people are regularly ostracized and isolated (Yang et al., 2022).

However, few developing countries have recognized the risks that individuals may face as a result of mental health issues (Yan et al., 2021). The Malaysian government recently unveiled its strategic psychiatric policy, which covers issues such as mental healthcare ease of access, endorsement of psychiatric disorder therapies, trying to prepare competent workers and instructors to deal with mental health issues (Ministry of Health, 2016), and establishing research institutes to conduct empirical studies on how to alleviate and build a resourceful frame against psychological illnesses (Mousa and Samara, 2022). Furthermore, a major topic that must be addressed here is how we can ensure that mental health help reaches individuals who need it (Torous et al., 2020), particularly in SMEs of underdeveloped countries where mental health diseases are ignored (Uzir et al., 2022). Finding solutions to avoid mental health difficulties becomes critical under such circumstances, especially when psychiatric therapy and knowledge are uncommon and not a concern for governments and businesses.

2.4. Meaningful work

The subjective perception that one's work is meaningful, promotes personal growth, and advances society is referred to as "meaning in work" (Allan et al., 2015). Finding meaning at work is regarded as a branch of meaning and serves as a prospective source of meaning in life (Steger and Dik, 2009; Ward and King, 2017; Zhang et al., 2019). Numerous studies (such as Ebersole and Devogler, 1981; Baum and Stewart, 1990; Emmons, 2005; Fegg et al., 2007) that queried participants about what gave their lives value and discovered similar replies, such as relationships, religion, service, and work, corroborate it. According to this view, experts contend that finding meaning at work leads to more meaning in life (Allan et al., 2015). This claim is backed up by several studies in which individuals regularly cite their jobs as a primary source of meaning (Ward and King, 2017).

Seligman (2002) has given attention to the concept of meaningful work as an area of positive psychology, which emphasizes the need to concentrate on actively cultivating the good elements of work and life. Rosso et al. (2010) defined meaningful work as work that is especially important and has greater personal significance. Asik-Dizdar and Esen (2016) stated that "the notion of meaningful work refers to a positive association between the individuals' participation

and the rewarding results they obtain, such as happiness, efficacy, and contentment, among others" (p. 5). McConnell (2004, p. 14) define it as "the worth of a work aim or purpose, as measured against an individual's own beliefs or principles."

Since it is strongly tied to employees' behavior and attitudes in the workplace, "meaningful work" has been acknowledged as a crucial term in research on vocational psychology (Ghadi et al., 2013). Previous studies have demonstrated a positive relationship between meaningful work and factors connected to the workplace, such as subjective wellbeing (Lintner and Elsen, 2018), job satisfaction (Ghislieri et al., 2019), and work engagement (Van Wingerden and Van der Stoep, 2018). These findings suggest that meaningful work is crucial for improving employees' mental health, both at work and in their personal lives.

Prior studies (such as, Martela and Pessi, 2018; Guo and Hou, 2022; Oprea et al., 2022) on the prerequisites of meaningful work either emphasized the features of the work directly or on individual work orientation. For instance, work significance, job enrichment, and person-job fit all support meaningful work. In terms of individual variables, emotional intelligence, work values, work volition, and work orientation all have an impact on meaningful work (Alotaibi et al., 2020).

Furthermore, it was found in recent research that leadership has a significant impact on how meaningful work is accomplished by employees (Ghadi et al., 2013). For instance, meaningful work is influenced by empowering leadership (Kim and Beehr, 2018), transformational leadership (Pradhan and Jena, 2019), and ethical leadership (Mostafa and Abed El-Motalib, 2020). As Lee et al. (2018) examined the effects of empowering leadership, LMX, and transformational leadership, they discovered that leaders' empowering behavior had the most influential impact on the psychological wellbeing of employees.

2.5. Dimensions of empowering leadership

Conger and Kanungo (1988) define empowerment as "a process of enhancing feelings of self-efficacy among organizational members through the identification of conditions that foster powerlessness and their removal by both formal organizational practices and informal techniques of providing efficacy information" (p. 474). Konczak et al. (2000) present the dimensions of empowering leadership: delegation of authority; accountability; self-directed decision making; information sharing; skill development; and coaching for innovative performance.

The study by Thomas and Velthouse (1990) identified that empowerment is a process that includes a supervisor sharing authority with employees. According to Conger and Kanungo's (1988) conception, empowerment denotes the distribution of power or delegation of authority, which should boost intrinsic motivation by altering task assessments pertaining to meaning, competence, self-determination, and influence (Burke, 1986). Therefore, Konczak et al. (2000) defined delegation of authority as one of the elements of empowering leadership. Therefore, we propose the following hypothesis:

Hypothesis 1a. *Delegation of authority is a significant component of empowering leadership.*

Konczak et al. (2000) explain one more component of empowering leadership as accountability, in which managers insist on outcomes accountability. Ford and Fottler (1995) claim that empowerment not only reallocates authority but also offers a way to hold team members accountable for achieving it. Conger (1989) shows how changes in power must be followed by a restructuring of performance assessment systems to ensure that individuals are evaluated and held responsible for performance they can influence. Therefore, we propose the following hypothesis:

Hypothesis 1b. *Accountability is a significant component of empowering leadership.*

Control, according to Tannenbaum (1986), is the capacity of the person to decide outcomes, behave as a causative agent, and also have an influence. The degree to which managers encourage autonomous decision-making should be a crucial component of the empowerment process since empowerment is linked to higher self-efficacy beliefs. Thus, Konczak et al. (2000) recognized encouragement of self-directed decision making as a component of empowering leadership. Therefore, we propose the following hypothesis:

Hypothesis 1c. *Self-directed decision making is a significant component of empowering leadership.*

Wellins et al. (1991) assert that in order to empower employees, managers must impart knowledge and information that will allow them to contribute as effectively as possible to the performance of the organization. Ford and Fottler (1995) explain that, instead of providing direction and control, the manager's role in skill development should be one of facilitation. A sizeable portion of the manager's time should be spent finding the right training to ensure that staff members acquire the skills necessary to support empowerment programs. Based on previous studies, information sharing and skill development were included by Konczak et al. (2000) as components of leader-empowering behavior. Therefore, we propose the following hypothesis:

Hypothesis 1d. *Information sharing is a significant component of empowering leadership.*

Hypothesis 1e. *Skill development is a significant component of empowering leadership.*

Another component of empowerment was identified by Konczak et al. (2000) and is referred to here as coaching for innovative performance. This aspect of empowerment involves leader behaviors that support calculated risk as well as innovation, offer performance feedback, and view failures and mistakes as moral lessons. Thomas and Velthouse (1990) noted that the word empowerment has become widely used at a time when organizations are looking for alternative management practices that foster dedication, risk-taking, and creativity due to international competition and change. While collaborating with subordinates to help them identify the causes of mistakes and lower the likelihood that they will occur again, leaders must make sure that taking risks is not penalized (Wallace, 1993; McConnell, 1994). Therefore, we propose the following hypothesis:

Hypothesis 1f. *Coaching for innovative performance is a significant component of empowering leadership.*

2.6. Empowering leadership and mental health

The psychological health of employees would be positively impacted by the empowering leadership style of SME owners/managers. In particular, leaders can have a beneficial impact on employees' psychological wellbeing when they adopt a participatory positive leadership attitude (Greenberg and Tracy, 2020). For instance, Gooty et al. (2009) find a similar positive relationship between transformational leadership's characteristics of empowerment and individual consideration and psychological wellbeing, and Rego et al. (2012) report a positive relationship between authentic leadership and psychological wellbeing.

Beneficial results are produced by empowering leadership that is characterized by positive leadership behaviors. Employees' psychological wellbeing is impacted by empowered leaders who use supportive actions to increase their intrinsic motivation (Suleman et al., 2021). For instance, previous research by Park et al. (2017) has shown that empowering leadership considerably decreases employees' levels of stress, anxiety, and depression and increases their sense of optimism for the future. Through allowing individuals to be independent in their work and encouraging them to adopt a meaningful attitude in the workplace, leaders' empowerment also helps employees become resilient (Avey et al., 2008). Indeed, it indicates that psychological wellbeing and a sense of meaning at work are significantly related to empowerment.

Avey (2014) notes a dearth of research on the effects on mental wellbeing and suggests that effective leadership (SME owners/managers) can have a significant effect on employees' mental wellbeing because these behaviors (such as encouraging others and removing obstacles) help employees to improve their mental health. Stuber et al. (2021) examine the effectiveness of leadership as a predictor of mental health in order to bolster his claim and find that it is the most effective predictor. To investigate the relationship between leaders' behaviors and employees' mental health, Walumbwa et al. (2010) argue that integrated research between mental health and effective leadership practices, such as empowering leadership, is needed. Based on previous research, we posit the following hypothesis:

Hypothesis 1. *Empowering leadership has a positive effect on the mental health of SME employees.*

2.7. Empowering leadership and meaningful work

According to Chalofsky (2003), workers who struggle to find purpose in their jobs include those who experience strong sentiments of rejection, bias, or misinterpretation. This study contends that by fostering perceptions of meaningful work, SME owners and managers can reduce or even eliminate such sentiments in an atmosphere where they exhibit empowering leadership behaviors. For instance, leaders may encourage their employees to be innovative and to find solutions to challenges by using knowledge-based motivation (Matsuo et al., 2019). The self-esteem of followers will increase in a setting where leaders are intellectually challenged. As a result, individuals do not even hesitate to voice their ideas in case they make a mistake for fear of being criticized (Kim and Beehr, 2018). This particular behavior may aid followers in managing their surroundings, which can prevent meaning in their job from emerging due to sentiments of rejection, discrimination, or misunderstanding (Matsuo et al., 2019). Scroggins (2008) stated that "consistency between work experiences and the individual's perception of self may enhance self-esteem, which will also make the work more meaningful" (p. 70).

Moreover, it may be argued that identifying meaningful work involves more than just the performance-related behaviors that employees have; it also involves the connection between purpose and values (Ghadi et al., 2013). SME owners or managers who create unique objectives, aims, and identities for businesses have the power to persuade employees that their work is meaningful (Martin et al., 2009). Empowering leaders are viewed as having a compelling future vision and conveying positivity about future objectives through inspiring motivation, which in turn strengthens followers' internal core values (Mendes and Stander, 2011). SME Owners' or managers' vision of the firm's mission and their subordinates' core values tend to align more frequently (Nanjundeswaraswamy, 2015). Therefore, subordinates are likely to consider the task to be more significant, motivating, and purposeful—all of which are essential elements in recognizing meaningful work (Ghadi et al., 2013). Hence, followers' view of meaningful work is likely to grow as owners or managers demonstrate more empowering leadership behaviors. Thus, we propose the following hypothesis:

Hypothesis 2. *Empowering leadership has a positive effect on the meaningful work of SME employees.*

2.8. Meaningful work and mental health

Work is meaningful, according to Steger et al. (2012), when it is regarded to be individually significant and contributes to a greater benefit. Meaningful work has been associated with benefits for both people and businesses in terms of an employee's mental health (Bufquin et al., 2021). Given the clear relevance of meaningful work to workers' happiness and favorable organizational outcomes (such as Kim and Beehr, 2018; Singh and Singh, 2018), the connection between meaningful work and health consequences has received little attention. Therefore, we bring up the research that shows meaningful work positively improves employees' mental health. In addition, Ryff and Singer (1998) advocated more "studies on how employment helps people find meaning in their lives, realize who they are, and use their unique talents, which in turn improves their health" (p. 8).

Burnout has been linked to strategies to improve meaningful work (Scanlan and Still, 2013), and meaningful work has been shown to mitigate the effects of job stress and improve the mental health of employees (Allan et al., 2018). The qualitative study of Mousa and Samara (2022) revealed that employees who can do meaningful work may experience less stress and have better mental health. Considering the nature of SME employees, who

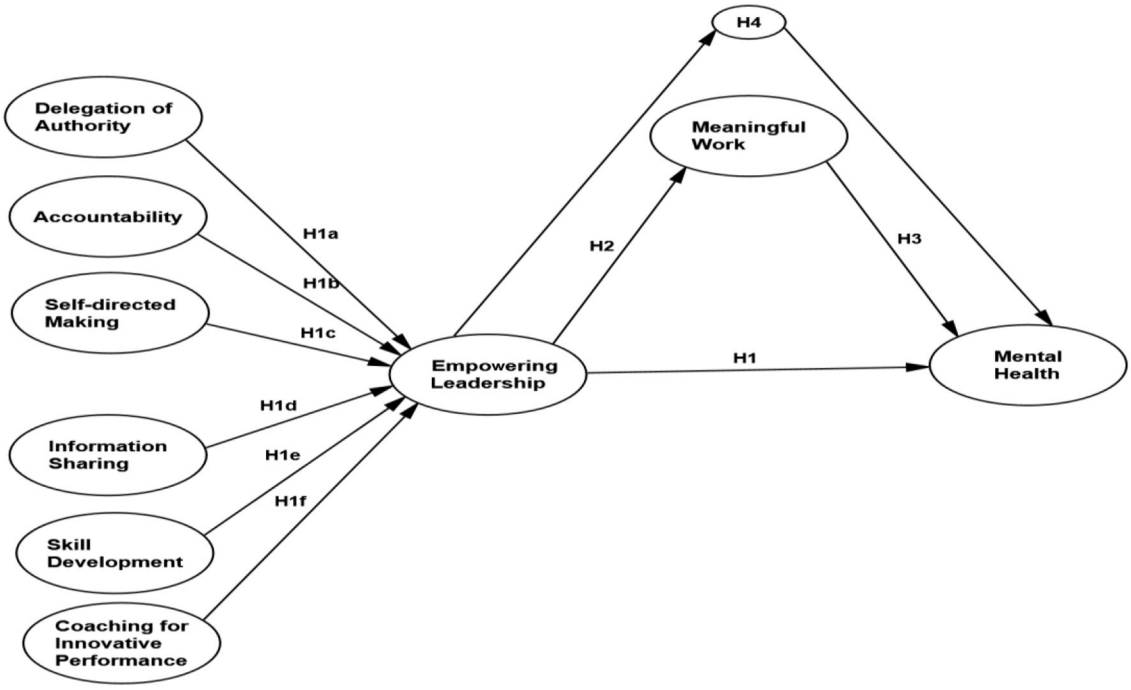

FIGURE 1
Hypothesized framework.

are needed to handle a heavy workload (Vanharanta et al., 2022), work overtime, and perform other admin duties, the participants claimed that their job duties caused them to experience constant depression, anxiety, stress, and other mental disorders (Chhinzer, 2022). Although meaningful work appears to be a protective factor, no research has been done to investigate if it may mitigate the impacts of stress and enhance the mental health of SME employees. Thus, we believe that meaningful work can have an influence on SME employees' mental health, and this study proposes the following hypotheses:

Hypothesis 3. Meaningful work has a positive effect on the mental health of SME employees.

2.9. Mediating effect of meaningful work

The prime objective of meaningful work has been the supposition that perceptions of meaningful work are related to personal and organizational outcomes (Ghadi et al., 2013). The contribution of this research lies in its investigation of how the relationship between empowering leadership and mental health is mediated by perceptions of meaningful work. The concept of meaningful work has also been identified in important models, like the empowerment model (Jena et al., 2019) and the model of job characteristics (Simonet and Castille, 2020), which provides more evidence of the significance of meaningful work.

However, the significant improvements that have taken place over the past two decades, including demographic shifts, globalization, and technological advancement, have had an impact on employee behavior and views of work (Ghadi et al., 2013). Therefore, Rosso et al. (2010) point out that scholars need to be more specific about the kind of meaningful work they do, as older techniques to determine meaning may no longer be suitable in light of these current developments. In fact, Scroggins (2008) asserts that despite the meaningful work appearing in a number of models, the construct in the literature on organizational behavior has only lately attracted attention. Because different conceptualizations in the literature have led to problems with the construct's growth, scholars should be more selective about the kind of meaningful work they are addressing (Pratt and Ashforth, 2003; May et al., 2004).

This research assessed some of the significant studies that looked at the importance of meaningful work in recent years to solve these concerns. From this assessment, this study can assume that employees' views of meaningful work are mostly reliant on interactions and subjective assessments of their work environments. The study further implies that workers perceive meaningful work when it has a goal, purpose, and value related to the employee and his/her capacity to create meaningful work, as well as when there is an interaction between the values and goals of the employees and those of the organization and the workplace (Rosso et al., 2010).

In this study, the relationship between empowering leadership and mental health is considered to be mediated by meaningful work. Baron and Kenny (1986) outlined two prerequisites: first, empowering leadership needs to be connected to both meaningful work and mental health; and second, the initial relationship between empowering leadership and employees' mental health

TABLE 1 Classification adopted by SME Crop Malaysia.

Size category	Employment	Assets (RM million)
Micro enterprises	<5 employees	<RM 0.25
Small enterprises	Between 5 and 50 employees	Between RM 0.25 and <RM 10
Medium enterprises	Between 51 and 150 employees	Between RM 10 and <RM 25

must be reduced by including meaningful work in the analysis. The only method to determine the mediating effect when both requirements are satisfied is to do a statistical analysis of them. This study has previously evaluated the pertinent literature on the connection between mental health, empowering leadership, and meaningful work. Therefore, this study proposes the following hypotheses:

Hypothesis 4. *The mediating effect of meaningful work between empowering leadership and the mental health of SME employees.*

2.10. Hypothesized framework

Previous studies (Amundsen and Martinsen, 2015; Alotaibi et al., 2020; Kim and Beehr, 2020) have examined the influence of empowering leadership on job satisfaction, organizational commitment, and work engagement. Few studies have considered the impact of empowering leadership on employees' mental health in SMEs. Therefore, the specific objectives of the study are: first, to identify the effect of empowering leadership on employees' mental health; second, to assess the mediating impact of meaningful work on the mental health of SME employees. The hypothesized framework is shown in Figure 1.

3. Methods

3.1. Specification of micro, small, and medium enterprises

The definition of micro, small, and medium enterprises (MSMEs) varies from country to country. The definitions of MSMEs used in this study are shown in Table 1 by SME Crop Malaysia.

3.2. Data collection: procedure and sample

We used a survey approach in order to obtain data from participants in Malaysia. Furthermore, in this study, data was collected using a close-ended structural questionnaire through a self-administered and online approach.

The sample size within that target audience must be specified for the study (MacCallum et al., 1999). In the same line, according to Schreiber et al. (2006), the sample size necessary for structural equation modeling (SEM) should be at least 200. Respondents in this study were SME employees, and data was obtained from six different Malaysian states: Kedah, Selangor, Sarawak, Sabah, Penang, and Johor. The questionnaires were sent to a total of 610 respondents using a stratified sampling method.

This sampling method divides the population into two or more significant and pertinent strata when the population is diverse in the variables or traits under consideration (Tong, 2006). As a result, only 516 questionnaires were completed, yielding a response rate of 84.6%.

3.3. Measurement of variables

According to Hair et al. (2014), the survey questionnaire was designed to collect the information necessary to address the research questions and meet the key goals of the study. The data for this study was acquired using adapted items from previous studies in order to assess the influence of meaningful work on SME employees' mental health through coping strategies. To allow participants to focus on the questions, the items in the questionnaire were evaluated on a 7-point Likert scale. To measure empowering leadership, the items were adapted from Konczak et al. (2000). To measure mental health, items were adapted from Hu et al. (2007) and Mazaherinezhad et al. (2021). The items were adapted from Steger et al. (2012) to measure meaningful work.

3.4. Ethical consideration

The University of Technology Sarawak Ethics Committee (UTS-EC) authorized the procedure (The Declaration of Helsinki) after all research participants provided written consent. The data was then processed and forwarded to be analyzed further.

3.5. Statistical analysis

The acquired data was separated into two parts for analysis in this study. The Statistical Package for Social Sciences (SPSS) 22.0 version was used in the first part for descriptive statistics about the respondents and preliminary data analysis. The analysis of moment structures (AMOS) 21.0 version was employed to screen and investigate the associations among constructs within the suggested conceptual framework during the second stage of SEM.

Due to its widespread acceptability among academic researchers, SEM, which is also known as path analysis, is used to evaluate and assess the hypothesized correlations among numerous independent and dependent constructs at the same time inside the suggested framework (Kline, 2010; Ryan, 2018). Hair et al. (2010) stated that "there are six steps in the SEM decision process; first: Defining individual constructs, second: Developing the overall measurement model, third: Designing a study to produce empirical results, fourth: Assessing measurement model validity, fifth: Specifying the structural model, and sixth: Assessing structural model validity" (p. 654).

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Within the provided conceptual framework, this study gives an in-depth investigation of the correlations among the variables. During the data analysis, two stages were employed. The confirmatory factor analysis (CFA) was used in the first phase to examine the components' validity and fitness in the model. The hypothesized associations between the variables (independent and dependent) were then tested using the structural model approach. When using the SEM two-step approach, according to Hair et al. (2010), only those items that have excellent measurements (validity and reliability) will be incorporated into the structural model.

4. Results

4.1. Demographic characteristics

In this study, demographic information was gathered from 516 employees working in 302 randomly chosen SMEs. Table 2 displays the demographic information such as gender, age, marital status, education, ethnic group, religion, enterprise level, enterprise activities, position in the enterprise, and income level. Moreover, the demographic information, particularly the range between age and income, was used from the SME Crop Malaysia.

4.2. Normality statistics

According to Yun et al. (2019), in multivariate analysis, normality must be tested. They further explain that, if the dataset is indeed not normally distributed, the validity and reliability of the findings may be compromised.

The Skewness-Kurtosis test was used in this research to determine whether the data was normally distributed. According to Pallant (2010), the value of skewness and kurtosis show the distribution's homogeneity. Furthermore, Tabachnick et al. (2007) identified that the usual range for skewness-kurtosis value is ±3. In response to a suggestion, Table 3 shows that all of the constructs in this research were determined to be normally distributed (i.e., ±3).

4.3. Reliability and correlation of the constructs

According to Heale and Twycross (2015), the consistency of a measure utilized in the research is referred to as reliability. Furthermore, they explain that when we perform the same study with other samples and give the identical initial circumstances for the test, we may call it reliable.

Coefficient alpha was used to test the constructs' reliability in this study (Cronbach, 1951). Coefficient alpha is a metric that assesses how effectively a group of items measures a single unidirectional latent concept (Kost and da Rosa, 2018). Different researchers thought different dependability levels were adequate. According to DeVellis and Thorpe (2021), it should be at least 0.7, with a value of 0.8 or higher being ideal. In other words, if Cronbach's coefficient approaches 1.0, the constructions are very reliable. The reliability tests in this research were analyzed using SPSS, as shown in Table 4.

TABLE 2 Demographic profile of respondents.

Constructs		Number	Percentage
Gender	Male	337	65.3%
	Female	179	34.7%
Age	Below 25	42	8.1%
	25–35	113	21.9%
	36–45	157	30.4%
	46–55	173	33.6%
	55 and above	31	6.0%
Marital status	Single	82	15.9%
	Married	377	73.1%
	Widow	21	4.1%
	Divorced	36	6.9%
Education	Diploma or high school or less	167	32.4%
	Bachelors	241	46.7%
	Masters	87	16.9%
	Doctorate	21	4.0%
Ethnic group	Malay	252	48.8%
	Chinese	159	30.8%
	Indians	76	14.7%
	Others	29	5.7%
Religion	Muslim	261	50.7%
	Hindu	44	8.5%
	Christian	103	20.0%
	Buddhist	87	16.7%
	Others	21	4.1%
Enterprises level (based on number of employees, $N = 302$)	Micro and small enterprise	179	59.3
	Medium enterprise	123	40.7
Enterprises activities ($N = 213$)	Manufacturing sector	96	31.8%
	Services sector	206	68.2%
Position in the enterprise	Lower level executives	108	20.9%
	Middle level executives	287	55.7%
	Upper level executives	121	23.4%
Income level	<RM3000	58	11.2%
	RM 3,000–4,000	246	47.7%
	RM 4,001–5,000	109	21.1%
	RM 5,001 and above	103	20.0%

N, number of selected SMEs.

TABLE 3 Descriptive statistics.

Varibales	Likert scale	Mean	Std. Dev.	Skewness	Kurtosis
Delegation of authority	1–7	4.68	0.34	0.107	−0.098
Accountability	1–7	4.95	0.39	0.065	0.462
Self-directed decision making	1–7	5.77	0.43	0.246	0.076
Information sharing	1–7	6.23	0.49	0.083	−0.082
Skill development	1–7	5.41	0.38	0.186	0.543
Coaching for innovative performance	1–7	5.29	0.44	0.382	0.188
Meaningful work	1–7	6.13	0.52	−0.045	0.076
Mental health	1–7	5.86	0.59	−0.871	−0.021

TABLE 4 The reliability correlation of the constructs.

	Alpha	1	2	3	4	5	6	7	8
Delegation of authority	0.934	1							
Accountability	0.965	0.331	1						
Self-directed decision making	0.947	0.329	0.372	1					
Information sharing	0.943	0.358	0.392	0.317	1				
Skill development	0.921	0.421	0.396	0.383	0.433	1			
Coaching for innovative performance	0.952	0.345	0.332	0.448	0.378	0.487	1		
Meaningful work	0.878	0.489	0.427	0.476	0.465	0.448	0.459	1	
Mental health	0.896	0.541	0.492	0.485	0.476	0.413	0.469	0.422	1

Pearson's correlation is used to assess the correlation between different variables in this research. The direction and magnitude of the linear association between the variables may be calculated using correlation coefficients (Armstrong, 2019). According to Benesty et al. (2009), "Pearson's correlation coefficients (r) indicate whether there is a positive or negative association and range from −1 to +1" (p. 5). Furthermore, Ahlgren et al. (2003) explain that the magnitude of absolute value provides information on the relationship's strength. Table 4 summarizes and presents the Cronbach's alpha findings as well as correlations between the variables.

4.4. Analysis of measurement model

Confirmatory factor analysis (CFA) was used in this study to evaluate the links between the variables studied in the conceptual model. In order to evaluate the measurement model in CFA, the researcher first assessed the measurement model fit before evaluating the measurement model validity (Marsh et al., 2009). As shown in Figure 2, the measurement model reveals that the factor loading of each item is adequate (above 0.70) as identified by Klein et al. (2001). To estimate the model's parameters, the researchers used the maximum-likelihood technique, with all analyses based on variance-covariance matrices. In order to measure the model's goodness-of-fit, various fit indices should be examined (Hair et al., 2010).

In the examination of overall measurement model, modification indices indicated that the indicators IS_3 (information sharing), SD_3 (skill development) and CIP_3 (coaching for innovative performance) had unacceptably high values. After iteratively removing these redundant items, the overall model fitness came up in good shape.

The model goodness-of-fit in this research was in the acceptable range (RMSEA = 0.041; chi square = 528.973; df = 515; GFI = 0.932; AGFI = 0.947; CFI = 0.951; CMIN/df = 1.566).

Examining the validity and reliability of the measurements is an essential process before testing the hypotheses in the suggested conceptual framework, since this may impact the results and hence the study objectives (Alias et al., 2015). Hair et al. (2010) determined that validity and reliability may be determined using "Composite Reliability (CR) and Average Variance Extracted (AVE)". Furthermore, they recommend that CR should be more than 0.6 and ideally over 0.7 in order to demonstrate dependability, and the AVE should be >0.5 to show convergent validity. The AVE for all variables in this study was >0.5, and the CR was >0.7. As indicated in Table 5, all components have good reliability and convergent validity.

4.5. Assessment of structural model

After the evaluation of CR and AVE, Boker et al. (2011) recommend testing the associations among exogenous and

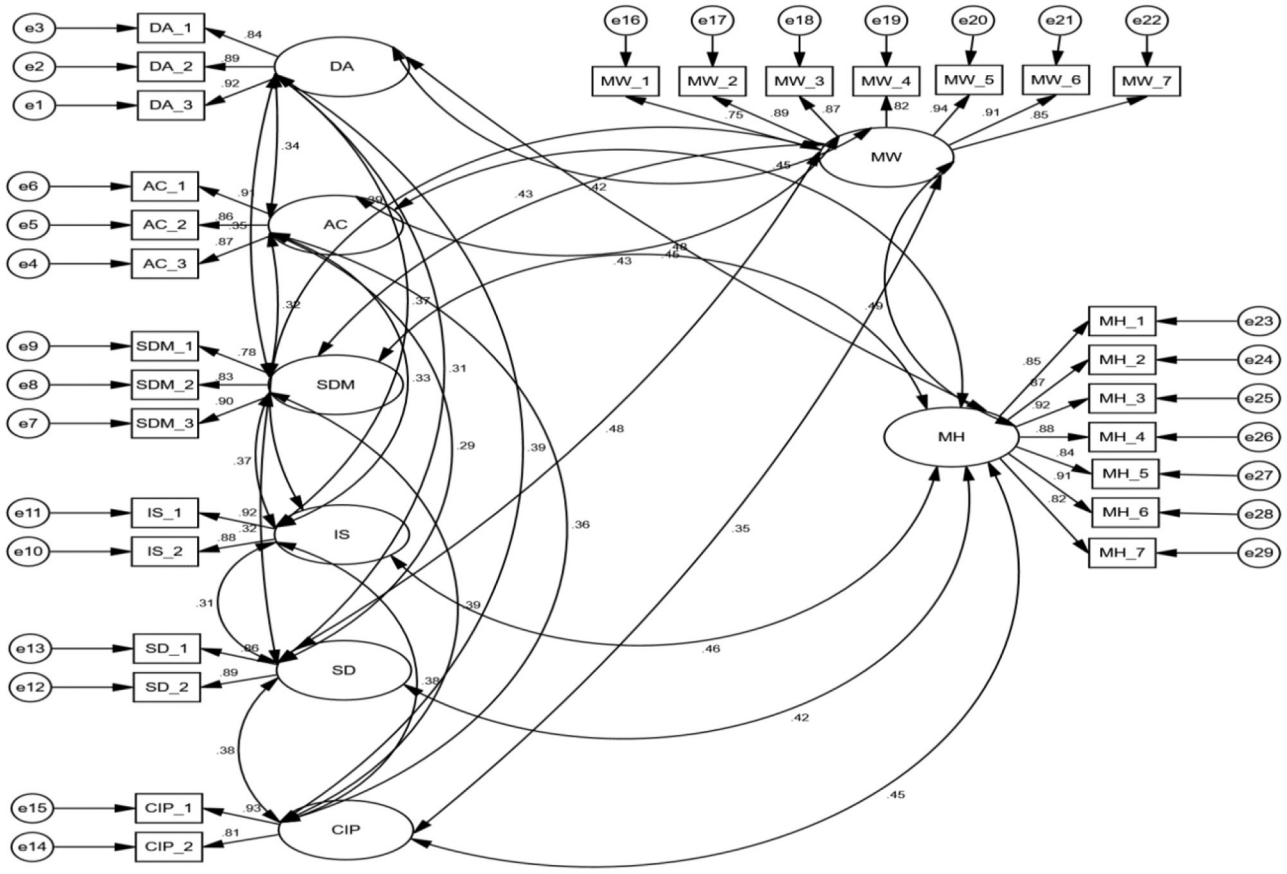

FIGURE 2
Measurement model. DA, delegation of authority; AC, accountability; SDM, self-directed making; IS, information sharing; SD, skill development; CIP, coaching for innovative performance; MW, meaningful work; MH, mental health.

endogenous latent constructs, which can be performed at the structural model stage. According to Iasiello et al. (2022), it is essential to determine the goodness-of-fit for the structural model. The fit indices were (Chi-square = 1.298; GFI = 0.946; AGFI = 0.935; CFI = 0.956; TLI = 0.961; RMSEA = 0.039), suggesting that the model is well-fitted, as shown in Figure 3.

The next step in this research is to examine the model's hypothesized relationships. The hypotheses "H1a, H1b, H1c, H1, H2, H3, H4, and H5", as shown in Table 6, were significant in assessing the hypothesized links within the suggested research model.

4.6. The mediation analysis

The research hypothesis 4 is to examine whether meaningful work mediates the association between empowering leadership and the mental health of SME employees. According to Baron and Kenny (1986), once the direct effect and indirect effect point in the same direction, it is considered partial mediation. According to the findings, the indirect effect of meaningful work between empowering leadership and mental health was 0.28 (0.49 × 0.58 = 0.28), while the direct effect was 0.26. As Jalil et al. (2021) revealed, this study also used the bootstrapping approach to confirm the study's findings, which suggested that partial mediation had occurred, as shown in Table 7.

5. Discussion

By using social exchange theory (Blau, 1964), this study has demonstrated how empowering leadership affects workers' mental health. This research examined specifically how empowering leadership improves the mental health of employees and how meaningful work mediates this relationship. The findings of the study indicated that empowering leadership by SME owners and managers significantly improved the mental health of employees. Additionally, it was shown that meaningful work had a favorable relationship with both empowering leadership and employee mental health. Furthermore, the connection between empowering leadership and employees' mental health is partially mediated by the effect of meaningful work.

The demographic findings of the study show that male employees with an age group between 35 and 55 years, holding a bachelor's degree, belonging to the Malay ethnic group, working in micro and small enterprises, particularly in the services sector, with an income level between RM 3,000 and 4,000, express the concern

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TABLE 5 AVE and CR evaluation.

Items	Measurement path	FL	CR	AVE
Delegation of authority				
DA_1	My manager/owner has given me authority to decide how to enhance the work process and procedures.	0.84	0.915	0.781
DA_2	My manager/owner gives me the power to implement the changes required to make things even better.	0.89		
DA_3	My manager/owner gives me the same level of authority that I am given in terms of responsibility.	0.92		
Accountability				
AC_1	I am considered accountable for the task given by my manager or owner.	0.91	0.912	0.775
AC_2	I am accountable for my performance and outcomes.	0.86		
AC_3	My manager/owner holds staff in the department accountable for maintaining customer satisfaction.	0.87		
Self-directed decision making				
SDM_1	When an issue arises, my manager/owner seeks to encourage me to find my own solutions rather than dictate what he or she would do.	0.78	0.876	0.702
SDM_2	My manager/owner depends on me to make independent decisions about matters that have an impact on how work is completed.	0.83		
SDM_3	My manager/owner pushes me to come up with my own solutions to issues I encounter at work.	0.90		
Information sharing				
IS_1	My manager/owner is responsible for sharing the knowledge or information that I need to produce significant results.	0.92	0.895	0.810
IS_2	I receive the information I require from my manager/owner to satisfy the needs of my consumers.	0.88		
Skill development				
SD_1	My manager/owner frequently gives me the chance to learn new skills.	0.86	0.867	0.766
SD_2	Continuous learning and skill development are priorities in our department, and my manager/owner makes sure of this.	0.89		
Coaching for innovative performance				
CIP_1	I'm encouraged to try out novel ideas, even if there is a possibility they won't work.	0.93	0.863	0.761
CIP_2	When I make a mistake, my manager/owner focuses on taking corrective action instead of placing blame.	0.81		
Meaningful work				
MW_1	I understand how my work adds to the meaning of my life.	0.75	0.953	0.745
MW_2	I have such a strong understanding of what makes my work meaningful.	0.89		
MW_3	I view my work as contributing to my own progress.	0.87		
MW_4	My work assists in my understanding of myself.	0.82		
MW_5	My work helps me make sense of the world around me.	0.94		
MW_6	My work has a significant impact on the organization.	0.91		
MW_7	The work I undertake has a larger meaning.	0.85		
Mental health				
MH_1	I am able to focus on my work.	0.85	0.956	0.758
MH_2	I did not lose much sleep because of anxiety.	0.87		
MH_3	I did not feel overworked.	0.92		
MH_4	I am optimistic that I will be able to tackle my work-related challenges.	0.88		
MH_5	I do not feel unhappy or depressed.	0.84		
MH_6	Recently, I've begun to believe in myself.	0.91		
MH_7	I consider myself to be a valuable individual.	0.82		

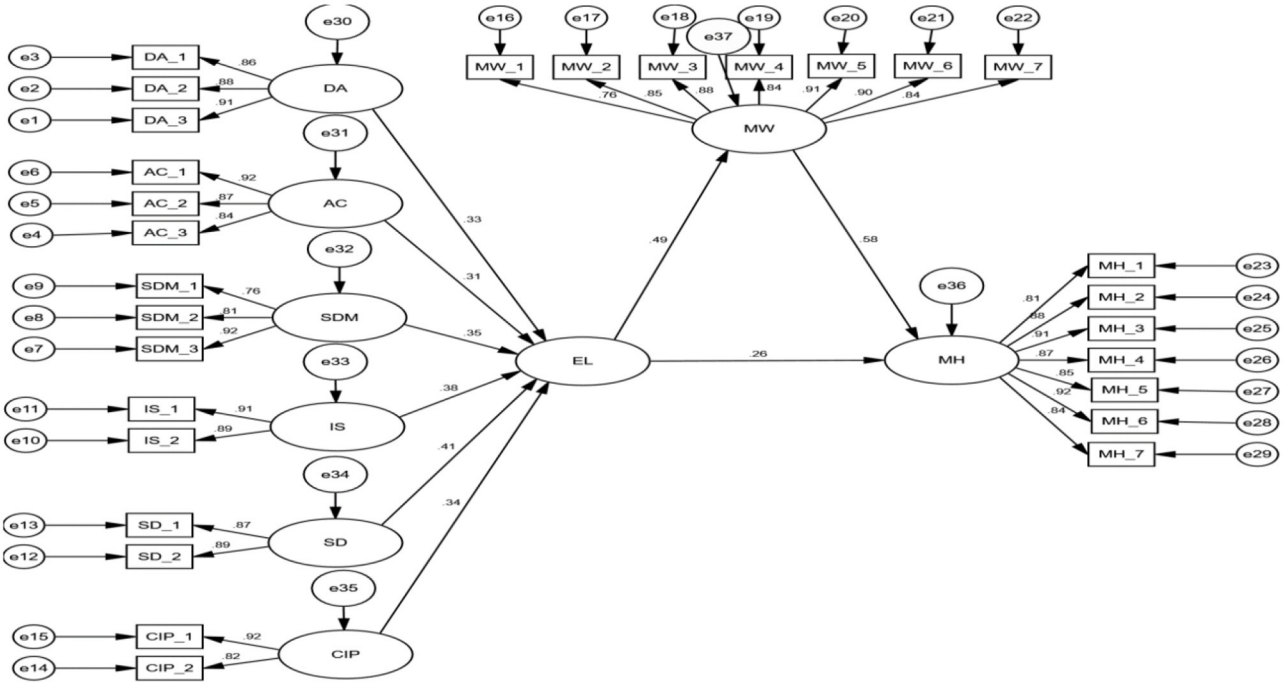

FIGURE 3
Structural model.

TABLE 6 Testing direct relationship.

Hypothese and paths	ß	*Z*-value	Supported
H1a: Delegation of authority –> Empowering leadership	0.33***	4.034	Yes
H1b: Accountability –> Empowering leadership	0.31***	3.989	Yes
H1c: Self-directed decision making –> Empowering leadership	0.35***	4.207	Yes
H1d: Information sharing –> Empowering leadership	0.38***	4.519	Yes
H1e: Skill development –> Empowering leadership	0.41***	4.698	Yes
H1f: Coaching for innovative performance –> Empowering leadership	0.34***	4.117	Yes
H1: Empowering leadership –> Mental health	0.26**	3.758	Yes
H2: Empowering leadership –> Meaningful work	0.49***	4.996	Yes
H3: Meaningful work –> Mental health	0.58***	5.767	Yes

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

TABLE 7 Bootstrapping results.

Paths	Relationship	Mediation
Empowering leadership –> Mental health	0.27	
Empowering leadership –> Meaningful work –> Mental health	0.50 × 0.59 = 0.30	Partial

and importance of empowering leadership toward mental health in the workplace.

Despite the limited amount of prior research on empowering leadership, it shows that the concept deserves additional study. To further advance this research, the findings identified empowering leadership components, including "delegation of authority, accountability, self-directed decision making, information sharing, skill development, and coaching for innovative performance" that help to improve the psychological state of employees. The findings are supported by the earlier studies of Konczak et al. (2000) and Alotaibi et al. (2020), which found that factors of empowering leadership such as "delegation of authority, accountability, self-directed decision making, information sharing, skill development, and coaching for innovative performance" had a substantial impact on psychological wellbeing. It also implies that all these components are vital, and that portraying each dimension could be incredibly beneficial in practical work with individuals, assisting in the identification of specific satisfactions and inadequacies related to a person's job experience.

The primary aim of this research was to evaluate whether or not empowering leadership has a significant impact on the mental health of SME employees. We found that empowering leadership improves employees' mental health, directly supporting our hypotheses. This is consistent with recent research by

Park et al. (2017), Kim et al. (2018), and Tripathi and Bharadwaja (2020), which suggests that empowering leadership is beneficial for employees' psychological wellbeing.

According to Ghadi et al. (2013), the relationship between leadership and psychological wellness has been found to be significantly mediated by meaningful work. The study's findings confirmed that meaningful work has a partial mediating impact on the connection between empowering leadership and employees' mental health in SMEs. The study contends that employing a meaningful work strategy and empowering leadership (in this case, SME owners and managers) can improve employees' mental health. The results of the research are consistent with Matsuo et al. (2019) research by indicating that meaningful work has an indirect influence on empowering leadership and employees' psychological wellbeing.

This study looks at a conceptual model that incorporates the body of knowledge on empowering leadership toward the psychological wellbeing of employees. In doing so, it makes an effort to combine employee participation with empowerment from small business owners and managers. Furthermore, the research exclusively focuses on SME employees in Malaysia, where there are few studies on psychological health, which is quite different from that of the corporate sector. The vocational psychological health literature might benefit from an understanding of these connections in the context of Malaysian SME employees.

6. Theoretical and practical implications

6.1. Theoretical implications

The study has several theoretical implications. The first theoretical contribution of this research concerns the effect of empowering leadership on the mental health of SME employees. After carefully considering the social exchange theory, the authors of this study chose to adopt a quantitative research approach, including a survey questionnaire, to get the required data from SME employees in order to acquire more in-depth insights into the mechanism by which this phenomenon occurs. The authors concluded from their examination of the data that empowering leadership (SME owners/managers) can improve the mental health conditions of employees in Malaysia. Based on the findings, we believe that empowered SME leaders can minimize any unfavorable mental health conditions.

Previous studies have not assessed how meaningful work links empowering leadership with SME employees' mental health. Therefore, the study's second theoretical contribution is to demonstrate empirically how SME employees may enhance their mental health by using meaningful work driven by empowering leadership. According to the findings, empowering leadership assists in the building of mental health in order to recover and survive psychology-related challenges as well as the adoption of meaningful work to improve their relationship.

The third major theoretical contribution to social exchange theory is demonstrating empirically that empowering leadership of SMEs should pay close attention to their employees' meaningful work in order to maintain a semblance of intent for their responsibilities and thus alleviate any mental illnesses. This might lead to other researchers reconsidering social exchange theory and assessing the effects of using it in other sectors.

6.2. Practical implications

This research showed that in order to increase employees' psychological wellbeing, they must emphasize meaningful work and, for that reason, empowering leadership, which plays an important role in improving the employees' mental health. Therefore, SME owners or managers should foster a sense of empowerment in their employees by allowing them to take on more difficult but meaningful tasks, increasing their feelings of competence, giving them more decision-making authority at work, and providing them with the opportunity to exercise influence by engaging them in strategic goal-setting and making job outcomes recognizable and beneficial.

The research's findings have significance for Malaysian SME managers and owners in terms of empowerment initiatives. For psychological wellbeing, it is essential to create employment that allows for self-determination and has personal significance for the employees. SME processes need to be simplified in order to improve the employees' impression of their work's significance, competence, autonomy, and influence. The development of empowering work environments may be greatly influenced by SME owners and managers. They may encourage a better work environment by responding to employee input, providing greater power, and promoting self-initiative. Owners and managers must promote employee involvement and voice from middle or lower management in order to achieve true empowerment.

7. Limitations and recommendations

We should acknowledge the limitations of this study. This study's data sample covers executives from lower, middle, and upper levels of management. The degree of empowerment or the scope of the impact of empowering leadership may also rely on the respondent's organizational structure if we believe that delegation typically follows a hierarchy and proceeds top-down. Therefore, comparing the disparities between non-professional workers and professionals in terms of the impacts of empowering leadership would be valuable for future study.

Future studies might focus on SME owners and managers to learn about their perspectives on the problems they encounter and also strategies to alleviate anxiety, depression, and some other mental health issues. Furthermore, the authors encourage other academics from the field of vocational psychology to participate in multi-disciplinary scholarly articles aimed at identifying the primary determinants that may positively affect employees' mental health.

Moreover, we recommend more research that examines the impact of other leadership styles in contrast to empowering leadership when looking at employees' mental health. "Authentic leadership, ethical leadership, and empowering leadership" were

the three positive leadership styles that Avey (2014) tested as antecedents of psychological wellbeing. However, there are other domains left out in those leadership styles, particularly regarding servant and spiritual behaviors. Future studies on how to enhance the mental health of employees should look at different leadership styles.

Finally, this study found a partial mediating effect of meaningful work between empowering leadership and mental health. In order to obtain new results, researchers can incorporate mediators or moderators into the established framework.

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 University of Technology Sarawak Ethics Committee (UTS-EC). The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it 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 conflict of interest.

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Stigmatizing attitudes toward mental disorders among non-mental health nurses in general hospitals of China: a national survey

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Background: Negative attitudes of nurses toward mental disorders have been reported in various countries. Nurses' stigmatizing attitudes can harm patients with mental disorders (PWMD), thereby delaying the provision of help to patients and leading to decreased quality of care. In this study, we aimed to assess Chinese nurses' stigmatizing attitudes toward patients with mental illness and provide a basis for future development and testing of appropriate and culturally adapted interventions to reduce it.

Objective: This study aimed to assess the attitudes of Non-mental Health Nurses (NMHNs) in general hospitals in China toward the stigma of PWMD and determine the factors influencing them.

Methods: A cross-sectional survey of NMHNs in general hospitals were conducted. A self-designed WeChat-based questionnaire was used that included demographic information about the need for training on mental health issues. Participants were provided with a vignette of a depression case with suicidal thoughts. The Depression Stigma Scale (DSS) and Social Distance Scale (SDS) were used to assess attitudes toward mental disorders. Nine questions on the adequacy of knowledge about anxiety and depression and the current status of scale use were used to assess the current status of training needs for mental disorders. Descriptive analysis, chi-square test, and multivariate logistic regression were used for the table.

Results: A total of 8,254 nurses in non-mental health professions participated in this study. The mean DSS score of NMHNs was (17.24 ± 6.700), and the SDS score was (10.34 ± 3.154). The total detection rate of stigma among the survey respondents was 13.40% (1,107/8254). Multivariate logistic regression showed that age between 30 and 39 years [$p = 0.001$, OR = 1.427 (1.154–1.764)], 4 years of work experience and above [$p = 0.018$, OR = 1.377 (1.056–1.796)], having a bachelor's degree [$p < 0.001$, OR = 0.742 (0.647–0.851)], adequate psychological knowledge [$p < 0.001$, OR = 1.567 (1.364–1.799)], full knowledge of communication with patients with anxiety and depression [$p < 0.001$, OR = 1.848 (1.389–2.459)], and the need to acquire skills to identify anxiety and depression were the influencing factors associated with stigma [$p < 0.001$, OR = 0.343 (0.236–0.499)].

Conclusion: Stigmatizing attitudes toward PWMD exist among NMHNs in general hospitals in China. Thus, more mental health education programs for NMHNs are

needed. Factors associated with higher morbidity stigma can be used to develop appropriate interventions to improve NMHNs' stigmatizing attitudes and provide better quality care to PWMD.

KEYWORDS

stigma, nurse, mental disorder, survey, China

Introduction

More than 450 million people suffer from mental disorders worldwide (1, 2), but stigmatizing attitudes toward people with mental disorders (PWMD) are prevalent in the global population (3–6). This is also evident in Chinese culture (7–10). Stigma is "the situation of an individual disqualified from full social acceptance" (11). It reflects an individual's negative attitude/behavior toward mental disorders (12) and is often divided into personal and perceived stigma. Personal stigma is generally the negative attitudes formed by negative perceptions and emotional experiences of PWMD. Meanwhile, perceived stigma is the derogatory behavior toward and rejection of PWMD by others (13). PWMD can be perceived as dangerous, unpredictable, intellectually disable (3), or personally weak (9, 14–16). Stigmatizing attitudes of PWMD may negatively affect their treatment-seeking behavior, education, social activities, work, and mental health (17). Stigma associated with mental disorders is a significant barrier to accessing mental health services and timely treatment (18–20).

Stigma is common among medical caregivers (19, 21, 22). Such stigmatizing attitudes create severe barriers to good patient-provider communication and quality therapeutic care (19, 23, 24), thereby resulting in delayed help-seeking (24), treatment interruptions, safety concerns (19), and poor prognosis (25, 26). Negative attitudes resulting from caregivers' lack of experience and knowledge about mental disorders can negatively affect patient interactions and the quality of care (19, 27). Stigma can also negatively affect caregivers' willingness to seek help or disclose mental health problems (19), and nurses' stigmatizing attitudes may affect other members of the team and future practitioners (28, 29).

The vital link between stigmatizing attitudes, substance use, and suicidal behavior cannot be ignored, such as cannabis being a relevant risk factor linked to suicidal attempts and behaviors (30).

Medical personnel have the closest contact with patients, and they often encounter patients with mental health problems or psychological crises (31). Fewer than 5% of patients see a psychiatrist first, and more than 70% see a non-mental health professional in general hospitals first (32). Due to these factors, non-mental health nurses in general hospitals are highly likely to come into contact with PWMD and play an essential role in the timely referral of patients to psychiatrists (33). However, nurses cannot better provide appropriate assistance to this population because of their negative attitudes toward mental disorders, lack of identification of PWMD, or lack of skills to assist (34, 35), which further affects the effective treatment, early diagnosis, and effective referral rate of this group of patients, thereby resulting in more extended hospital stays, and patients with mental problems being more prone to doctor-patient disputes (36).

Most published studies have focused on the general public's attitudes toward mental disorders and people with lived experiences (21). However, there is less research on the extent of stigmatization of people with clinically common anxiety and depression by NMHNs in general hospitals. An Australian study comparing the attitudes of health professionals with those of members of the general community showed that health professionals' stigmatizing attitudes were comparable to those of members of the general community (37). In addition, a study on the attitudes of Finnish nurses showed positive attitudes (38). A recent study of medical students in 65 countries showed that women and medical and nursing students showed more positive attitudes toward PWMD (22). Meanwhile, a survey of healthcare professionals in Qatar showed that nurses had higher levels of stigma than doctors (25). Moreover, studies in Saudi Arabia and Poland showed that stigmatizing attitudes toward PWMD were common among physicians in tertiary care hospitals (39, 40).

Furthermore, a study in Iran showed that stigmatizing attitudes were higher among internal medicine and cardiology departments than among residents in psychiatry (41). Recently, a Greek study showed that healthcare professionals' willingness to interact with psychiatric patients is relatively poor, and the prejudice against them is high (42).

In addition, screening for depression in general hospitals can improve the accuracy of detecting depressed patients (43) and the overall treatment of patients (44). Nurses are essential in screening, identification, and referral programs for depression in general hospitals' physical disease management teams (45, 46). A nurse-based model for early screening of depression in patients with physical illness in general hospitals has been proposed in Korea (46), and there are a few reports on such aspects in China.

Therefore, this study primarily aimed to examine the attitudes and frequency distribution of NMHNs toward PWMD and mental disorders among demographic and occupational characteristics in Chinese general hospitals. Secondly, the study aimed to explore factors associated with morbidity stigma and investigate the current use of depression screening by NMHNs, to provide a basis for further intervention studies.

Methods

Design and setting

This was a descriptive cross-sectional study to explore the attitudes of NMHNs working in Chinese general hospitals toward PWMD. This

Abbreviations: NMHNs, Non-mental health nurses; DSS, Depression Stigma Scale; SDS, Social Distance Scale; OCD, Obsessive–compulsive disorder; PTSD, Post-traumatic stress disorder; PWMD, Patients with mental disorders; GHOC, General hospitals of China.

study aimed to examine factors associated with the detection rate of stigma and understand the current status of knowledge and skills of anxiety and depression and willingness to use screening scales. A convenience sample was used to collect data. This survey was conducted using a self-designed anonymous WeChat-based questionnaire from April 10 to June 1, 2022. The respondents were NMHNs in general hospitals above the second level in China.

Ethical clearance

This study was approved by the Ethics Committee of Xiangya Nursing School of Central South University approved on April 20, 2022 (No. E202255). Informed consent was obtained from all participants. This research received grants from the National Natural Science Foundation of China (No. 81873806) and Major Scientific and Technological Projects in Hunan Province (No. 2020SK2085). Completing the survey questionnaire implied consent to join the study.

Participants' recruitment and data collection

Firstly, the directors of nursing departments of 14 tertiary-level general hospitals in Xinjiang province were contacted to communicate the considerations related to distributing the questionnaire survey. Then, a link to our questionnaire was sent to the nursing department directors of each hospital via WeChat (social media). Subsequently, the questionnaire link was distributed by the nursing department directors of each hospital to the WeChat groups of the chief nursing officers of each hospital. Afterwards, they separately sent the questionnaire link to the WeChat groups of nurses in their departments. An introduction to the study was displayed on the first page of the questionnaire, and participants selected "agree" to continue the survey or "disagree" to withdraw. Completion of the questionnaire implied consent to join the study. In addition, participants were encouraged to invite colleagues or classmates to participate in the online survey, but no compensation was given. The questionnaire link was distributed among the respondents' friends and WeChat groups. The sample size was subsequently expanded. Moreover, the study population consisted of front-line nurses working in different departments in Chinese general hospitals above the second level for more than 1 year, excluding nurses specializing in mental health.

The study instruments included the Depression Stigma Scale (DSS) scale, the Social Distance Scale (SDS) scale, and a background questionnaire covering socio-demographic factors, with nine multiple-choice questions on the need for knowledge training and willingness to use the scales for anxiety and depression. Data collection was completed online using WeChat from May 10, 2022, to June 30, 2022. All data were collected anonymously.

Measures

The survey included sociodemographic information such as gender, age, education level, and occupational questions, including hospital care level, work sector, specialty, title, hours worked, and position. Respondents also answered the following nine questions:

1. What are the most common mental disorders you encounter regularly? (Multiple choice).
2. What are your main ways of obtaining knowledge about mental disorders? (Multiple choice).
3. Do you currently have enough psychological knowledge? (Single-choice question).
4. Do you know how to provide help for people with anxiety or depression? (Single-choice question).
5. Do you think it is necessary to train nurses to recognize anxiety and depression? (Multiple choice).
6. Does your department use anxiety or depression scales for patients? (Single-choice question).
7. Are you willing to use scales to screen patients for anxiety or depression? (Single-choice question).
8. If no, what are the reasons? (Multiple choice).
9. If yes, what are the reasons? (Multiple choice).

Personal stigma

The present study used the personal depression stigma subscale of the standardized DSS (47, 48). The DSS-Personal Scale consists of nine items scored on a 5-point Likert scale (0 = strongly disagree, 4 = strongly agree) (47). The total score (range 0–36) is calculated by summing all item scores, with higher total scores indicating higher levels of individual morbidity stigma. The DSS-Personal Scale has been widely used in surveys of different populations (3, 10). Our study used the Chinese scale version, which showed excellent psychometric properties (49, 50). The internal consistency of this sample was 0.824. The study analysis combined the categories of agree and strongly agree for each purpose to indicate that the entry had a personal stigma. If there were ≥ 6 entries with personal stigma, we defined that the survey respondent had a personal stigma against mental disorders.

Social Distance Scale

Willingness to contact the person described in the small case was measured using SDS, a five-item scale developed by Link et al. (51). Each item was rated on a 5-point scale, ranging from absolute willingness (1) to absolute unwillingness (4) (Supplementary material). Our study used the Chinese scale version, which showed good psychometric properties (52). The internal consistency of this sample was 0.886. Lower scores indicate a greater willingness to interact with people with mental illness (for details of the questionnaire in this study, Supplementary material).

Statistical and data analysis

A total of 8,254 valid questionnaires were collected. In this study, descriptive analyses of participants' demographic characteristics were performed, reporting numerical variables as means and standard deviations (SD), while categorical data were reported as frequencies and percentages. The "agree" and "strongly agree" options of the DSS-Individual Scale were combined, indicating that the entry had a personal stigma. If ≥6 entries had a personal stigma, we defined the

survey participant as having a personal stigma of mental disorders or having no stigma. In addition, the mean and SD of the total score of the DSS-Personal Scale were reported for "most commonly encountered mental disorders," "main way to obtain knowledge about mental disorders." "Willingness and unwillingness to use the scale to the four questions of most commonly encountered mental disorders," "main way to obtain knowledge about mental disorders," and "willingness and unwillingness to use the scale to screen for causes of anxiety or depression" were reported as numbers and percentages and ranked. Factors associated with the detection rate of stigma were included in subsequent multivariate logistic regression analyses at a prespecified p-value of 0.1 to identify significant predictors of the outcome variable having stigma. Associations between the current status of psychological knowledge application and morbidity stigma and social distance were assessed using t-tests, F-tests, and chi-square tests. All analyses were performed using the IBM software SPSS V.28.0 for Windows. In addition, 95% confidence intervals were used, and all comparisons were two-tailed. The threshold of significance was set at $p = 0.05$.

Results

Background characteristics of participants

A total of 8,314 nurses from all provinces in mainland China responded to the questionnaire, of which 60 were excluded because of incomplete data. Of the 8,254 respondents, 95.9% were female ($n = 7,915$), 91.9% worked in a tertiary care hospital ($n = 7,586$), 69.2% held a junior title ($n = 5,709$), 58.7% had a bachelor's degree ($n = 4,841$), 37.3% had 4–10 years of service ($n = 3,076$), and 8.3% were head nurses ($n = 687$). The respondents' age ranged from 20 to 59 years, of which 54.0% were between 30 and 39 years old ($n = 4,469$), with a mean age of 33.58 years ±6.823 years. The demographic and training needs of the participants and the distribution of willingness to use the scale are shown in Table 1.

Association of DSS and SDS scores with nurse characteristics

The mean value of the DSS-Personal Scale for NMHNs was (17.24 ± 6.700), and the SDS score was (10.34 ± 3.154).

The internal consistency and reliability of the DSS and SDS scales were good, with Cronbach alpha values of 0.824 and 0.886, respectively.

Table 2 describes the associations between DSS and SDS mean scores and nurse characteristics. At the bivariate level, DSS mean scores were significantly ($p < 0.05$) related to age, years of experience, level of education, knowledge, knowing ways to communicate with patients with anxiety and depression, having the skills to identify anxiety and depression, and willingness to use scales to screen patients for anxiety and depression. DSS mean scores tend to increase with the increase of age and length of service. Moreover, DSS mean scores tend to decrease with the increase of education levels.

Analysis for mean scores regarding SDS showed that SDS scores were significantly associated with all variables except department and gender ($p < 0.05$). An increasing trend of SDS scores with age, years of work, education, and title was also found. SDS scores were higher for nurse leaders than for nurses and higher for tertiary hospitals than for secondary hospitals. Not enough psychological knowledge scored higher than enough. Scores ranged from low to high for knowing completely, knowing a little, and not knowing much about providing help to people with anxiety or depression. Those reluctant to train nurses in skills to recognize anxiety and depression scored higher than those willing to train. In terms of using the scale to screen patients for anxiety and depression, those who were reluctant to use it scored higher than those who were willing to use it. Higher scores indicate a greater reluctance to engage and interact with people with mental illness.

Social distance

The prevalence rate of stigma

Table 3 shows that the mental disorder stigma prevalence rate was 13.41% (1,107/8,254) among the 8,254 validated respondents. The differences in stigma prevalence rates were statistically significant ($p < 0.05$) for age, years of work, education level, job title, knowledge adequacy, perception of having skills to identify anxiety and depression, and willingness to use the scale to screen for anxiety and depression. The prevalence rate of stigma was higher among the respondents aged 30–39 than in other age groups, higher in respondents with 11–15 years of work experience than among the other years of service groups, and higher among nurses than among nurse leaders. Interestingly, the prevalence rate of stigma was higher among respondents with sufficient knowledge of psychology than those with insufficient knowledge. In addition, it was higher among those who did not consider it necessary to acquire the skills to identify anxiety and depression than among those who did. Moreover, it was higher among respondents who were not willing to use the scale to screen for anxiety and depression than among the willing group. Furthermore, it was higher in the respondents who fully knew of the need to help people with anxiety and depression than in the other groups.

Multifactorial logistic regression analysis of the prevalence rate of stigma in DSS

Table 4 shows that the presence or absence of stigma was detected as the dependent variable. The variables with p-values greater than 0.2 in Table 3 (nine factors) were included in a multifactorial logistic regression model for analysis, including age, years of experience, education level, professional title, position, adequacy of knowledge, the necessity of skills to identify anxiety and depression, willingness to use the scale to screen for anxiety and depression, and whether or not they were aware of assisting patients with anxiety and depression. Results showed that 30–39 years of age, 4 years or more of work experience, a bachelor's degree, adequate knowledge, full knowledge of providing help to patients with anxiety and depression, and the need for skills to identify anxiety and depression were the factors influencing the prevalence rate of stigma of the interviewed nurses.

Current status of training needs and willingness to use scale screening for anxiety and depression

The most common mental disorder encountered by respondents in this survey was anxiety disorder (87.60%), followed by depression (81.00%) and obsessive–compulsive disorder (50.20%) (Figure 1).

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TABLE 1 Demographic characteristics of participants (n = 8,254).

Demographic variables		Frequency (n)	Percentage (%)
Level of hospital	Tertiary hospital	7,586	91.9
	Secondary hospital	668	8.1
Work department	Oncology and infection and hemodialysis	1,162	14.1
	Emergency and outpatient	837	10.1
	Intensive care unit	757	9.2
	Internal medicine	2,065	25
	Surgical department	1,653	20
	Gynecology and obstetrics	536	6.5
	Pediatric	303	3.7
	Operating room and anesthesia department and interventional room	406	4.9
	Diagnosis and subsidiary	535	6.5
Gender	Male	339	4.1
	Female	7,915	95.9
Age group (year)	<30	2,434	29.5
	30–39	4,460	54
	≥40	1,360	16.5
Years of occupational experience	1–3	1,052	12.7
	4–10	3,076	37.3
	11–15	2,153	26.1
	≥16	1,973	23.9
Education	Master's degree or above	135	1.6
	Bachelor's degree	4,841	58.7
	Associate's degree or below	3,278	39.7
Professional title	Primary	5,709	69.2
	Intermediate	2,105	25.5
	Senior	440	5.3
Position	Nurse	7,567	91.7
	Head nurse	687	8.3
Do you currently have enough psychological knowledge?	Not enough	4,302	52.1
	Enough	3,952	47.9
Do you know how to provide help for people with anxiety or depression?	Know it completely	659	8
	Know a little	6,574	79.6
	Don't know	1,021	12.4
Do you think it is necessary to train nurses to recognize anxiety and depression?	Necessary	8,111	98.3
	Not necessary	143	1.7
Does your department use anxiety or depression scales for patients?	Anxiety scale only	700	8.5
	Using only the depression scale	314	3.8
	Using both scales	2,160	26.2
	Not using any scale	5,080	61.5
Are you willing to use scales to screen patients for anxiety or depression	Unwilling	1,362	16.5
	Willing	6,892	83.5

The primary source of knowledge about mental disorders for the respondents in this survey was radio and television (87.60%), followed by unit continuing education knowledge lectures and newspapers and books (Figure 2).

Figures 3, 4 show that the most popular option for respondents in this survey who were willing to use the scale to screen patients with anxiety and depression was that it would help to provide good psychological care to patients, improve treatment compliance, and

TABLE 2 Scores of DSS and SDS among participants with different characteristics.

Variables		DSS score (mean ± SD)	*T*-/*F*-value	*P*-value	SDS score (mean ± SD)	*T*-/*F*-value	*P*-value
DSS total score (mean ± SD)		17.24 ± 6.700			SDS total score (mean ± SD)	10.34 ± 3.154	
Level of hospital	Tertiary hospital	17.23 ± 6.735	−0.518	0.605	10.37 ± 3.168	2.461	0.014*
	Secondary hospital	17.37 ± 6.284			10.06 ± 2.977		
Work department	Oncology and infection and hemodialysis	16.77 ± 6.543	1.461	0.166	10.12 ± 2.957	1.826	0.067
	Emergency and outpatient	17.41 ± 6.727			10.57 ± 3.137		
	Intensive care unit	17.26 ± 6.879			10.41 ± 3.202		
	Internal medicine	17.24 ± 6.730			10.27 ± 3.169		
	Surgical department	17.21 ± 6.819			10.38 ± 3.278		
	Gynecology and obstetrics	17.63 ± 6.549			10.40 ± 3.063		
	Pediatric	17.94 ± 6.969			10.24 ± 3.172		
	Operating room and anesthesia department and interventional room	17.10 ± 6.285			10.54 ± 3.137		
	Diagnosis and subsidiary	17.31 ± 6.518			10.41 ± 3.156		
Gender	Male	17.16 ± 7.146	−0.217	0.828	10.19 ± 3.404	−0.929	0.353
	Female	17.24 ± 6.680			10.35 ± 3.143		
Age group (year)	<30	16.31 ± 6.709	33.638	0.000**	9.80 ± 3.018	69.970	0.000**
	30–39	17.67 ± 6.765			10.44 ± 3.183		
	≥40	17.46 ± 6.297			11.01 ± 3.139		
Years of experience	1–3	15.67 ± 6.815	26.065	0.000**	9.60 ± 2.933	39.549	0.000**
	4–10	17.19 ± 6.720			10.20 ± 3.199		
	11–15	17.84 ± 6.836			10.47 ± 3.12		
	≥16	17.49 ± 6.318			10.84 ± 3.143		
Education level	Master's degree or above	15.20 ± 5.404	16.829	0.000**	11.40 ± 2.727	12.323	0.000**
	Bachelor's degree	16.99 ± 6.450			10.41 ± 3.110		
	Associate's degree or below	17.68 ± 7.067			10.20 ± 3.224		
Professional title	Primary	17.28 ± 6.894	0.509	0.601	10.13 ± 3.164	43.684	0.000**
	Intermediate	17.17 ± 6.309			10.77 ± 3.062		
	Senior	16.99 ± 5.913			11.07 ± 3.162		
Position	Nurse	17.26 ± 6.773	0.953	0.341	10.29 ± 3.149	−5.571	0.000**
	Head nurse	17.03 ± 5.833			10.99 ± 3.148		
Do you currently have enough psychological knowledge?	Not enough	16.75 ± 6.169	−6.921	0.000**	10.60 ± 3.051	7.545	0.000**
	Enough	17.77 ± 7.196			10.07 ± 3.242		
Do you know how to provide help for people with anxiety or depression?	Know it completely	18.26 ± 8.766	8.338	0.000**	8.85 ± 3.292	121.627	0.000**
	Know a little	17.16 ± 6.557			10.35 ± 3.084		
	Don't know	17.10 ± 5.982			11.27 ± 3.150		
Do you think it is necessary to train nurses to recognize anxiety and depression?	Necessary	17.19 ± 6.662	−3.872	0.000**	10.33 ± 3.139	−2.736	0.000**
	Not necessary	19.86 ± 8.197			11.22 ± 3.857		
Are you willing to use scales to screen patients for anxiety or depression	Unwilling	17.90 ± 6.637	4.012	0.000**	11.39 ± 3.289	13.008	0.000**
	Willing	17.11 ± 6.705			10.14 ± 3.085		

DSS total score (mean ± SD) 17.24 ± 6.700 SDS total score (mean ± SD) 10.34 ± 3.154. *$P < 0.05$; **$P < 0.01$.

TABLE 3 Detection of disease stigma in survey respondents with different characteristics (n, %).

Variable		Total (n, %)	No stigma (n, %)	Stigmatized (n,%)	χ^2	*P*-value
Level of hospital	Tertiary hospital	7,586 (91.90)	6,562 (86.50)	1,024 (13.50)	0.609	0.435
	Secondary hospital	668 (8.10)	585 (87.60)	83 (12.40)		
Work department	Oncology and infection and hemodialysis	1,162 (14.10)	1,022 (88.00)	140 (12.00)	6.649	0.575
	Emergency and outpatient	837 (10.10)	715 (85.40)	122 (14.60)		
	Intensive care unit	757 (9.20)	646 (85.30)	111 (14.70)		
	Internal medicine	2,065 (25.00)	1,791 (86.70)	274 (13.30)		
	Surgical department	1,653 (20.00)	1,425 (86.20)	228 (13.80)		
	Gynecology and obstetrics	536 (6.50)	463 (86.40)	73 (13.60)		
	Pediatric	303 (3.70)	257 (84.80)	46 (15.20)		
	Operating room and anesthesia department and interventional room	406 (4.90)	359 (88.40)	47 (11.60)		
	Diagnosis and subsidiary	535 (6.50)	469 (87.70)	66 (12.30)		
Gender	Male	339 (4.10)	286 (84.40)	53 (15.60)	1.504	0.220
	Female	7,915 (95.90)	6,861 (86.70)	1,054 (13.30)		
Age group (years)	<30	2,434 (29.50)	2,179 (89.50)	255 (10.50)	30.403	0.000**
	30–39	4,460 (54.00)	3,783 (84.80)	677 (15.20)		
	≥40	1,360 (16.50)	1,185 (87.10)	175 (12.90)		
Years of occupational experience	1–3	1,052 (12.70)	954 (90.70)	98 (9.30)	30.249	0.000**
	4–10	3,076 (37.30)	2,676 (87.00)	400 (13.00)		
	11–15	2,153 (26.10)	1,804 (83.80)	349 (16.20)		
	≥16	1,973 (23.90)	1,713 (86.80)	260 (13.20)		
Education	Master's degree or above	135 (1.60)	125 (92.60)	10 (7.40)	25.292	0.000**
	Bachelor's degree	4,841 (58.70)	4,256 (87.90)	585 (12.10)		
	Associate's degree or below	3,278 (39.70)	2,766 (84.40)	512 (15.60)		
Professional title	Primary	5,709 (69.20)	4,912 (86.00)	797 (14.00)	5.830	0.054
	Intermediate	2,105 (25.50)	1,842 (87.50)	263 (12.50)		
	Senior	440 (5.30)	393 (89.30)	47 (10.70)		
Position	Nurse	7,567 (91.70)	6,530 (86.30)	1,037 (13.70)	6.701	0.010*
	Head nurse	687 (8.30)	617 (89.80)	70 (10.20)		
Perceived psychological knowledge	Not enough	4,302 (52.10)	3,849 (89.50)	453 (10.50)	64.250	0.000**
	Enough	3,952 (47.90)	3,298 (83.50)	654 (16.50)		
knowledge and skills in helping people with anxiety or depression	Know it completely	659 (8.00)	512 (77.70)	147 (22.30)	51.969	0.000**
	Know a little	6,574 (79.60)	5,725 (87.10)	849 (12.90)		
	Don't know	1,021 (12.40)	910 (89.10)	111 (10.90)		
Do you think it is necessary to train nurses to recognize anxiety and depression?	Necessary	8,111 (98.30)	7,048 (86.90)	1,063 (13.10)	37.754	0.000**
	Not necessary	143 (1.70)	99 (69.20)	44 (30.80)		
Are you willing to use scales to screen patients for anxiety or depression	Unwilling	1,362 (16.50)	1,157 (84.90)	205 (15.10)	3.777	0.000**
	Willing	6,892 (83.50)	5,990 (86.90)	902 (13.10)		

*$P < 0.05$; **$P < 0.01$.

promote early recovery (21.8%). Secondly, it helps nurses to know which patients have anxiety symptoms or depressive symptoms and focus on them to avoid adverse events (21.1%). Knowing patients' psychological abnormalities can improve patient satisfaction and avoid some doctor-patient disputes (20.0%). The number one ranked reason for not wanting to use the scale was being too busy to do a

TABLE 4 Predictors of stigmatizing attitudes toward people with mental disorders.

Associated factor		OR (95% CI)	*P*-value
Age group (years)	<30	Reference	
	30–39	1.427 (1.154–1.764)	0.001**
	≥40	1.364 (0.97–1.919)	0.074
Years of occupational experience (years)	1–3	Reference	
	4–10	1.377 (1.056–1.796)	0.018*
	11–15	1.714 (1.247–2.356)	<0.001**
	≥16	1.546 (1.065–2.243)	0.022*
Education	Associate's degree or below	Reference	
	Bachelor's degree	0.742 (0.647–0.851)	<0.001**
	Master's degree or above	0.595 (0.306–1.159)	0.127
Professional title	Primary	Reference	
	Mid-level	0.864 (0.714–1.046)	0.133
	Senior	0.858 (0.574–1.285)	0.458
Position	Head nurse	Reference	
	Nurse	1.168 (0.867–1.572)	0.308
Psychological knowledge	Not enough	Reference	
	Enough	1.567 (1.364–1.799)	<0.001**
Knowledge and skills in help people with anxiety or depression	Don't know	Reference	
	Know a little	1.111 (0.895–1.38)	0.341
	Know it completely	1.848 (1.389–2.459)	<0.001**
Do you think it is necessary to train nurses to recognize anxiety and depression?	Not necessary	Reference	
	Necessary	0.343 (0.236–0.499)	<0.001**
Are you willing to use scales to screen patients for anxiety or depression	Unwilling	Reference	
	Willing	0.935 (0.789–1.108)	0.439

*$P < 0.05$; **$P < 0.01$.

screening. The second ranked reason was the scale chosen needs to be short. The third reason was patient refusal (20.1%). However, the number of people who were willing (83.5%) to use the scale to screen for anxiety and depression was much higher than the number of people who were not (16.5%).

Discussion

This study found that NMHN in Chinese general hospitals have stigmatized attitudes toward patients with mental disorders. Factors associated with stigma and sources of acquiring knowledge about mental disorders inform the next steps in developing interventions to provide a better quality of care for patients.

This study explored the stigmatization of PWMD in Chinese general hospital NMHNs. In this study, the mean DSS-Personal Scale score of Chinese general hospitals NMHNs was (17.24 ± 6.700) (Table 2), which was higher than the scores of Chinese medical students (13.71 ± 5.350) (10) and Portuguese community adults (12.71 ± 5.520) (53). This finding suggests that the stigma of personal mental disorders is higher in Chinese general hospital NMHNs.

In addition, the survey analysis found that the detection rate of stigma for mental disorders among the nurses interviewed was significantly lower than in studies related to the stigma of patients and families attending outpatient clinics in Chinese domestic community hospitals (21.5%) (54). However, Swedish nurses' attitudes toward PWMD are similar to those of the general public (55). A study by Cattell showed that nurses had higher negative attitudes toward PWMD than physicians (25), which may indicate a global phenomenon. Media portrayals of mental disorders may influence nurses toward seeing patients as potentially dangerous, unpredictable, violent, or weak (56).

The findings showed an effect of stigma of mental disorders among nurses interviewed between ages 30–39 years [OR = 1.427 (1.154–1.764), $p = 0.001$], which is inconsistent with a study on the stigma of depression in the general population in Canada (57).

In the present study, a bachelor's degree was also an independent influence on the morbid stigma of mental disorders [OR = 0.742 (0.647–0.851), $p < 0.001$], which is generally consistent with a Greek study (42). Higher levels of education are associated with less stigmatizing attitudes toward PWMD. However, our study showed that having a master's degree or higher was not an independent influence on the stigma of mental disorders [OR = 0.595 (0.306–1.159), $p = 0.127$]. However, univariate analysis showed that the prevalence rate of stigma gradually decreased with the increase of education level (7.40% for master's degrees and higher, 12.10% for bachelor's degrees, and 15.60% for college and lower). Those with a master's degree had the lowest detection rate of stigma.

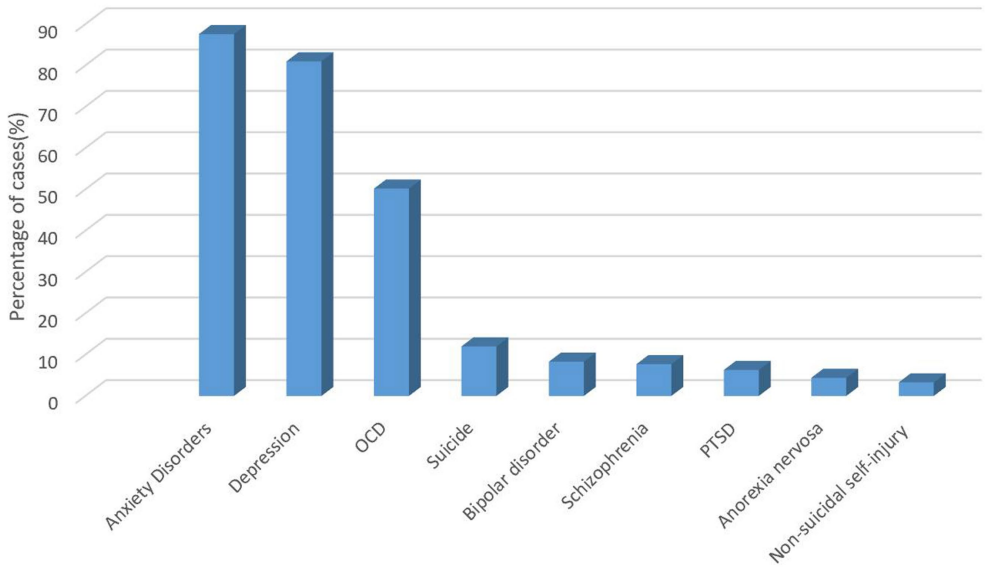

FIGURE 1
The most common mental disorders encountered regularly.

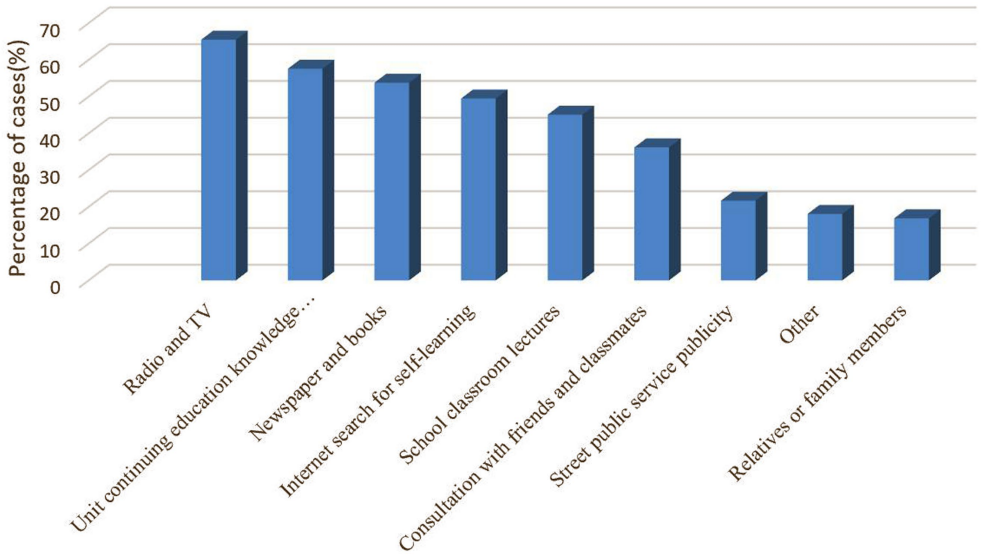

FIGURE 2
Primary source of knowledge about mental disorder.

Years of work experience is another critical variable in our data. The highest OR for stigma was found among the nurses surveyed with 11–15 years of work experience [OR = 1.714 (1.247–2.356), $p < 0.001$] in a U-shape. Moreover, in the univariate analysis, the stigma prevalence rate was highest among the surveyed nurses with 11–15 years of work experience (16.20%). This may be because most undergraduate medical education programs in China are rarely designed with mental health-related course credit hours (58).

In this study, no independent influences on the stigma of mental disorders were found in the department for NMHNs. However, a study in Qatar showed that stigma was highest among emergency department nurses (25). Individuals requiring acute mental disorder care are initially assessed in the emergency department. Thus, nurses' attitudes can severely impact the quality of patient care (25). A patient's physical discomfort may be overlooked and attributed to their mental disorder in the emergency department. This diagnostic masking is a high risk for worsening morbidity and potential mortality. It is a significant barrier to help-seeking behavior and may lead to delays in receiving necessary help (25). A Swedish study showed that staff in inpatient units had more negative attitudes than staff in outpatient departments (21). Greater exposure to mental disorders and higher knowledge of mental disorders predicted lower personal stigma and social distance (59).

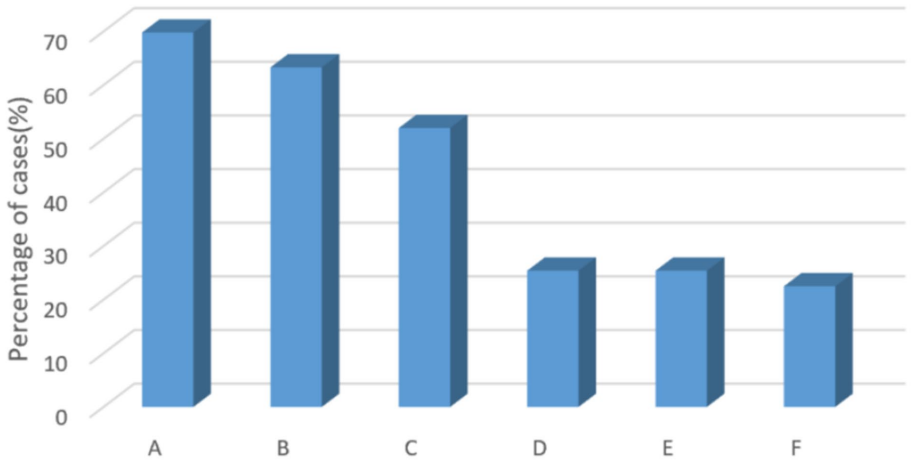

FIGURE 3
Reasons for reluctance to use scales to screen for anxiety and depression. A, there is no time for screening because of busy work; B, the selected scale takes too long; C, patient refusal; D, this is the doctor's work area, and the nurse does not need to do this work; E, no need for screening; F, other.

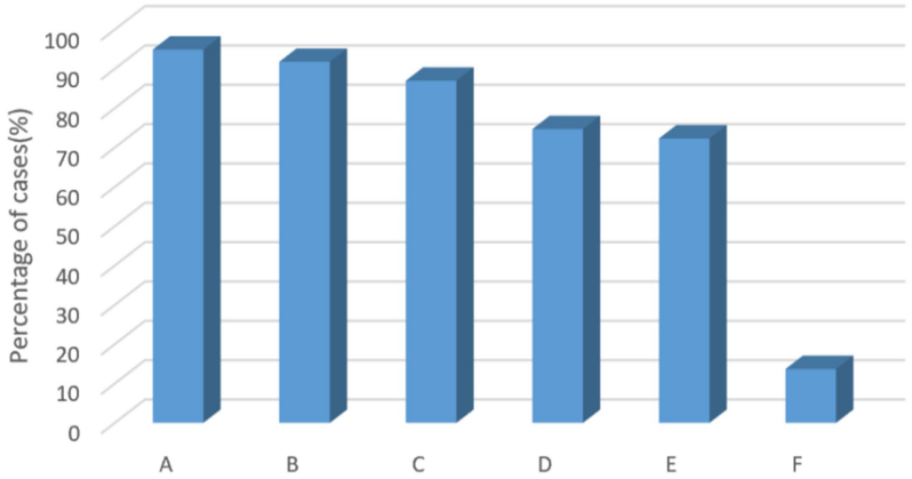

FIGURE 4
Reasons for willingness to use the scale to screen for anxiety and depression. A, it is conductive to providing better psychosocial care for patients, which can improve treatment compliance and promote early recovery; B, it is beneficial for nurses to find out which patients have anxiety or depression and can focus on them to avoid adverse events; C, knowing more emotional abnormalities of patients, avoiding some doctor-patient disputes, and improving patient satisfaction; D, easy and fast screening using scales; E, it can improve the effective referral rate of patients with psychosomatic abnormalities; F, other.

This study showed that Chinese NMHNs' overall mean SDS score was (10.34 ± 3.154). Results also found that the willingness to interact with patients with mental illness was highest among young respondents, those with only a few years of experience, those with low education and title, and who were working in secondary hospitals. Interestingly, we found that the willingness to interact with patients with mental illness was lower for head nurses than for nurses. However, stigma prevalence rates were higher for nurses than for nurse leaders. This finding suggests that a high level of contact with patients with mental illness is not necessarily associated with sufficient willingness to interact with these patients, nor does it decisively reduce existing bias (42, 55).

Therefore, results in Figure 1 indicate that people between the ages of 30–39, with 11–15 years of work experience, with college degrees or less, who believe they have sufficient knowledge and are fully capable of assisting people with anxiety and depression, and who do not believe it is necessary to acquire the skills to identify anxiety and depression, can be the focus of future stigma education and training implementation in the region.

Current status of training needs and willingness to use scales for anxiety and depression

In this study, respondents commonly encountered anxiety disorders (87.60%) and depression (81.00%). This is consistent with a recent epidemiological study in which anxiety disorders were the most

common mental disorder (60). However, most people suffering from anxiety or mood disorders do not immediately seek help from a mental health professional but initially seek help at their local general hospital (61). In contrast, NMHNs are the healthcare workers with the most contact with patients in clinical practice. The ability of these NMHNs to identify and refer patients and their attitude toward them is very important, particularly those patients with non-psychotic disorders who do not receive timely referrals or appropriate treatment. Until they can receive timely referrals, the high expenditure on health resources increases the financial burden on patients and takes away from limited healthcare resources. Stigmatizing attitudes toward these patients can further inhibit their treatment-seeking behavior and affect healthcare quality (62). The poor quality of care they receive can further worsen treatment adherence, reduce the stability of mental disorders, shorten their life expectancy, and increase nurse–patient conflict (63).

Interestingly, although the results of this study showed that the number of people willing to use the scale to screen for mental problems was overwhelming (83.5%, Table 1), the rate of stigma detection among those who were unwilling to use the scale (15.1%) was higher than the rate of stigma detection among those who were willing (13.1%, Table 3), that is, stigma among the unwilling was higher than those willing. This also suggests that respondents unwilling to use the scale to screen patients with anxiety and depression are priority targets for intensive stigma education. Early identification of high-risk patients with mental problems facilitates healthcare professionals to provide more accurate treatment services to such patients. The survey results regarding willingness to use the scale may provide meaningful guidance for developing future management strategies for rapidly identifying patients with mental problems.

In this survey, radio and television were the most common sources of mental health knowledge for the nurses interviewed, followed by continuing education knowledge lectures in the unit and then newspapers and books, slightly different from the study by Wu et al. (33). It is suggested that Chinese nurses have inadequate education and training on the most common mental disorders. Mental health resources, particularly human resources, are inadequate worldwide, especially in low- and middle-income countries (64). NMHNs play an essential role in the identification and timely referral of PWMD. The current survey showed that most surveyed nurses (61.5%) had not used screening tools for anxiety and depression. However, most (83.5%) were willing to use screening tools to identify depression in patients with physical illnesses.

Strengths and limitations of the study

This study is the first for NMHNs in China, and results reveal a critical public health issue. Therefore, we innovatively used the stigma detection rate method to explore and analyze the factors that influence the stigma of mental disorders in NMHNs, opening up new research ideas in this field. Second, the sample size of this investigation was relatively large for this type of study. However, this study also has its limitations. First, this study was a national online cross-sectional survey. Although 8,254 nurses from all provinces of mainland China responded, the sample was small and disproportionately distributed compared to the number of nursing staff in China, which may affect the validity and generalizability of our findings. Second, no causal relationship can be inferred from the current study, and future longitudinal studies are needed. Third, in the research analysis, the categories of absolute and possible unwillingness for each item in the SDS scale were not combined; this research will be conducted later. The investigation was conducted during the COVID-19 pandemic. Therefore, we could not assess whether or not personal mental health problems and occupational exhaustion affected participants' responses. Fourth, the current study analyzed self-reported data from NMHN, which may pose a potential risk to the validity of the measurements. However, based on the critical influencing factors of stigma identified in this research, it may provide meaningful guidance for future efforts to improve intensive education on attitudes toward mental disorders appropriate for NMHNs in Chinese general hospitals.

In clinical practice, biased perceptions may negatively affect how patients with mental illness are treated during hospitalization (42, 65). Nurses are the frontline healthcare workers with the most access to patients; thus, they are the most proportional and widespread force in the healthcare workforce and can play an essential role in anti-stigma efforts (66), more so as healthcare workers. Therefore, appropriate educational programs can improve perceptions of mental illness and of patients (67, 68). Our findings suggest that using stigma detection rate methods can detect people at high risk for stigmatizing attitudes and focus on giving targeted interventions based on this. The construction of the mental health system is a significant public health, livelihood, and social issue related to economic and social development and the physical and mental health of the people in China. The reform of China's mental health system should not only focus on technology and infrastructure but also on improving the way and attitude of providing services to each patient to meet current mental health service needs.

Conclusion

This study identified a high stigma toward and social distance from mental disorders among NMHNs in Chinese general hospitals and found various associated factors. There were more stigmatizing attitudes among such respondents who were between 30 and 39 years old, had been working for 11–15 years, had a bachelor's degree, self-identified as having sufficient knowledge of psychology, and thoroughly understood how to communicate with people suffering from anxiety and depression.

The current study also found that anxiety and depression were the most common mental disorders encountered by nurses interviewed, and radio and television were the most common sources of mental health knowledge. The most frequent options for willingness to use the scale to screen for anxiety and depression were facilitating good patient psychological care, improving treatment adherence, and promoting early recovery. In addition, the most frequent reason for being unwilling to use the scale was being too busy at work to do it. The number of people willing to use the scale to screen for anxiety and depression was much higher than those who were not willing to do so. These findings guide the development and implementation of effective

interventions for stigma to reduce problems in clinical services in the future.

Data availability statement

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

Ethics statement

The studies involving human participants were reviewed and approved by The Ethics Committee of Xiangya Nursing School of Central South University approved this study on April 20, 2022 (No. E202255). Informed consent was obtained from all participants. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

LL and YL participated in the conception and design of this study. CX organized the database. LL performed the statistical analysis and wrote the first draft of the manuscript. SL revised the manuscript. YL and SL provided advice on the statistical analysis and interpretation of the results and reviewed the manuscript draft. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the study was conducted without any commercial or financial relationship, which may be considered 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/fpsyt.2023.1180034/full#supplementary-material

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Psychological risks experienced by interpreters in the domestic violence cases: a systematic review

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Interpreters occupy a complex position in police interviews involving domestic violence cases—neutral but necessary parties to traumatic content. The following systematic review explores the relatively sparse scholarly literature on interpreters' psychological responses to being a party to domestic violence interviews in a policing context. This article aims to explore themes of relevant studies targeting interpreters' mental health in such cases, with nine articles emerging from a comprehensive search of eight databases supplemented with a Google Scholar search. Various themes involving interpreters emerged from the ensuing analysis, including intrinsic difficulties, misguided expectations, role requirements, psychological impacts, posttraumatic growth, coping strategies, and recommendations for future research and practice, with findings holding implications for interpreting in other traumatic domains.

KEYWORDS

vicarious trauma, resilience, mental health, interpreting studies, police interviews, domestic violence

1. Introduction

International immigration has created increasingly multi-ethnic societies (Wallin and Ahlström, 2006), with new migrants globally experiencing cultural and language barriers that impede their communication in a range of contexts. The acculturation process of immigration, coupled with the lack of a common language, leaves immigrants needing regular access to interpreting services (Splevins et al., 2010). A particularly charged context for these encounters is domestic violence, with immigrants lacking fluency in the dominant language in highly multicultural societies such as Australia more likely to be victimized and particularly vulnerable due to their disconnection with extended family networks (InTouch, Multicultural Centre against Family Violence, 2014). Police typically engage interpreters to assist in investigative interviews with domestic violence victims, witnesses, and perpetrators (Martin and Valero Garcés, 2008), a role that invariably involves highly emotionally charged interview contexts.

Evidence suggests that interpreters experience an emotional toll from being party to these interviews. This emotional toll takes place against a background of considerable stress intrinsic to the interpreter's role. Moser-Mercer et al. (1998) found that interpreters' physiological and psychological responses seemed to be more negative due to task overload in contested settings. Sometimes, due to time constraints and the lack of help from organizations or peers, interpreting presents unpredictable risks, including incoherent information delivery and inappropriate interventions during interpretation (Giustini, 2021).

Moreover, time pressure, the ill-defined role of interpreters, and the interpreting agencies' culture at times hinder investigators from properly briefing the interpreters regarding the investigation background and concerns (Walsh et al., 2020). Walsh et al. (2020) researched the role of interpreters during international criminal investigations and found that the ability of interpreters to substantially mitigate the emotional impact of such investigations was achievable in only a minority of cases. Darroch and Dempsey (2016) systematic review of sign language interpreters' experiences of transferred/vicarious trauma suggests that the task of the interpreter is intrinsically laden with emotional risk.

Research exploring the use of interpreters in forensic settings, including police-interpreter interviews and courtroom interviews, found a general lack of scrutiny of interpreter competence, including receiving inadequate training (Powell et al., 2017). Suggested shortcomings in the training of interpreters include a lack of instruction on dealing with the emotional challenges of their work. Various factors, including insufficient protective measures, interpreters' level of resilience, and lack of preparedness prior to the interpreting process, would all arguably take their toll on interpreters' psychological distress (McDowell et al., 2011; Crezee, 2015). In addition, numerous studies have indicated that community interpreters are at high risk of vicarious trauma and secondary traumatization while working with traumatized victims (see Lai et al., 2015; Mehus and Becher, 2016; Kindermann et al., 2017).

Interpreters have limited opportunities to receive education and training on gender-related violence (Norma and Garcia-Caro, 2016). In addition, scant scholarly attention has been paid to the emotional impacts of interpreter work, together with the extent to which trauma suffered by interpreters increased with greater exposure to victims of violence (Loutan et al., 1999). Also, the lack of scholarly inquiry focusing on the extent to which interpreters are impacted by the demands of their role can ultimately hamper their performance in the evidence-gathering process, together with potentially harming the victims' wellbeing (Powell et al., 2017).

1.1. Common terminology

This section will briefly explain common terminology used in describing interpreters' and other public service providers' psychological responses.

Vicarious trauma (VT) is a term often used to describe negative transformation in trauma workers' inner experience caused by empathetic engagement with traumatic content (Pearlman and Saakvitne, 1995), and will be the term preferred in this review. Other terms are more or less interchangeable with vicarious trauma, including "compassion fatigue," "secondary traumatic stress" (Stamm, 1995, 1997), "secondary victimization" (Figley, 1995, 2002), and *secondary trauma* and *secondary traumatization* (ST; Pearlman and Saakvitne, 1995), all of which can be experienced by service workers engaged in frontline activities with traumatized clients (Diaconescu, 2015). Cieslak et al. (2014) utilized umbrella term *secondary traumatic stress* to discuss the impacts of secondary exposure as vicarious traumatization, compassion fatigue, and posttraumatic stress disorder (PTSD).

In contrast with vicarious trauma, there are a range of responses that do not rely on empathy as a mechanism of impact. *Compassion fatigue* can be understood as the cost of caring for vulnerable people (Figley, 1995), the emergence of a form of apathy as a result of the cumulative effect secondary trauma (Stamm, 2010). By contrast, Stamm (2010) described some positive and rewarding potential of working in traumatic interpreting settings as "*compassion satisfaction*," defining it as the positive affect derived from performing valuable work (p. 8). Meichenbaum (1994) perceived some of these positive changes as post-traumatic growth engendered by witnessing others manage distress and thereby instilling hope to recover. Tedeschi and Calhoun (2004, p. 2) defined posttraumatic growth as "the experience of positive change that occurs as a result of the struggle with highly challenging life crises." Specifically, self-perception, interpersonal relationships, and life philosophy are the three components of posttraumatic growth occurrence (Tedeschi and Calhoun, 1996; Manning et al., 2015).

Mathieu (2012) sees *burnout* as a term commonly used to describe professionals' physical and emotional fatigue when they lack job gratification and feel overwhelmed at work. Maslach et al. (2001) defined job burnout as a long-term three-dimensional response to job stressors: exhaustion, cynicism, and inefficacy. Burnout can lead to compassion fatigue, secondary traumatic stress, and secondary traumatization (Stamm, 2010) and is frequently linked to job turnover. Unlike other psychological syndromes, Diaconescu (2015) argues, burnout can be diminished by exposure to a supportive organizational climate.

In addition to the above terms, there are a range of terms that refer to ability to resist the emotional damage present in a traumatic environment. For example, emotional stress *resilience* is regarded as one of the non-cognitive elements of interpreters' protective toolkit (Chabasse, 2009).

1.2. Interpreting in police settings

As one aspect of community interpreting, legal interpreting is a broad field that incorporates court interpreting and interpreting for other legal processes or proceedings (Bancroft et al., 2013). There is a relatively broader scholarly inquiry into court interpreting than in non-courtroom contexts, such as policing settings, both in monolingual and bilingual situations (Eades, 2003).

An increasing number of law professionals and researchers acknowledge interpreters' assistance in negotiating the linguistic and cultural terrain of interviewing perpetrators and victims; their role is increasingly seen as vital in investigations when interviewing victims and witnesses (Milne and Bull, 1999). Legal interpreting is an extremely taxing professional area of expertise and tends to evolve into a separate area of specialization (Burley, 1990; Mayfield and Krouglov, 2019).

The involvement of interpreters in police interviews ranges from the *ad hoc* to highly structured and mandated. In Spanish police settings, the engagement of interpreters is often left to police officers' discretion; interpreters are assigned various tasks, including assisting police in performing an arrest, translating related documents, and questioning involved parties (Martin

and Valero Garcés, 2008). By contrast, in Australia, the use of interpreter in police operations is covered in police standing orders (Mulayim et al., 2014). Compared to policing contexts, more research targeting court interpreting has been undertaken, both in monolingual and bilingual situations (Eades, 2003). This is partly because court interpreting is more often conducted in the public eye, while police interviews using interpreters are more often conducted in relative obscurity (Mulayim et al., 2014). Researchers, including Gallai (2013), highlighted this gap in the literature and addressed the need for further research, particularly the imperative to enhance public scrutiny when interpreters assist police during investigative interviews.

While certified interpreters are always considered the first option when working in Australian police systems (Lai, 2016) most Australian interpreters were trained on a general basis, with no specialist training regarding police interpreting (Lai, 2016). Despite most interpreters' exposure in contesting contexts and the complexity of the job, the interpreter training in Australia lacks breadth (Guo et al., 2023). While interpreters are needed in most police interviews, many police in Australia still concern about the job performance of police interpreters, with potential bias if interpreters could take sides (Goodman-Delahunty and Howes, 2019; Hale et al., 2019).

1.3. Taking cultural context into account

Interpreters are required to convey information in an emotionally and culturally congruent way (Prentice et al., 2014)—a complex taxing task. Extra literature supplemented that it is noteworthy that interpreters who share the same language with clients may not necessarily share the same culture (Berthold and Fischman, 2014), despite assumptions held by other involved parties. In practice, the interpreters' cultural background will often not perfectly match their clients; different cultural backgrounds between interpreters and clients may subsequently trigger potential bias (Engstrom et al., 2010; Berthold and Fischman, 2014). Cultural issues relating to sensitive topics, especially gender-based crime, can have a dramatic impact on the interpreter's performance (Powell et al., 2017; Walsh et al., 2020).

1.4. The interpreter's role

When conveying emotional and cultural information, the act of interpreting ideally demands that the interpreter adopts a "backseat," neutral, unobtrusive role (McDowell et al., 2011). Interpreters can shift into the role of clients' advocates when processing their verbal and non-verbal information (McDowell et al., 2011; Prentice et al., 2014). In addition, in the seemingly simple act of information transfer, interpreters perform multiple functions, including catalysts, cultural counselors, and clients' advocates (Prentice et al., 2014). Interpreters can shift into the role of clients' advocates when processing their verbal and non-verbal information (Prentice et al., 2014).

1.5. Impacts on interpreters and coping mechanisms

According to McDowell et al. (2011), interpreting is physically and mentally taxing, requiring competency in language skills, knowledge of cultural customs, and interpersonal relationship skills, and the "reading" of non-verbal cues. Against this background of inherent complexity, Tipton (2017) noted that relevant stakeholders highlighted a lack of understanding about the emotional toll of the work. Research by Mirdal et al. (2012) on therapists and interpreters in professional psychology settings revealed a link between compassion, vicarious victimization, and stress-related burnout in line with the findings of with Darroch and Dempsey (2016) review. Based on Harvey (2001) research targeting psychologists' perspectives on interpreters, interpreters who work alongside mental health professionals might be equally vulnerable to occupational stress but lack adequate training to mitigate these adverse impacts.

The broader literature on coping strategies in the context of professional interpreting is also evolving rapidly. Holmgren et al. (2003), for example, found that some refugee interpreters detached themselves from traumatic contents and applied self-control coping strategy to stabilize themselves. Some interpreters avoid emotionally taxing interpreting activities to escape being exposed to trauma. However, avoidance is never an effective long-term strategy when dealing with trauma (Brewin and Holmes, 2003).

Catherall (1995) research on therapists took a less avoidant approach, emphasizing the potential benefits of peer groups, particularly in alleviating emotional disturbance and detecting and clarifying distorted viewpoints resulting from close exposure to traumatic work environments. Similarly, Mahyub-Rayaa and Baya-Essayahi (2021) point to peer support and professional psychological consultation as potentially effective in building resilience in alleviating the emotional burden of interpreting (Anderson, 2011). Moreover, organizational support can ensure interpreters access peer-group debriefing as a means of tackling emotional stress (Anderson, 2011). Strategies such as the provision of pre-meetings and engaging in other preparatory activities (Powell et al., 2017) have also been raised as potential responses.

Finally, the promulgation of appropriate policies and practices concerning the use of interpreters is also recommended for professional or humanitarian organizations (Valero-Garcés, 2005). Despite this body of work, much of it theoretical rather than based on primary research, enhancing interpreters' working conditions and improving the status/understanding of roles performed by professional parties in emotionally challenging contexts warrants further exploratory research (Holmgren et al., 2003).

2. Study aims

This systematic review aims to synthesize the available peer-reviewed scholarly evidence, exploring the emotional experiences of interpreters in a particularly challenging context: during the police interview process involving cases of domestic violence. It builds on the work by Darroch and Dempsey (2016) who conducted a review looking at the emotional challenges faced

by sign language interpreters. The following review question was developed using the PICO (Population, Intervention, Compassion, and Outcome) framework (Tawfik et al., 2019) and asked, "*what are the psychological effects on interpreters when working with police involving cases of domestic violence?*"

2.1. Inclusion criteria

Drawing upon the review protocol of Stern et al. (2014), this study focuses on scholarly papers that meet the following inclusion criteria: (i) journal articles published since 2000; (ii) written in English; (iii) with full-text available; and (iv) presenting empirical research, as opposed to purely theories, concepts or literature reviews. Papers that did not include an explicit focus on emotional or psychological impact were excluded, as well as papers that included interpreting/translation but not in a professional policing context. For example, various papers that referred to bilingual family members or bystanders involved in interpreting within domestic violence contexts were excluded from the study.

2.2. Search strategy

In 2021, the following eight electronic databases were utilized in the search, owing to their relevance to the social sciences: Wiley Online, Taylor and Francis Online, Web of Science, Scopus, Sage Journals, CINAHL, Embase, and PsycINFO. The search strategy involved directly searching the databases using the search strategy below, followed by a search of the respective reference lists. Consistent with the method recommended by Butler et al. (2016), each database was interrogated by the researcher in consultation with an expert librarian, and each term was truncated where appropriate, combined with the Boolean operator "AND" or "OR." In addition, a supplementary search was conducted in Google Scholar to ensure that the inclusion of all pertinent literature to the best extent possible.

A full list of search terms can be found in Table 1. An initial search was conducted using the terms (interpreter* OR interpreting) AND ("domestic violence") AND ("police interview*"), which failed to retrieve any relevant results. Subsequently, a broader search was undertaken by removing search terms involving either domestic violence or police interviews. The second round of search terms combined "interpreter*" OR "interpreting" with "domestic violence," "domestic abuse," "domestic violence and abuse," "gender violence," "GV, "DV," "DVA," "police," and "police interview*."

2.3. Study selection

The review process used two independent reviewers—the first and second authors—using Rayyan software, which allows reviewers to examine papers for inclusion independently, blind to the other's choice, and then reconcile differences. Differences between the reviewers were settled through discussion and more detailed reading. Finally, included articles were downloaded for full-text reading.

The preliminary search identified 967 relevant studies. All studies were saved using Endnote and screened for duplicates.

TABLE 1 Search terms.

Databases	Search terms		Total
	"interpreter*" AND "domestic violence" "interpreter*" AND "DV" "interpreter*" AND "domestic abuse" "interpreter*" AND "domestic violence and abuse" "interpreter*" AND "DVA" "interpreter*" AND "family violence" "interpreter*" AND "gender violence" "interpreter*" AND "sexual violence" "interpreter*" AND "GV" "interpreter*" AND "intimate partner violence" "interpreter*" AND "police" "interpreter*" AND "police interview*"	"interpreting" AND "domestic violence" "interpreting" AND "DV" "interpreting" AND "domestic abuse" "interpreting" AND "domestic violence and abuse" "interpreting" AND "DVA" "interpreting*" AND "family violence" "interpreting" AND "gender violence" "interpreting*" AND "sexual violence" "interpreting" AND "GV" "interpreting" AND "intimate partner violence" "interpreting" AND "police" "interpreting" AND "police interview*"	
Embase	7	44	51
Wiley	10	57	67
Taylor and Francis	12	41	53
Scopus	83	195	278
Web of Science	79	182	261
Sage	3	15	18
CINAHL	5	9	14
PsycINFO	4	3	7
Manual search	**218**		
Total	**967**		

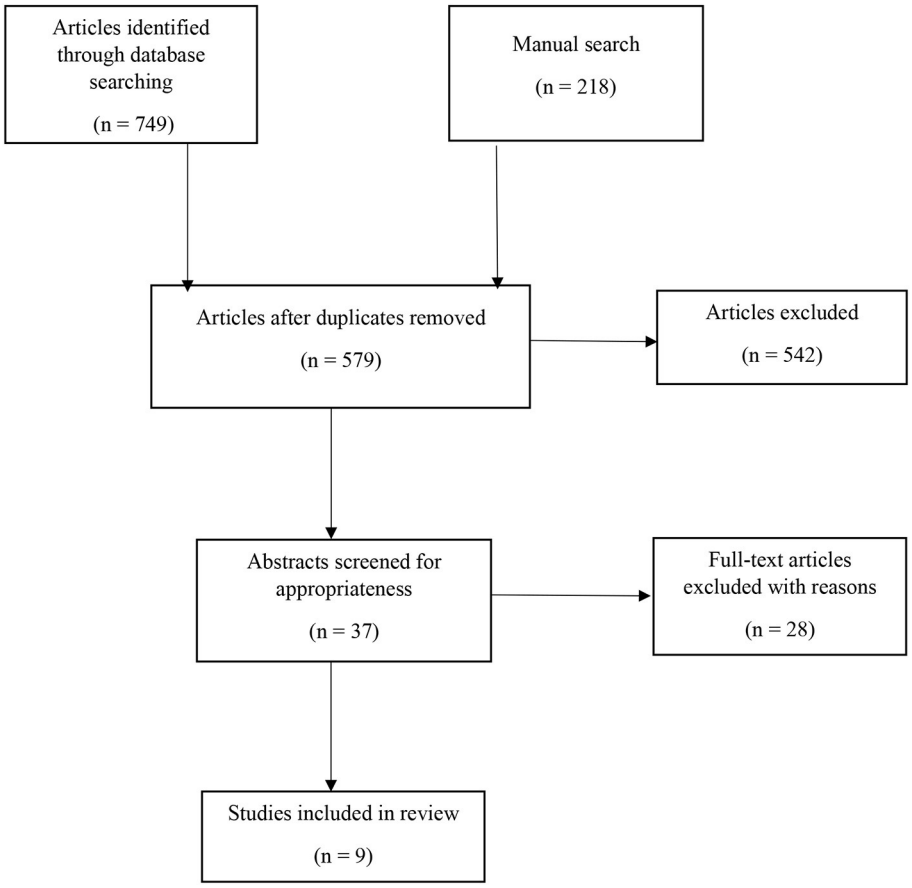

FIGURE 1
Flow chart.

Following the removal of duplicates, 579 journal articles remained. The systematic search yielded a limited number of results specifically focused on domestic violence studies. Therefore, research pertaining to interpreters in the context of domestic violence was included as eligible consideration. After two rounds of the screening process by reading the title, abstracts, and keywords, 37 articles were regarded as eligible articles, which were subsequently printed in hard copy for further reading and assessment. However, only nine studies that met inclusion criteria (see Section 2.1 above) were finally included in the review. A list of all nine remaining articles can be found in Appendix A. Figure 1 provides a flowchart of the literature search strategy.

A data extraction form based on Preferred Reporting Items for Systematic reviews and Meta-Analysis for Protocol (PRISMA, Tawfik et al., 2019) and the quality assessment form titled the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018) was also applied to assess the articles' quality.

2.4. Overview of papers

A total of nine studies remained after the search process was concluded, which were then then categorized using Table 2. The heterogeneity of interpreting services was not thoroughly examined by included studies. Most studies were directed at discussing the experiences and perspectives of the role of interpreters working with different professionals, including two studies that explored the challenges of using interpreters drawn from the perspectives of professionals. The remaining studies explored various issues, including emotional stress and coping strategies that emerged during the interpretation process.

All selected studies were conducted in "developed countries," which may be attributed (in part) to confining studies only published in English. One study was conducted in the United States, two in continental Europe, with the balance in the United Kingdom (three) and Australia (three).

One study employed mixed methods combining focus groups, survey, and interviews. Four studies employed a qualitative approach, chiefly using interviews (one employed a focus group approach). The remaining four studies deployed a quantitative approach that was equally represented in surveys and questionnaires (one each) and a combination of surveys and questionnaires (two each).

3. Key themes emerging from this review

Eight key themes relating to the psychological challenges faced by interpreters emerged from the analysis and were

TABLE 2 Overview of included papers.

References	Locations	Research design	Data collection	Research approach	Key findings
Del Pozo-Triviño and Toledano-Buendía (2017)	Spain	Mixed methods	Focus groups; Questionnaire survey; Semi-structured interviews		The paper defines the characteristics of police and court interpreting for victims of gender violence and ascertains the training needs of interpreters in these contexts. Specialized training is needed in building communication bridges between victims and service providers.
Doherty et al. (2010)	UK	Quantitative	Surveys and questionnaires	Grounded theory	The study highlights the need for good practice guidelines to support interpreters in mentally demanding work. Interpreters in this study experienced a range of emotions related to their work, including anger, sadness, hopelessness, and powerlessness. Posttraumatic growth also exists alongside interpreting.
Engstrom et al. (2010)	USA	Qualitative	In-depth interviews	Ethnography	The study highlights the need for proper training of interpreters and preventing against their exposure to vicarious trauma.
Kindermann et al. (2017)	Germany	Quantitative	Cross-sectional survey and questionnaire		Significant correlations emerged between primary and secondary traumatization among interpreters, which is partially mediated by low secure attachment.
Lai and Costello (2021)	AU	Qualitative	Focus groups	Phenomenology	Interpreters in Australia are at risk of experiencing vicarious trauma due to working in public service settings. Vicarious trauma can take a significant toll on the mental health and wellbeing of interpreters, and their ability to perform job effectively.
Lai et al. (2015)	AU	Quantitative	Online survey		Public service interpreters in Australia are exposed to traumatic client material, which can significantly affect their cognitive processes and emotions during and after the job. Interpreters use a range of coping strategies to manage the impact of traumatizing material, including seeking support from colleagues and mental health professionals. The study highlights the need for institutional care and self-care for to interpreters exposed to traumatic material.
Mayfield and Krouglov (2019)	UK	Quantitative	Questionnaires		The study identified a range of inconsistencies, issues, and challenges interpreters face in facilitating communication with non-English speaking victims and witnesses during police investigations and statement taking procedures.
Powell et al. (2017)	AU	Qualitative	Interviews	Thematic analysis	The interpreters' lack of preparedness to deal with the traumatic and sensitive nature of children's abuse histories is a major challenge in using interpreters in child sexual abuse interviews. An insufficient understanding of the optimal child interview process is another challenge in using interpreters in child sexual abuse interviews.
Splevins et al. (2010)	UK	Qualitative	Interviews	Phenomenology	The study explored the vicarious experiences of interpreters working with asylum seekers and refugees in therapeutic settings. Although all participants experienced distress, they also perceived themselves to have experienced posttraumatic growth in some way.

categorized as: 1. "Intrinsic difficulties," 2. "Misguided stakeholder expectations," 3. "Mismatch in cultural contexts," 4. "Multiple roles," 5. "Impact pathways," 6. "Training/support issues," 7. "Post-traumatic growth," and 8. "Coping strategies and recommendations." Table 3 presents the themes and the papers they emerged in. Note that in some cases these themes emerged not from primary evidence, but in the authors' analysis/discussion.

TABLE 3 Key themes.

Themes	General notions from studies	References
Intrinsic difficulties	Physically and mentally involved work Miscommunication	Engstrom et al., 2010; Lai et al., 2015; Mayfield and Krouglov, 2019
Misguided stakeholder expectations	Unsatisfaction from other parties Other parties lack collaboration and understanding with interpreters	Mayfield and Krouglov, 2019; Lai and Costello, 2021
Mismatch in cultural contexts	Interpreters' cultural backgrounds do not always match up with clients Difficulties dealing with cultural differences including cultural taboos	Engstrom et al., 2010; Splevins et al., 2010; Powell et al., 2017; Mayfield and Krouglov, 2019; Lai and Costello, 2021
Multiple roles	Invisible person Cultural broker Impartial helper Facilitator	Splevins et al., 2010; Del Pozo-Triviño and Toledano-Buendía, 2017; Powell et al., 2017; Mayfield and Krouglov, 2019; Lai and Costello, 2021
Impact pathways	Empathy/identification with clients Physical uncomfortableness Emotional distress Over-empathy Depression and anxiety Affecting personal life Vicarious trauma Secondary traumatization	Doherty et al., 2010; Engstrom et al., 2010; Splevins et al., 2010; Lai et al., 2015; Kindermann et al., 2017; Powell et al., 2017; Lai and Costello, 2021
Training/support issues	Lack of preparedness and understanding of the optimal practice Lack of specific theme training and well-established training protocol Lack of status recognition and respect Lack of professional support	Engstrom et al., 2010; Splevins et al., 2010; Lai et al., 2015; Del Pozo-Triviño and Toledano-Buendía, 2017; Powell et al., 2017; Mayfield and Krouglov, 2019; Lai and Costello, 2021
Posttraumatic growth	Personal growth (relations with other parties, sense of achievement, skill upgradation, learning different cultures, and deepening sense of compassion)	Doherty et al., 2010; Splevins et al., 2010
Coping strategies and recommendations	Avoidant coping Debriefing Detachment and self-control Social support Self-care activities Preparatory communication with other professionals Further education, specialization, and refinement of skills Feedback mechanism for negative experiences	Doherty et al., 2010; Engstrom et al., 2010; Splevins et al., 2010; Lai et al., 2015; Del Pozo-Triviño and Toledano-Buendía, 2017; Kindermann et al., 2017; Powell et al., 2017; Mayfield and Krouglov, 2019; Lai and Costello, 2021

3.1. Intrinsic difficulties

Mayfield and Krouglov (2019) found that performing interpreting services for domestic violence victims and witnesses was more challenging than (for example) interpreting in the interrogation of suspects. Interpreters may struggle with conveying linguistic content and cultural context of the story accurately (Engstrom et al., 2010). As a result, inaccurate and inconsistent interpretation can emerge, with interpreters needing to avoid confabulation in cases of nuanced information (Engstrom et al., 2010).

3.2. Misguided stakeholder expectations

With interpreters working in domestic violence interviews, police officers may attempt to shift responsibilities outside the purely interpreting duties (Mayfield and Krouglov, 2019). With the power imbalance between police and interpreters in this setting, interpreters can feel they are being coerced by police (Mayfield and Krouglov, 2019). Lai and Costello (2021) discovered that there might be some lack of recognition among stakeholders about the taxing nature of interpreting work and the need to recognize the impact on interpreters' mental wellbeing.

3.3. Mismatch in cultural contexts

A number of studies suggest that interpreters' background characteristics can influence the interview outcome and consequently impact the validity of the interview, a finding consistent with Jentsch (1998) earlier research. On the one hand, shared commonalities between the interpreter and the client, such as religious beliefs, gender, cultural background, and social class, can act as the catalyst for establishing rapport with one another (Lai and Costello, 2021) but at the same time, this rapport can lead to premature assumptions on the part of the interpreter or the domestic violence victims. Splevins et al. (2010) found that when there was a shared cultural background, interpreters' emotional mirroring with clients was also more common.

On the other hand, non-matching religious beliefs, ethnicities, or political conflicts between interpreter and victim may impede information disclosure and distort the interview content (Engstrom et al., 2010). At times interpreters need to overcome, or be aware of, cultural taboos that may hinder the quality of communication (Mayfield and Krouglov, 2019). Powell et al. (2017) argued that cultural taboos might compromise interpreters' professional performance, especially cultural taboos involving gender issues. Some interpreters may face barriers to help-seeking due to cultural stigma, such as mental illness, and it should be left up to relevant stakeholders to create a supportive work environment to acknowledge the cultural diversity in workplace (Lai and Costello, 2021). Even though language does not equate to culture, not surprisingly, interpreters are required to undertake the role

of "cultural broker," to facilitate cross-cultural understanding (Splevins et al., 2010).

3.4. Multiple roles

Lai and Costello (2021) described how stakeholders, including police, regarded interpreters as marginal importance to the encounter, but in fact more commonly interpreters are playing active and multiple roles. In Del Pozo-Triviño and Toledano-Buendía (2017) research, interpreters played the role of building communication bridges between the public services and victims, or of cultural "broker" (Splevins et al., 2010). In Mayfield and Krouglov (2019) study, the majority of police interpreters regarded their role as impartial helpers, with a small percentage viewing them as facilitating the whole communication exchange, a role that Powell et al. (2017) also found in their study of interpreters working with child complainants.

3.5. Impact pathways

A number of papers included in this review highlight that interpreting can have considerable negative psychological impacts on interpreters, despite what can be seen as a technical and unobtrusive role. For instance, the very act of being consigned to the background during interviews can place considerable demands on interpreters, including a negative emotional toll (Powell et al., 2017). Interpreters who are not adequately prepared to deal with the traumatic and sensitive nature of abuse can be emotionally affected by the traumatic contents, which could further affect victims' willingness to disclose further information (Powell et al., 2017). The unobtrusive role demands can present various emotional effects on interpreters, including helplessness, isolation, anxiety, depression, indifference, and sadness (Doherty et al., 2010; Lai et al., 2015). When dealing with traumatic cases, interpreters frequently experience strong empathetic feelings toward their clients and feel "torn" emotionally by conflict between their role and the content of interviews (Doherty et al., 2010; Engstrom et al., 2010). Furthermore, Doherty et al. (2010) suggested that nearly one third of respondents reported having difficulty moving onto next job due to the aftereffects of distress from a previous interpreting job.

In line with research on interpreters working in other stressful settings, interpreters working with domestic violence victims may experience vicarious trauma or defensive reactions designed to distance themselves from the emotional impact of being exposed to the content of interviews (Splevins et al., 2010). Lai et al. (2015) found that about four in five interpreters reported experiencing distress caused by exposure to traumatic client content, including domestic violence settings. When interpreting a victims' harrowing experiences, whether the interpreters have experienced a similar situation or not, they are still prone to be affected (Lai and Costello, 2021). Interpreters may experience burnout, compassion fatigue, and other forms of psychological distress because of their demanding work (Lai and Costello, 2021). Kindermann et al. (2017) in their research on domestic violence in a refugee setting found that interpreters who had a prior history of trauma and those with a lack of social support and low sense of coherence were particularly vulnerable to secondary traumatization.

3.6. Training/support issues

Considering the evidence of emotional impact, the literature suggests interpreters lack formal skills to work effectively in delicate or distressing contexts. For instance, Powell et al. (2017) examined sexual abuse investigations and found that interpreters were underprepared for such cases. The lack of specialist training in specific contexts, subsequently undermined their performance in effectively undertaking their role (Mayfield and Krouglov, 2019). American researchers Engstrom et al. (2010) mentioned that this situation is compounded by the lack of accredited training on offer to interpreters involving less directly trauma-related skills such as ethics, note-taking techniques, and mastery of technical terminology. Engstrom et al.'s team add that, there is no well-established protocol for training professional interpreters in community settings due to the disparity in guidelines for interpreters and the lack of standard qualifications to become eligible interpreters (Engstrom et al., 2010).

The literature as a whole thus supports the need for improvements in the quality of interpreter training beyond current practice, particularly to incorporated psychological skills (Del Pozo-Triviño and Toledano-Buendía, 2017). This is related to the question of how to enhance the occupational status of interpreters and raises the broader question of interpreting as a profession, let alone interpreting in trauma settings as a specialization. Lai and Costello (2021) pointed out that national bodies in some cases set minimum standards for interpreter training and credentialing, but those standards may not be sufficient to prepare interpreters for emotional demands of their work.

The provision of training is particularly problematic, because a substantial proportion of interpreters are freelancers engaged on a casual basis, despite being employed indirectly by recruitment agencies (Splevins et al., 2010), so they tend to lack proper organizational support when an emergency occurs. Study by Lai et al. (2015) found that only one in five interpreters sought support from counselors, and only 14% from therapists. Therefore, interpreters' lack organizational support could exacerbate their mental issues.

3.7. Posttraumatic growth

While most of the literature points to stress and vicarious trauma as a result of involvement in domestic violence interviews, the experience need not be uniformly negative. Splevins et al. (2010) found that over time, the negative emotions dissipated, and positive emotions predominated. Two studies highlighted interpreters' positive emotional reactions when interpreting, including describing the role as gratifying, stimulating, and helpful (Doherty et al., 2010; Splevins et al., 2010). Splevins et al. (2010) also found that interpreters articulated more cohesive relationships with their clients and service providers and felt more compassionate and

altruistic in their work. Interpreters' perceived changes in self and life philosophy can be inferred that interpreters may find their work rewarding in terms of personal growth and development (Splevins et al., 2010). These researchers also found that interpreters sensed feeling valued for providing a service that helped others. Some interpreters also described a diverse array of rewarding aspects associated with their work, including expanding their knowledge base, skills enhancement, and receiving positive feedback and recognition from participating parties (Doherty et al., 2010).

3.8. Coping strategies and recommendations

A review of the scholarly evidence has revealed that interpreters employ various coping mechanisms to deal with the demands of their occupation. Not all coping mechanisms are adaptive, however. Interpreters for example, in some cases simply avoid emotionally demanding jobs that might negatively impact their emotional stability (Doherty et al., 2010), or actively practice emotional detachment a (Lai and Costello, 2021). More positively, interpreters seek support from colleagues, family, friend, counselors, and therapists (Lai et al., 2015; Lai and Costello, 2021).

Splevins et al. (2010) and Doherty et al. (2010) concluded that interpreters developed strategies ranging from exercising, watching films, mediating, and turning to religion to deliberately avoidant coping techniques. Also, interpreters learned coping on the job or through acting as bystanders to the process, which allowed them better coping with their own distress (Splevins et al., 2010).

The provision of pre-meetings and engaging in other preparatory activities beforehand is raised in the literature as one pathway to improving interpreters' work efficiency and accuracy (Powell et al., 2017) and thus reduce the intrinsic difficulty of the job. Enhanced self-care, including regular work breaks and exercise, can also alleviate their mental distress (Doherty et al., 2010). Again, as noted in the previous section, there is a role for training. Researchers advocated more specialized training and screening to prepare interpreters for the emotional demands of interpreting in traumatic police interviews (Doherty et al., 2010; Engstrom et al., 2010; Splevins et al., 2010; Del Pozo-Triviño and Toledano-Buendía, 2017; Kindermann et al., 2017; Powell et al., 2017; Mayfield and Krouglov, 2019).

Doherty et al. (2010) found that interpreters view improvements in training and the level of interpreter support as being important factors in helping them better manage the demands of interpreting. Powell et al. (2017) argue that interpreters should be trained to exhibit a professional demeanor, engender mutual trust with clients, and help facilitate clients' disclosure. In addition, Lai et al. (2015) suggested that interpreter training programs should include curricula on trauma and its effects and organizations should have policies in place to support those who may become traumatized in workplace.

Finally, there appears to be a need for support services and supervision to help interpreters care for themselves. Lai and Costello (2021) mentioned the need for interpreting agencies to foster a sense of trust and support for interpreters, instead of creating a culture of fear and uncertainty when disclosing distress form work. Furthermore, the establishment of a feedback mechanism for interpreters to provide feedback about their negative experiences with others may also help better tackle trauma (Lai and Costello, 2021).

4. Discussion

Interpreters play a complex and demanding role in police interview/domestic violence settings that require (amongst other things) mental attentiveness, processing information, and conveying clients' emotions. This review indicates that in addition to these technical requirements, interpreters face considerable psychological challenges in completing their duties without sustaining emotional damage. The scenario also requires the interpreter to be both highly attuned to the context, but at the same time retain professional and emotional separation. Despite the complexity of roles such as this, the field of interpreting is still not commonly recognized as a profession as this vocation lacks official recognition, a situation compounded by generally accepted standards that vary worldwide (Rajpoot et al., 2020).

The limited literature available focuses on stressors impacting professionals, more broadly, and highlights that researchers hold divergent opinions regarding the risk factors causing professionals' stress. In fact, researchers such as Devilly et al. (2009) asserts that mental health professionals' exposure to clients' traumatic material had no significant impact on burnout, vicarious trauma, or secondary traumatic stress for service providers like mental health professionals. These researchers instead argued that the stress involved with the work itself, such as being new to the vocation, caused professionals the most distress. Findings from this literature review are at odds with this viewpoint; the small body of literature generally accepts the view that interpreters are at high risk of vicarious victimization and stress-related burnout (Lai et al., 2015; Lai and Costello, 2021). However, less attention has been focused on the potentially negative psychological impacts on service providers exposed to the traumatic experiences of victims (McCann and Pearlman, 1990). Working with victims may contribute to interpreters' feeling helpless and hopeless (McCann and Pearlman, 1990. Furthermore, they may find their cognitive processes disrupted due to long-term exposure to traumatic information in the workplace (Paivio, 1990).

In response to these challenges, there appears to be a clear need for ongoing training to assist interpreters in more effectively coping with emotional challenges associated with the interpreting process (Valero-Garcés, 2005; Del Pozo-Triviño and Toledano-Buendía, 2017). However, there is no set standard or protocol which addresses minimum training requirements for interpreters' mental wellbeing. For example, in Australia, National Accreditation Authority for Translators Interpreters (2016) does not require any wellbeing competency in its interpreter attributes. This is at odds with view such as Pochhacker (2015) who argues that stress resistance and stamina (trainable skills) are pivotal for aspiring interpreters, and Oraki and Tajvidi (2020, p. 52) who identified that the occupational requirements of interpreting could be clustered under two main competencies: common and specific, amongst which stress management was listed as a competency that can be developed. It is recommended

that training institutions including universities should consider the critical importance of including curriculum on wellbeing. While no doubt, as some scholars argue, both interpreters and investigators must bear some responsibility for being as well prepared as possible prior to commencing the interview process (Holmgren et al., 2003; Miller et al., 2005; Prentice et al., 2014), the profession as it stands seems relatively ill prepared.

5. Limitations

The power of this review is clearly by the fact that the literature is quite sparse. It is possible that by extending the search terms and including the gray literature, the body of relevant work could be expanded. It is also possible that unpublished police reports and papers may address some of the issues raised—in the field, together with the likelihood that studies exist in languages, other than English, that address this field. Besides, the heterogeneity of interpreting services was not explored and required further exploration. Interpreters' variations may influence their emotional stability and the generalizability of the research findings, which were not discussed in this review either.

6. Conclusion

Despite lacking the formal status of a profession, interpreting is a complex and demanding undertaking, requiring interpreters to respond to clients, often within emotionally charged and stressful contexts, in an unobtrusive and reserved manner. The extent to which interpreters are psychologically impacted by their role is inextricably intertwined with interpreters' mental wellbeing, the neutrality of involved parties, and the collaboration with service providers like police officers during investigative interviews.

Nonetheless, empirical research exploring the psychological impacts experienced by interpreters working in police settings is scarce, particularly when dealing with domestic violence situations, the focus of this review. Through a comprehensive search of eight databases and one search engine, this study revealed that the risks of vicarious trauma occurring in the context of interpreting are likely to be pronounced, particularly within traumatic contexts. Instances where interpreters are required to work with police in domestic violence cases are not uncommon, and evidence suggests that interpreting cases involving trauma can seriously impact their career and personal life, both in a positive and negative manner. Therefore, there is a need for further research on interpreting in potentially traumatizing contexts such as domestic violence investigations.

In summary, despite a relatively small body of existing literature, there already appears to be a clear consensus on the need to broaden the scope of training for interpreters to better equip themselves to deal with the role demands posed by interviews in these demanding and stressful contexts. This research highlighted that further research is needed regarding interpreter training, including building resilience, developing interpreters' cultural competence and domain-specific training in domestic violence and police interviews.

Author contributions

NG and OM contributed conception and design of the study. NG performed database searches and statistical analysis in agreement with OM and SD. NG wrote the first draft of the manuscript. All authors contributed to the manuscript revision and read 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

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fsoc.2023.1139431/full#supplementary-material

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Leveraging behavioral science and artificial intelligence to support mental health in the workplace: a pilot study

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Introduction: Many American employers seek to alleviate employee mental health symptoms through resources like employee assistance programs (EAPs), yet these programs are often underutilized. This pilot study explores the design of a behavioral science-based email campaign targeting engagement with stress management and mental health resources via an EAP, among employees of a large home builder in the Southeastern US.

Methods: Behavioral designers created a behavioral science intervention using a multi-step design approach and evidence based behavioral strategies. For this pilot intervention, employees received either a treatment message [i.e., behavioral science message assembled and delivered via the behavioral reinforcement learning (BRL) agent] or a control message (i.e., a single generic, supportive message with a stock photo) with a call to action to utilize their EAP.

Results: A total of 773 employees received emails over the course of 1 year. Engagement was high, with an 80% email open rate. Over 170 employees (22%, 159 treatment and 14 control) clicked the CTA and logged into the EAP site at least once.

Discussion: This pilot study suggests that using behavioral science and artificial intelligence can improve employee usage of EAP, specifically with the intention of exploring mental health and stress management resources, compared to benchmark rates of 5% per year.

KEYWORDS

mental health, stigma, employee health, stress management, behavioral science, artificial intelligence

Introduction

Supporting positive mental health and well-being is a prominent public health concern, with reducing workplace stigma around mental health being a key area of focus. Poor mental health (e.g., high stress, depression, anxiety) in the workplace contributes to increased absenteeism and presenteeism, and an overall reduction in productivity levels (1). The COVID-19 pandemic heightened the concerns for mental health across all adults in the United States (2) and increased efforts to provide support within the workplace environment as many work cultures drastically and rapidly shifted (3). However, given the complexity of mental health, interventions should consider both the individual employees as well as the workplace environment; that is, they

should address both the i-frame (individual level) and the s-frame (societal level) (4).

Work is a major contributing factor to an individual's mental well-being, and a variety of stressors such as individual level job-related factors (e.g., extended working hours, perceptions of safety or opportunities for professional growth), unfavorable psychosocial or relational workplace environments, and poor management or leadership all contribute to the likelihood of developing mental health issues as a result of work (5, 6). As many as 15% of adults worldwide have mental health conditions, with depression and anxiety specifically costing the global economy each year in both actual dollars (~1 trillion) and lost working days (~12 billion) (7). Despite the prevalence and worldwide impact of mental health on workplace productivity, employees who are struggling may refrain from speaking up or seeking supportive resources due to perceived or actual stigma (8).

The COVID-19 pandemic exacerbated employee mental health struggles by not only significantly changing the working environment but simultaneously negatively impacting daily life outside of work (9). Approximately half (51%) of employees have reported worse mental health at work since the start of the pandemic (10). These effects spared no industry or location. Global reports of negative changes in mood and stress levels (11), insomnia (12), fear, and distress (13) increased, with these negative effects being exacerbated in individuals with greater workplace seniority and among healthcare workers (14). Even several years after the start of the pandemic, the workplace has remained drastically different (e.g., prevalence of remote work) and employee mental health and well-being is still considered a high priority (3, 15).

Fortunately, most US employers offer benefits to support mental well-being (16). Among all resources and interventions, digital offerings have gained popularity in supporting employee mental health due to their ability to reduce stigma and protect anonymity at a reasonable cost (17). A common employer benefit is employee assistance programs (EAPs), designed to offer employees resources around a variety of topics, including mental health, well-being, and stress management. A 2021 survey revealed that 88% of employers reported offering EAPs and other mental health resources to their employees (16).

However, not all employee mental health resources are created equally, varying in efficacy and effectiveness as well as in level of employee engagement. Research shows it can be a challenge to find alignment between what resources employees will use and what is effective in actually improving mental health (18). For example, a systematic review of the acceptability of digital interventions to support mental health shows that individuals are largely willing to try such interventions, yet the intervention quality varies widely (i.e., not all of them are equally effective) (19). When examining EAPs specifically, research has indicated an association between EAP usage and improved work performance (20) as well as a reduction in symptoms of anxiety and depression (21). Despite these benefits, EAP utilization remains low, with data suggesting that only about 5% of employees will use their EAP benefits in a given year, with less than a quarter (~20%) using them in a 5 years period (22). It remains a challenge to find the right set of mental health offerings to provide meaningful outcomes while also engaging employees.

Prior research offers insights into some of the limitations of employee mental health interventions that may contribute to their low utilization and mixed success rates. Workers may be reluctant to participate in corporate-initiated mental health programs due to a variety of barriers including concerns about confidentiality and stigma, individual attitudes and beliefs, group dynamics and culture, and work characteristics (23–26). Mental health interventions need to be implemented in a way that makes them easy and desirable to use, including offering protection from perceived or actual stigma. Considering how to directly address stigma as well as offering private and confidential access are important considerations for employee uptake of mental health resources. The current study provided mental health support to employees via an anonymous EAP that the employee could access privately through their corporate email. Further, this study involved very inclusive eligibility (i.e., anyone with a company email address) as well as required an active opt-out (i.e., unsubscribing from messages). Interventions that require an active opt-in can create unnecessary intervention onboarding friction (e.g., diabetes behavioral intervention) (27). Similarly, opt-in strategies may negatively impact employee intervention uptake, especially for those employees most at-risk who may perceive this added friction as an additional stressor and therefore may not engage with the intervention. The current study design deployed intervention outreach without enrollment friction (i.e., no active opt-in) and without restrictions based on individual, baseline mental health. Further, the broad eligibility criteria made it such that the company norm was to receive the intervention, thereby increasing efforts to directly reduce stigma.

Stigma-related barriers can contribute to the underutilization of available mental health resources, yet employees may also face other barriers that prevent engagement with employer sponsored mental health programs. In order to increase employee engagement with mental health resources, it is critical to account for and address a variety of possible barriers. Leveraging behavioral science evidence-based tools (e.g., behavior change techniques) to address unique, individual determinants (i.e., barriers and facilitators) is an effective way to drive desired behavior change (28–30). This study leveraged behavioral science to increase participation in a workplace intervention targeting mental health and stress management. At the same time, tailored, personalized interventions are difficult to scale. Recent advancements in behavioral science and artificial intelligence have shown promise in using a behavioral reinforcement learning (BRL) agent to assemble personalized health communications and deliver them at scale across a variety of health arenas (31–33). Specifically, a BRL agent was used to deliver behavioral science-based messaging to patients overdue for their mammogram, resulting in increasing the number of scheduled and attended screenings in a population overdue for this prevention visit (31). Artificial intelligence has also been used to deliver personalized messages prompting individuals to complete their COVID vaccine series (32). Reinforcement learning specifically offers the ability to increase the frequency of a desired behavior based on data feedback (34). This study combined a BRL agent with behavioral science to predict individual determinants and prompt employees to engage with their corporate EAP and explore its mental health resources.

The success and sustainability of employee mental health interventions depend heavily on their integration into the working environment, situational factors, and active, sustainable involvement from employees. Research specifically finds that increased opportunities for worker participation in programs and more control over how to do so is associated with improved outcomes (35). Similarly, a meta-synthesis of research on workplace mental health

interventions found scheduling flexibility and accommodating resource utilization during work time were positively associated with successful implementations (23). Finally, the COVID-19 pandemic severely restricted the ability for employers to provide in-person mental health support, heightening the need for flexibility in resource access and utilization. The current intervention offered unlimited, 24 h remote access to mental health resources via an online EAP portal shortly after the COVID-19 pandemic began.

This pilot study explored the design of a behavioral science-based intervention to drive increased engagement with mental health resources, including stress management tools, via an EAP among employees of a large home building company in the Southeastern US. The current intervention was informed by the gaps from past literature and aimed to address these systemic and contextual challenges. Contextual factors such as the workplace environment, employee social interactions, availability of breaks and strategic recovery, and other organizational considerations were addressed through audit-driven behavioral science recommendations that complemented the email intervention.

Methods

Participants

Intervention participants were 773 corporate employees from a large home building company in the Southeastern United States. Employees were eligible for the intervention if they had a company email address. There were no exclusion criteria for this study, and, because this intervention was implemented as part of a mental health initiative at the described company, no demographic data were collected.

Procedures

Behavioral science-based intervention design

In order to support employee mental health, an email campaign was designed to encourage use of mental health resources via a workplace sponsored EAP, delivered through an online portal.

Behavioral designers were doctorally trained in the fields of public health, behavioral science, and digital health intervention development and deployment. Designers had 5+ years of experience designing behavioral science infused interventions for a wide variety of health topics (e.g., preventive cancer screenings, physical activity, sedentary behavior, hydration).

Behavioral designers followed a multi-step intervention development approach that included incorporating behavioral strategies and design practices from behavioral economic principles, the COM-B Model, the Behavior Change Wheel, and the Theory and Technique Tool (28, 29, 36). These behavioral frameworks and tools were specifically chosen because they not only explain how health behavior change occurs but also describe the mechanisms through which behavior change is possible. The COM-B Model allows interventionists to account for multiple levels of influence (i.e., capability, opportunity, motivation) that can impact whether an individual takes the desired health action. The Behavior Change Wheel and Theory and Technique Tool both describe strategies for maximizing those levels of influence and driving the individual to positive behavior change. Specifically, the Theory and Technique Tool provides interventionists with an online tool for selecting behavior change techniques from a list of 93 techniques (e.g., information about health consequences, social support, incentives). This tool allows interventionists to explore each behavior change technique's level of evidence for successfully driving behavior change across 26 mechanisms of action for behavior change. Despite the reliability and reproducibility associated with these models and tools (36), they do have limitations. For one, often multiple behavioral techniques from the Theory and Technique Tool are shown to be successful in driving or prompting the desired health behavior, and therefore the designer must lean on their expertise and understanding of the target population and other contextual factors to prioritize their use. Further, specific effect sizes of each of these behavioral techniques can be difficult to calculate and thus understanding how much behavior change can be expected to be attributed to any single technique is complicated. Often times, intervention designs are better positioned to highlight success at a more global level (i.e., did the intervention as a whole result in the desired behavior change?).

The intervention was designed in four major steps. First, behavioral designers compiled a list of behavioral economic based strategies that have been shown to drive engagement with health communications (e.g., social proof, mere measurement effect). Then, behavioral designers conducted a literature review to identify the behavioral determinants associated with engaging with mental health resources via a workplace sponsored portal, such as an EAP. A list of these determinants can be found in Table 1. Each determinant ($n = 10$) was then paired with a mechanism of action (MoA) (e.g., skill, intention, social influences). These MoAs describe how behavior change techniques (e.g., instruction on how to perform behavior, information about health consequences, social comparison) are used to drive behavior change. Finally, designers used the Theory and Technique Tool to select behavior change techniques shown to have a positive effect on behavior change through the identified mechanisms of action, either by helping an employee overcome a barrier to engaging with mental health resources or facilitating employee usage of the EAP resources. As an example, if the behavioral determinant is mental health literacy, where an individual's ability to recognize poor mental health can predict whether they will seek out and engage with mental health resources, the mechanism of action through which behavior change can occur could be skill. In other words, improving an individual's skills with identifying mental health needs and seeking out resources increases their ability to complete the target behavior (i.e., log into EAP portal and explore mental health resources). The behavior change technique instruction on how to perform behavior can be used in intervention content to build these skills. For example, the intervention content that leveraged this behavior change technique in this study described how to log into EAP and what resources the person would have access to.

The four-step design process outlined above yielded a suite of unique behavioral strategies ($n = 20$) that either drive initial engagement with the intervention email messages or prompt the employee to complete the desired behavior (i.e., log into their EAP portal and explore mental health resources). A comprehensive list of the behavioral strategies leveraged in this intervention can be found in Table 2.

TABLE 1 List of behavioral determinants for engaging with mental health resources (including via a workplace sponsored portal such as an EAP).

Individual	Social	Environmental
Desire for anonymity (e.g., EAPs that are perceived as safe, confidential, and secure facilitate more employee engagement)	Social support from an individual's network (e.g., family, friends, co-workers, health providers) can impact engagement	Convenience level (e.g., ease of access in general as well as flexibility in when and where the EAP can be accessed can facilitate employees seeking out and using mental health resources)
Mental health literacy (e.g., an individual's ability to recognize poor mental health can predict whether they will seek out and engage with mental health resources)	Perceived or actual stigma from one's social network regarding mental health can inhibit engagement	Lack of time to engage with mental health resources
Adherence to digital tools and programs that support mental health and well-being facilitates continued engagement with these types of resources		
Attitudes (positive or negative) towards mental health support, including resources like EAPs		
The desire to independently self-manage mental health can inhibit engagement with mental health resources		
Lack of awareness and knowledge about the fact that mental health resources exist and where and how to access them blocks engagement		

TABLE 2 Behavior change strategies to either drive engagement or completion of the desired behavior.

Initial engagement strategies	Prompts for action (i.e., behavior change techniques)
Curiosity	Anticipated regret
Gain frame	Behavioral practice/rehearsal
Implementation intentions	Credible source
Loss aversion	Comparative imagining of future outcomes
Power of free	Goal setting
Prosocial	Information about health consequences
Reduce friction	Instruction on how to perform behavior
Self-efficacy	Salience of consequences
Social proof	Social comparison
Trusted messenger	Social support (emotional)

The behavioral designers then worked with content creators to build a library of behavioral science infused email messages. Each message was comprised of a subject line, preheader, headline, body copy, a hero image, and a call-to-action (CTA) button. Further, each behavioral strategy was operationalized three different ways, leading to an intervention message library with 30 content items targeting engagement (i.e., subject lines and preheaders) and 30 content items directly prompting the desired action (i.e., headlines, body copy, hero images).

The intervention CTA buttons in each email ($n = 2$) would automatically log recipients into their employer's EAP if clicked. From there, the employee could explore a variety of resources to support positive mental health including stress management tools.

Intervention delivery

The intervention was delivered via an artificial intelligence, BRL agent algorithm. The BRL agent utilized for this intervention is based on best practices from the behavioral reinforcement and machine learning literature (37–39). First, behavioral designers established the target behaviors of logging into EAP and using specific resources, with secondary target behaviors of opening and interacting with messages. The BRL agent (algorithm) was programmed with a reward function that prioritized the primary target behavior of logging into EAP with smaller rewards when recipients completed the secondary target behaviors of opening and interacting with the messages themselves. The agent facilitates the delivery of tailored, personalized content to each recipient by learning what messages elicit desired behaviors through feedback (e.g., engagement data such as opening the communication), as well as demographic and contextual factors when available. For this intervention, prior information about the recipient (i.e., employee) was limited and therefore the learning agent relied only on behavioral feedback to select intervention content. Specifically, the BRL agent algorithm was trained to understand what combination of subject lines and body copy (with hero images) maximized the likelihood that the employee would engage in the specified target behaviors: open the email and engage with content, and more importantly, click on the CTA and log into the EAP to explore mental health resources. The data indicating whether these behaviors had occurred was passed back to the BRL, allowing it to learn over time about intervention engagement and subsequently improve and adapt email message compilation for each employee. For example, the BRL agent may learn that email content detailing the benefits of EAP for mental health and stress management resources is associated with higher intervention engagement, and therefore, may prioritize sending content that focuses on these incentives in future messaging.

For this intervention, the BRL agent assembled each of the content items, described above in the intervention design section, into 1,800 possible email combinations. The agent then considered several data inputs (e.g., prior engagement with messages and participation in the desired behavior) to determine which email combination should be delivered to each employee, allowing for the delivery of personalized emails based on individual employee characteristics.

Employees received the intervention via their company email address. Intervention material was delivered following a strategy that allowed for regular intervention exposure while also guarding against notification fatigue. Specifically, employees could receive one intervention email message each week for the first 3 weeks, and then a message every other week thereafter for a total of 12 weeks. The maximum number of intervention messages an employee could receive was seven. Employees could opt out of the intervention communications by clicking the unsubscribe button at the bottom of the email. This intervention was delivered from February 2021–February 2022.

Treatment and control conditions

This pilot study was designed to establish the feasibility of delivering a behavioral science-based intervention to employees as part of the company's expanding mental health initiatives in the wake of the COVID-19 pandemic. Therefore, the study was not powered to detect statistical significance between treatment and control groups. Further, given that this study was a pilot study conducted as part of the described company's efforts to increase accessibility to mental health resources, priority was focused around providing as many employees as possible with the treatment content. In the interest of maximizing the effectiveness of the overall intervention, a larger percentage of the population received the treatment messages (90% vs. 10%). Employees were randomly selected to receive either the treatment messages or control message, and all employees were equally eligible to be placed in either condition at the start of the study.

All messages included the components of a subject line, preheader, headline, body copy, hero image, and CTA button. Employees were randomly selected to receive a treatment message (i.e., behavioral science message assembled and delivered via the BRL agent) or control message (i.e., a single generic, supportive message with a stock photo). The control message was written to express what the employee would gain from utilizing the EAP for mental health support, a common tactic used in the company's existing marketing materials. An example of an intervention email and the control email can be found in Figures 1, 2, respectively.

Measures

Employee engagement with the intervention was defined as an employee opening the email that was promoting EAP utilization. The email prompt was considered successful if the employee clicked the CTA in the email and logged into the EAP website. The BRL agent tracked these opens and clicks in order to inform future email combinations that should be delivered to each employee.

Transparency and openness

This intervention was implemented as part of a mental health initiative at the described company to increase employee mental health support in the wake of the pandemic. Therefore, this study and the analysis plan were not pre-registered and de-identified data are not publicly available.

Results

Participants ($N = 773$) were corporate employees, both men and women, at a large home building company in the Southeastern US. Participants held various traditional, corporate roles including but not limited to call center support, home insurance, and employee benefits/human resources. All participants were eligible to receive the email campaign from February 2021 through February 2022. Engagement with this pilot intervention was high, with the majority of participants (79.9%) opening the email messages (80.3% for treatment and 76.8% for control). Throughout the study period, only four people (0.05%) opted-out of the intervention (i.e., unsubscribed from the email messages). Across the intervention year, over 170 employees (22%) completed the desired behavior at least once (i.e., clicked the email CTA and logged into the EAP site to explore mental health resources). Of these 170 employees, the majority received the treatment content (i.e., 159 employees vs. 14). Finally, any behavioral insights and strategies identified during peer-reviewed and product research that were not suitable for the described pilot intervention yet were still relevant to supporting employee mental health (e.g., recommendations for improving workplace environment and co-worker interactions), were summarized in a report and delivered to the organization with implementation recommendations.

Discussion

This study used a BRL agent to deliver a behavioral science-based intervention for employees at a home building company, targeting engagement with mental health resources through an EAP online portal. The intervention had broad eligibility criteria that did not rely on baseline mental health status, deployed an active opt-out to reduce intervention onboarding friction, and was piloted during the height of the COVID-19 pandemic.

Research into the barriers experienced by employees also led to a comprehensive report containing recommendations for how the organization could support employee mental health alongside the behavioral email campaign. Implementing organizational-or team-level strategies may help improve the impact of individual-level interventions such as a behavioral science-based intervention used in this study by creating circumstances favorable to EAP use. The specific recommendations were intended to provide organizational support around mental health initiatives, like the email campaign, and also require a minimal implementation budget.

While this pilot intervention was not powered to show statistical significance, the preliminary results are promising. The EAP engagement rates associated with the intervention compare favorably with national data showing approximately 5% of employees access EAP in a given year (22). During the intervention period, 22% of the

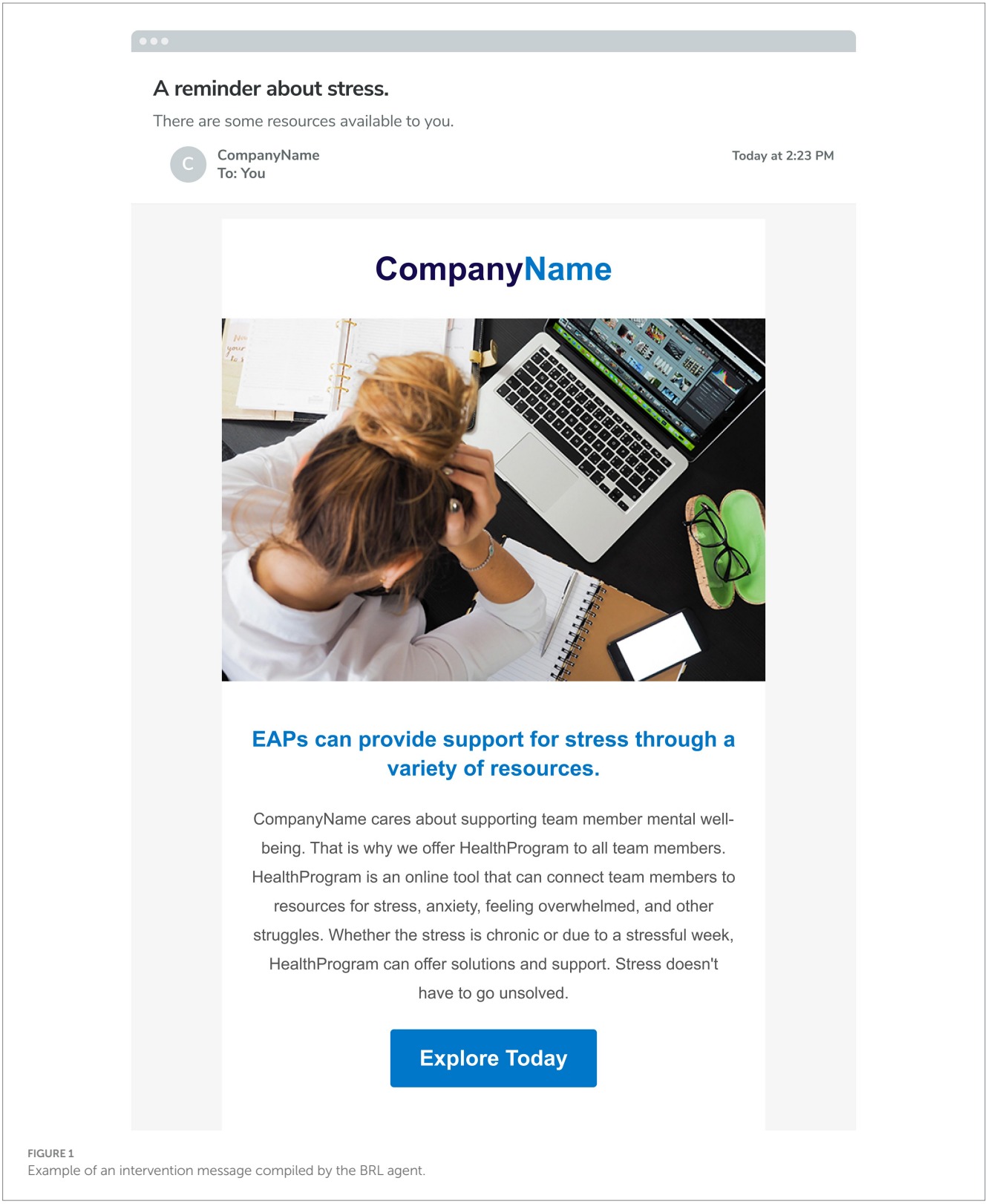

FIGURE 1
Example of an intervention message compiled by the BRL agent.

participating employees accessed EAP at least once. The emails themselves also received strong engagement rates, with 80% of the messages being opened and a very low unsubscribe rate of 0.05%.

Using a BRL agent to personalize the selection and unique combination of behavioral strategies likely drove improvements over more generic email campaigns. There is a general issue of low employee awareness of available resources such as EAP and the benefits they provide (40). A corporate email blast with information about EAP could easily be ignored or skimmed by recipients. Personalized communications, on the other hand, have been shown to receive greater attention and improve information retention (41). Additionally, by focusing on one specific barrier and behavioral

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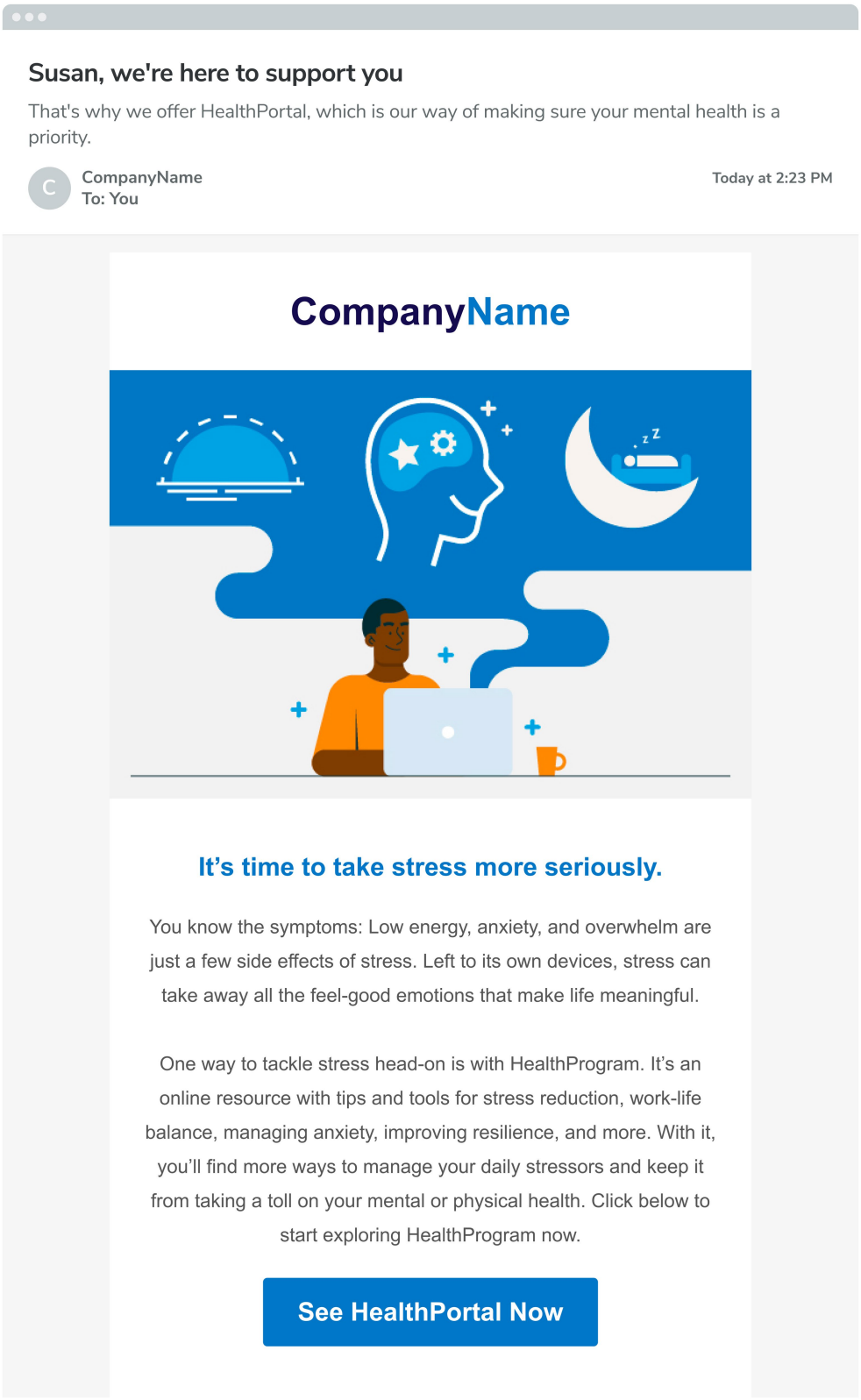

FIGURE 2
Single control message that includes generic, supportive content with a stock photo.

strategy in the body of the email, the real estate within the message could be used not to just to inform the recipient of the existence of the EAP resource, but also address specific hesitations they may have about using it.

Personalization enabled the intervention to address the breadth of barriers employees may experience to using EAP resources without presenting employees with content that is not relevant to their particular concerns. The behavioral science-based intervention addressed 10 high level barriers to EAP usage through three different messages per barrier. Each employee only saw messages likely to be meaningful to them based on their past interaction patterns. This presentation style reduces user burden by delivering pointed, relevant content, and may support health equity by facilitating the inclusion of barriers experienced by under-served groups (32).

Emailing also may have been an effective channel for this outreach because it offers privacy and the ability for recipients to read and react to messages at a time of their choosing. Given that stigma is a reason why many employees refrain from using workplace mental health resources, it is important to communicate in a way that can be kept private and confidential from others.

Offering a digital suite of EAP resources (e.g., stress management tools) may have also promoted engagement. While digital support tools may not be sufficient to address all mental health concerns, many have been associated with significant reductions in symptoms and distress (42), and increases in productivity (43). The current intervention offered a logical way for employees to take immediate action by clicking to log into the EAP portal and explore its offerings. Compared to attending a health fair, phoning a hotline, or setting an appointment with a counselor, this is a low-friction behavioral loop. Future research should examine how to introduce employees with more significant mental health needs to higher touch services as part of the EAP experience.

Limitations and future research

Results from this study may not generalize to non-corporate employees. This intervention was delivered to employees with a company email address, limiting outreach only to employees working in the corporate setting. However, employees who work in blue collar jobs such as within the manufacturing and home building roles did not have a company email address. Future research should explore opportunities for increasing access to mental health resources for employees who work outside of corporate offices. Further, the stress and other mental health issues faced by these employees may differ from those experienced by those in an office setting. Future research should explore what determinants and behavioral strategies may be more applicable to different employee roles.

Demographic data were not collected as part of this pilot study. Therefore, conclusions about the diversity of the participant sample as well as any impact of various demographic factors on engagement with the intervention is unknown. Future research should deploy this intervention design among a diverse sample of corporate and non-corporate employees.

This pilot implementation was designed to establish feasibility and meet an immediate organizational need to support employees, and so was not sufficiently powered to detect significant differences between the control and treatment groups. In addition to a larger and appropriately powered replication of the current work, future research should determine which behavioral strategies can improve employee engagement with mental health resources when compared to traditional tactics such as education about available benefits. Future research can also explore how to drive not just engagement but also utilization of EAP benefits.

This intervention highlighted the challenges in tracking both how employees are engaging with mental health resources and whether there is mental health improvement in the workplace. For instance, it is possible more than 22% of employees logged into their EAP as a result of the intervention (i.e., an employee could have logged into EAP without using the CTA button and therefore would not be reflected in the current count). Further, it is unclear if employees logged into the EAP site once or multiple times to engage with the mental health resources over the course of the yearlong intervention period. Finally, this study was not able to capture how employees utilized the resources once they logged into the EAP site (e.g., how many resources were explored, was anything downloaded or printed out). Outcomes associated with use of the EAP resources, such as any reductions in self-reported stress levels or adoption of new coping strategies, were also not measured. Future research should explore how best to measure and capture improvement in employee mental health and sustained usage of these digital resources, particularly when engagement with resources within an EAP may need to consider anonymity and privacy concerns.

Finally, there is an opportunity to build on the pilot intervention for a more robust implementation. This would include not just extending intervention access across the company, but also reviewing the performance of specific behavioral strategies in the pilot implementation in order to refine the message content. It would also be worth revisiting the barriers addressed in the intervention, given the speed with which workplace cultures have changed post-COVID-19. Future research should explore how addressing mental health stigma in the workplace from a variety of angles (i.e., individual vs. interpersonal vs. environmental influences) and message content could differentially impact employee mental health and well-being.

Conclusion

Employee mental health is an issue of significant importance to employers, given its pernicious effects on employee attendance, productivity, and well-being. Employers have invested in tools, such as EAPs, that can help address employee challenges of stress, anxiety, depressive symptoms, etc. But even when employees are aware they have access to these programs, barriers including stigma may prevent them from engaging. Interventions that personalize outreach to specifically address the unique barriers each employee has to using mental health interventions can increase engagement. Further, it is critical to not only consider the individual level, but also the workplace context in which these resources are delivered. The best results will come when employers reshape the work environment to reduce stigma while simultaneously connecting employees to the tools that will help them with mental well-being and resilience.

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 humans were approved by Solutions IRB, identifier Subject: Protocol #2021/05/28. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and the institutional requirements.

Author contributions

ABW: contributed to the design of the behavioral nudging campaign described in the manuscript, supported the acquisition of the data, responsible for conceptualizing the topic for the manuscript and interpretation of the data, and drafted the manuscript and critically revised it. As first author and corresponding author, ABW agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. YG and AB: drafted portions of the manuscript and critically revised it and provided approval for publication of the content. AB: supported conceptualizing the topic for the manuscript and interpretation of the data as well as supported data analysis. All authors contributed to the article and approved the submitted version.

Conflict of interest

ABW, YG, and AB are full-time employees of Lirio, the company that designed and deployed the intervention described in the manuscript.

Publisher's note

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From the dual-dimensional perspective of employee mindfulness and superior trust, explore the influence mechanism of negative workplace gossip on work engagement

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Introduction: As a common phenomenon of workplace negative gossip in organizations, how it affects employees' work engagement is not yet clear, nor what methods can be used to mitigate its negative impact on employees' work engagement.

Methods: Based on Conservation of Resource Theory, this study obtained 334 valid employee samples from mainland China enterprises through a three-time lagged research design and explored the mechanism of negative workplace gossip on work engagement from the dual perspectives of employees and supervisors.

Results: The results show that: (1) Negative workplace gossip negatively affects employee work engagement. (2) Professional commitment plays a mediating role between negative workplace gossip and employee work engagement. (3) Employee mindfulness negatively moderates the negative impact of workplace negative gossip on professional commitment; superior trust negatively moderates the negative impact of workplace negative gossip on professional commitment. (4) Employee mindfulness and superior trust are further weakened to moderate the negative indirect impact of workplace negative gossip on employee work engagement through professional commitment, and this negative indirect impact is weaker when employees have a higher degree of mindfulness and higher trust in superiors.

Discussion: It proposes effective strategies for managing workplace gossip to harness its positive influence and offer practical guidance to enhance employee work engagement.

KEYWORDS

mindfulness, negative workplace gossip, professional commitment, superior trust, work engagement

1 Introduction

In the context of economic globalization, a complex and volatile market environment, and the rapid advancement of science and technology, an increasing number of organizations recognize that their employees are the source of their fundamental competitiveness (1). Whether employees can actively and proactively engage in work is crucial to the development of the organization. Employees are more energetic and fully committed to work, dare to accept work challenges and not give up easily, and achieve better performance for the organization and individuals (2). Work engagement is the key link connecting work factors and work performance, and it is a crucial strategy used by businesses to obtain a competitive edge (3). Therefore, enhancing workers' work engagement is crucial for both the organization's and the workers' personal growth (4).

At the same time, with the intensification of workplace competition, the problem of workplace violence has also intensified, and scholars and managers have become more and more interested in the "dark side" of organizational behavior (5, 6). In the context of Chinese organizations, influenced by traditional culture and implicit personal characteristics, workplace violence mostly occurs in the form of workplace gossip (7). Gossip is ubiquitous. In daily life, people often hear, participate in or spread other people's gossip intentionally or unintentionally, and use it as an important way to obtain information, vent emotions and maintain relationships (8). In the specific social situation of the workplace, positive and negative gossip can be distinguished in the workplace, with the latter's prevalence and worry rates being of more concern (9–11). Negative workplace gossip is an informal communication phenomenon that negatively evaluates an absent member (12). At present, most of the research studies and measures negative gossip in the workplace from the perspective of gossip goal perception, and explores the results of negative gossip in the workplace (13). Research has indicated that unfavorable rumors in the workplace have an adverse effect on workers' behavior at work (14), and adversely impacts the organization's performance. On the one hand, it will cause trouble to employees, and on the other hand, it will not be conducive to creating a good working atmosphere, which will adversely affect the performance of employees and the organization.

With the improvement of material living standards and the background of organizations advocating "people-oriented" humanized management, it is imperative to allocate increased focus towards the psychological well-being of employees (15). Work engagement is a positive, proactive, and energetic work state (16). The state of positive work engagement has a significant impact on employees' proactive behavior and work performance. It enables them to effectively navigate the complex and dynamic working environment, thereby maintaining their competitiveness (2, 17). This study follows the trend of paying attention to employees' mental health, combines negative gossip in the workplace with employees' work engagement, and explores how negative workplace gossip affects employees' work engagement in the context of common and frequent adverse interpersonal relationship situations and negative events within the organization. Simultaneously, this study takes the gossiped employees as the object and explores whether there are intervention methods to alleviate the impact mechanism of negative workplace gossip on employees' work engagement. From the dual perspectives of employees' own mindfulness and superior trust, this paper tries to clarify the function and mechanism of negative gossip in the workplace affecting professional commitment, which again affects employees' work engagement.

In the context of workplace stressors, negative gossip can be fundamentally perceived as a potential threat to resource depletion (18). Grounded in the Conservation of Resources Theory, individuals inherently strive to acquire, preserve, and safeguard their personal resources. In cases where one's resources are diminished and not easily replenished, individuals may resort to reducing resources to safeguard what remains (19). Consequently, as per the Conservation of Resources Theory, negative workplace gossip can lead to the depletion of an employee's personal resources, thereby impacting their commitment and engagement in their work (20). At the same time, negative workplace gossip will destroy the emotional bond between employees and the organization, affect employees' judgment of the organization, reduce professional commitment, and thus reduce their commitment to work (21). Although negative gossip in the workplace contributes to employees' negative emotions and experiences, its effect is also influenced by several factors (22). Most of the existing studies on the volatilization effect of negative gossip in the workplace focus on the single-factor adjustment at the team or individual level (10, 11), which fails to comprehensively consider the synergistic influence of external and internal resources from the perspective of the integration of employees and superiors. Therefore, this study will introduce superior trust as an external resource and employee mindfulness as an internal resource, and comprehensively investigate the influence of the moderating effect (22). In order to make up for the shortcomings of existing studies, from the perspective of employees and leaders, this paper explores the moderating effects of superiors' trust and employees' mindfulness on workplace negative gossip and work engagement.

In summary, this study examines the impact and mechanisms of negative workplace gossip on employees' work engagement, drawing on the Conservation of Resources Theory and considering the perspectives of both employees and their superiors. Initially, the study seeks to ascertain the impact of negative workplace gossip on employees' level of work engagement, thereby contributing to a more comprehensive understanding of the consequences associated with negative workplace gossip. Furthermore, in conjunction with the conservation of resources theory, professional commitment serves as the mediating variable in examining the mediating role between negative gossip and work engagement. In this study, we aim to examine the moderating role of employee mindfulness and superior trust from the perspective of employees and leaders. Specifically, we will investigate how these two variables influence the relationship between negative workplace gossip and career commitment, focusing on their inhibitory effect. This study presents a moderated mediation model that aims to elucidate the impact mechanism of workplace negative gossip on employee work engagement within Chinese organizations. The model integrates both mediation and moderation effects, with the objective of providing guidance and inspiration for management practices in this context.

2 Hypothesis development

2.1 The relationship between negative workplace gossip and work engagement

Work engagement is a constructive and gratifying condition at work distinguished by three fundamental attributes: energy, dedication and focus (2). Work engagement means that individuals can maintain a high degree of physiological involvement in work and maintain a high degree of cognitive arousal. The necessary prerequisite for this is sufficient emotional and psychological resources (23). According to the conservation of resources theory, individuals exhibit a proclivity to uphold, safeguard, and obtain resources (24), and the loss of resources will lead to negative behaviors of employees (19). Specifically, negative gossip in the workplace makes employees feel isolated, worsens the interpersonal relationship among employees (8, 25), and increases the uncertainty and instability of work tasks (26), leading to serious depletion of employees' emotional and psychological resources (27). The depletion of emotional and psychological resources has a detrimental impact on employee enthusiasm and dedication, posing challenges for employees in fully engaging with their work. In addition, negative gossip makes relevant employees unable to feel the importance and support of the organization and other members, thus losing enough energy to devote themselves to work (28). Secondly, the conservation of resources theory is that when individual resources are depleted, it will trigger a series of subsequent resource protection responses (19). Negative gossip in the workplace damages the personal reputation and image of employees, causing anxiety and negative emotions, consuming employees' psychological resources, and making it difficult for employees to allocate more resources to work (29). At the same time, employees who are troubled by negative gossip in the workplace not only need to spend extra resources to trace and clarify the gossip information, but also be careful to avoid the spread of a new round of gossip, try to avoid dealing with interpersonal relationships and teamwork, and it is difficult to devote themselves to work (30). Finally, the presence of negative gossip within a professional setting has the potential to foster a sense of mutual distrust among employees, consequently leading to a negative emotional encounter for said employees (7), gossip can also easily lead to the loss of employees' reputation, and cause the negative emotions of the gossip to expand (13), it is difficult to maintain a positive mental state, and it is difficult to engage in work satisfactorily. Therefore, this study proposes Hypothesis 1:

> *H1*: Negative workplace gossip has a negative impact on employees' work engagement.

2.2 Professional commitment as a mediator

Professional commitment reflects the degree of employee identification, commitment, and emotional attachment to the organization (31). Generally speaking, employees with high professional commitment are more identified with organizational goals, will take the initiative to make their own contributions to the organization, and actively devote themselves to work (32). Secondly, according to the social identity theory (33), the increase in employees' identification with the organization will intensify the employees' sense of belonging to the organization, their sense of identity and responsibility will be significantly enhanced, and eventually they will show more positive states and behaviors (34). Employees with high professional commitment are motivated by positive emotions, willing to fulfil organizational role expectations and put in extra work effort (35), and inject full personal cognitive, emotional, and physical commitment into their work (17). Thirdly, when the employee's professional commitment reaches a certain intensity, the employee may actively engage in work and take active work behaviors in order to express their sincerity to the organization. Finally, Macey and Schneider (36) believed that the concept of work engagement contains emotional connotations, and proposed that professional commitment is an effective predictor of work engagement in achieving organizational goals (36).

Negative workplace gossip causes interpersonal stress, which drains emotional and psychological resources and lowers employees' identification and investment in the company (37). According to the conservation of resources theory, when resources are reduced or threatened, individuals will become tense and exhausted, triggering uneasy interpersonal interactions and hindering the formation of professional commitment to the organization (27). First of all, employees who are subjected to negative gossip within the workplace are required to invest significant amounts of time and energy in order to effectively process and assimilate the adverse consequences resulting from such gossip (19). Due to the lack of psychological and emotional resources, employees cannot generate a professional commitment to the organization. Secondly, when employees perceive being attacked by gossip, they will greatly reduce their sense of obligation and responsibility to the organization (28), consuming their own professional commitment to the organization. Thirdly, employees suffer from negative gossip in informal communication, the need for emotional communication cannot be met, it is difficult to maintain emotional communication between employees and the organization, and it is difficult to form professional commitment (38). Finally, interpersonal emotional connection and psychological identity are clearly reflected in the organization. Negative gossip in the workplace causes emotional connection to be unsmooth (39). Emotional alienation intensifies (9–11), resulting in employees having difficulty attaching to and belonging to the organization's professional commitment.

Therefore, based on the conservation of resources theory, this study believes that negative gossip in the workplace can make individuals fall into an unfriendly, unsafe, defensive and suspicious working climate, and employees are difficult to identify with and rely on the organization, and their career commitment is greatly reduced, resulting in employees' inability to engage in work (14). At the same time, victims of gossip are affected by external negative influences such as personal image, reputation or career, and consume a large amount of their own resources, resulting in a sense of disappointment towards the organization, a decrease in the organization's sense of identity and commitment, and an inability to work (40). Finally, the negative attributes of negative gossip in the workplace tend to lower the value standard and cause uneasy interpersonal interaction, resulting in a decline in employees' attachment to the organization (41), and prompting employees to make negative perceptions and evaluations of the organization (42). These negative evaluations and experiences hinder the formation of employees' identity and fulfilment

of career commitments, consume their own emotional and psychological resources, and have a detrimental impact on employees' work engagement (43). Therefore, this study proposes Hypothesis 2:

> *H2*: Professional commitment mediates negative workplace gossip and work engagement.

2.3 Mindfulness as a moderator

Mindfulness is the quality of being conscious, non-judgemental, and focused on the present moment with openness and acceptance (44). As a positive personal trait, mindfulness not only has a positive and direct impact on the individual's cognitive function, emotion regulation, and adaptive behavior, but also buffers the adverse effects of external risks (45). The Mindful Coping Model also believes that when individuals with high mindfulness face stressful events, they will make positive cognitive evaluations and re-evaluate stressful events, thereby reducing the negative impact of stress (46). Negative gossip in the workplace is regarded as a stressful situation, resulting in the loss of employees' psychological and emotional resources, disapproval of the organization and team, and reduced professional commitment. In this negative gossip organization, employees use their own positive mindfulness traits to deal with the negative impact of stressful events; by adjusting their attitudes, they actively re-evaluate and define gossip events, reduce the impact of negative gossip, and maintain positive professional commitments (47).

First, individuals with high levels of mindfulness tend to interpret internal thoughts simply as mental events, weakening the need for external social approval (48). Furthermore, employees with high levels of mindfulness are less affected by external situations and are more inclined to consider themselves to completing work tasks (49). Therefore, employees with high mindfulness are less affected by negative gossip, which will also alleviate the impact of negative gossip on employees' career commitment. Second, mindfulness can encourage individuals to pay attention to uncertainty and negative experiences with an open and accepting attitude (50). Correspondingly, the higher the level of mindfulness of employees, the higher the tolerance to uncertainty and the lower the occurrence of emotional problems (51). Employees with high mindfulness judge negative gossip events in the workplace with an open and accepting attitude, and alleviate the negative emotions and behaviors caused by negative gossip. Finally, employees with high levels of mindfulness have higher emotional regulation and self-acceptance, and can increase their psychological capital to cope with stress (52). When encountering negative gossip and stressful events in the workplace, employees with high levels of mindfulness are more likely to improve their mental health, regulate their emotions and tolerance, and maintain a positive emotional commitment to the organization. Therefore, this study proposes Hypothesis 3:

> *H3*: Mindfulness negatively moderates the negative relationship between negative workplace gossip and professional commitment. The higher the level of employee mindfulness, the weaker the negative relationship between negative workplace gossip and professional commitment; otherwise, the stronger the relationship.

2.4 Superior trust as a moderator

The conservation of resources theory points out that the impact of resource acquisition and resource loss on individuals will show different effects due to the difference in individual initial resources (53). Negative gossip in the workplace, as a kind of interpersonal pressure, causes the loss of employees' psychological and emotional resources and affects employees' professional commitment. At the same time, in the context of Chinese organizations, superiors play a very important role. Since the structure of Chinese enterprises is not flat enough, the relationship between most employees and organizations is defined by the specific relationship with their superiors (54, 55). Therefore, it is necessary to clarify the impact of superiors as an external resource on the relationship between negative workplace gossip and professional commitment, and it is more in line with the actual situation of the organization.

Perceived superior trust refers to employees' perception of superiors' positive expectations of themselves and their willingness to take risks (56). In real work, superior leaders tend to have a lot of resources, and individuals' perceived trust in superiors can not only obtain additional psychological resources, but also be supplemented by other work resources (57). Meanwhile, Employees who perceive trust from their superiors can supplement individual energy with relational energy (58). Therefore, the perceived trust of superiors can effectively measure the difference in initial resources, and may play a moderating role in the impact of negative gossip in the workplace on occupational commitment. Employees with higher levels of perceived trust are more psychologically resilient (59). This implies that individuals possess greater psychological capacities, enabling them to effectively manage adverse workplace rumors with composure, thereby minimising the detrimental impact of such rumors on employees' dedication to their professional roles. On the contrary, employees with a low level of perceived trust from their superiors may pay more attention to negative workplace gossip related to themselves, pay more attention to the loss of resources caused by negative gossip, and undermine their own organizational identity and professional commitment (9–11). Furthermore, employees with a lower perceived level of trust from their superiors may devote more time and energy to understanding the sources of negative gossip (27), which leads to further resource damage, and thus the negative impact of negative gossip in the workplace on professional commitment becomes more intense. Therefore, hypothesis 4 is proposed:

> *H4*: Perceived superior trust negatively moderates the negative relationship between workplace negative gossip and professional commitment. When employees perceive higher superior trust, the weaker the negative relationship between negative workplace gossip and professional commitment; otherwise, the stronger the relationship.

2.5 Mediation model with moderation

This study presents a moderated mediation model by incorporating the mediating effect of Hypothesis 2 and the moderating effects of Hypothesis 3 and Hypothesis 4. Employees are exposed to negative gossip in the workplace, which affects their professional

commitment and makes it difficult to engage at work. Specifically, employees' professional commitment plays a mediating role between workplace negative gossip and work engagement, but the mediating effect is influenced by employees' own mindfulness and superiors' trust. When employees have a higher level of mindfulness and perceive higher trust from superiors, the negative effects of workplace gossip on employees' professional commitment and job engagement can be alleviated. Therefore, hypothesis 5 is proposed:

> *H5*: Both employee mindfulness and perceived superior trust negatively moderate the indirect effect of workplace negative gossip on work engagement through professional commitment. When employees have a higher level of mindfulness and perceived higher superior trust, this indirect effect is weaker; on the contrary, this indirect effect is stronger.

Based on the above theoretical hypotheses, this proposed research model is shown in Figure 1.

3 Research methods

3.1 Research subjects and collection procedures

In this study, a questionnaire survey was used to obtain data, and all questionnaires are pencil self-supporting reports. The data samples come from Beijing, Shanghai, Jiangsu, Zhejiang and other places, involving sales, marketing, finance, management and information technology departments. In order to prevent the influence of common method bias, the research time of longitudinal tracking was adopted in this study, and questionnaires were distributed in three time periods, with a time break of 1 month. Before commencing the formal investigation, our research team established an investigation group consisting of both MBA and DBA students, many of whom possess extensive executive experience. Additionally, we communicated with and provided clarification to the employees and supervisors who were participating in our study. We emphasized to all participants that there were no right or wrong answers and assured them of the anonymity and confidentiality of the questionnaires. Simultaneously, the participants were duly notified prior to the commencement of the formal inquiry that their involvement was exclusively intended for the purposes of this scholarly investigation. Finally, this project that collected the data from questionnaires was approved by the Institutional Review Board of the Peking University. An Ethic Issue Form offered by Peking University was signed and submitted to promise this article's authenticity and compliance with academic ethics.

A total of 400 employees were invited to complete this study. In the first stage, employees fill out Questionnaire 1 to investigate negative workplace gossip; In the second stage, employees fill out Questionnaire 2 to investigate mindfulness, perceived superior trust, and professional commitment; in the third stage, employees' work engagement is investigated. After the survey and research were completed, the last 4 digits of the mobile phone numbers of the employees were used as the matching basis for the three questionnaires, and invalid questionnaires that were omitted or wrongly filled were eliminated. Finally, this research obtained 334 valid questionnaires from mainland Chinese employees. The effective recovery rate was 83.5%. All samples are filled in by employees. The specific departments to which employees belong are as follows: 220 people are in the sales department; 39 people are in the marketing department; 32 people are in the finance department; 21 people are in the management department; 22 people are in the information technology department. In this valid questionnaire, there are a total of 190 male employees, accounting for 56.9% of the questionnaire survey; a total of 144 female employees, accounting for 43.1% of the questionnaire survey. There are 143 people with a college degree or below, accounting for 42.8%, 71 people with college degrees, accounting for 21.3%, and 120 people with college degrees or above, accounting for 35.9%. The average age is 30.90 years old. The average working week is 51.89 h.

3.2 Measuring tools

To ascertain the questionnaire's reliability and validity, this investigation utilises established, mature scales. Prior to the survey, the English scale underwent a translation process that adhered to the standard procedure for translation and back-translation (60). The questionnaire-issuing team conducted multiple rounds of proofreading to ensure that the translated scale into Chinese was accurate. The entire study employed a 5-point Likert scale, with responses ranging from "strongly disagree" to "strongly agree" (as indicated on the questionnaire).

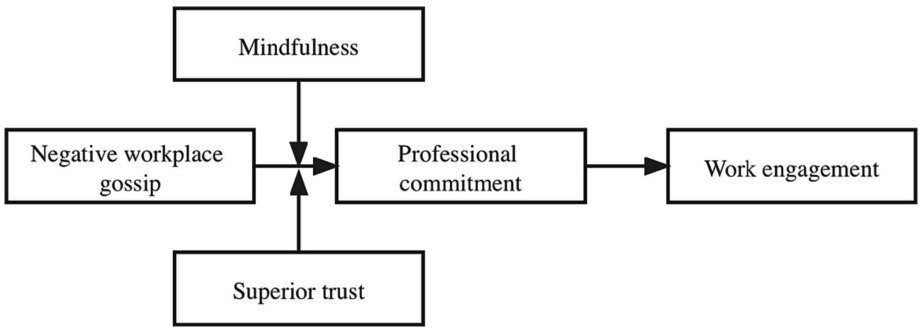

FIGURE 1
Proposed research model.

3.2.1 Negative workplace gossip

Using the workplace gossip scale developed by Brady et al. (37), since this study only focuses on negative gossip, relevant items in this part are selected, a total of 10 items. Examples of questions include: "Have you talked about your boss's conversations in the workplace. These conversations took place when your boss was not present or could not hear the conversation. When talking with colleagues, you have questioned your boss's ability" and "Talk about a colleague's conversation in a workplace context where your colleague is not physically present or able to hear the conversation, or criticize another colleague during a conversation." The alpha reliability of the scale is 0.95.

3.2.2 Professional commitment

The professional commitment scale developed by Suddaby et al. (61) was used, with a total of 7 items. Example questions include: "When I work, I identify with my job role" and "This work is now an important part of my career." The alpha reliability of the scale is 0.93.

3.2.3 Mindfulness

The mindfulness scale developed by Zheng et al. (62) was used, with a total of 18 items. Example questions such as: "When I am at work, my attention is entirely on work" and "I accept my unpleasant experiences at work." The alpha reliability of the scale is 0.88.

3.2.4 Superior trust

Using the scale developed by Lau et al. (63) according to the context of Chinese organizations, there are a total of 4 items. Example questions include: "Supervisors often assign important tasks to me" and "Supervisors were willing to rely on [their employees'] work-related judgments." The alpha reliability of the scale is 0.85.

3.2.5 Work engagement

The Work Engagement Scale developed by Rich et al. (16) includes three dimensions: emotion, cognition and physiology, with a total of 18 items. Example questions such as: "I work with intensity on my job" and "At work, my mind is focused on my job." The alpha reliability of the scale is 0.92.

3.2.6 Control variables

According to previous research, it has been found that the gender, age, and education level of employees will affect work engagement (64). At the same time, it was found that employees' weekly working hours have different effects on work engagement (65, 66). Therefore, in order to verify the model more accurately, this study uses gender, age, education and weekly working hours as control variables.

3.3 Data analysis

This study used SPSS 25.0 for Harman's one-way test, descriptive statistics, correlation analysis and multiple regression analysis, and Amos 22.0 was used for confirmatory factor analysis. When testing the mediating effect, this study uses the three-step method of Baron and Kenny (67) combined with the Bootstrap technique (using the PROCESS program-Model 4) (68) to estimate the confidence interval of the mediating effect. When testing moderated mediation, this study is based on the research of Edward and Lambert (69) and combines the Bootstrap technique (using the PROCESS program-Model 9) to test the value and significance of the difference between the indirect effect under high and low moderating variables.

4 Research results

4.1 Common method deviation test

In order to reduce the impact of common method bias, follow the multi-stage answering method suggested by Podsakoff et al. (70) to control the possible common method bias (70). At the data level of the survey results, a Harman single-factor test was performed on the collected data, and it was found that the variance explained by the first factor was 24.53%, which was less than the standard of 40% (70). From Table 1 that the fitting index of the confirmatory factor analysis of the single factor model did not pass the test ($\chi^2 = 23015.23$, df = 1,539, RMSEA = 0.20, SRMR = 0.29, CFI = 0.35, TLI = 0.33). Thus, the variables in this study do not exhibit any significant common method bias.

4.2 Confirmatory factor analysis

The following fitting indices were chosen for examination in this study in order to assess the degree of model fitting. This study compares a number of competition models, and the results of the analysis are presented in Table 1. The model fit of the five-factor model in this study ($\chi 2 = 6451.11$, df = 1,529, RMSEA = 0.07, SRMR = 0.07, CFI = 0.91, TLI = 0.90) is better than other competing models. Furthermore, the test was passed by every fitness indicator comprising the five-factor model. This study concludes that all of the research variables are discernible on the basis of this.

4.3 Correlation analysis

There was a correlation between the variables and the control variables, as shown in Table 2. Table 2 shows that all variables are significantly linked, which gives us a starting point for testing the model's hypothesis. A significant negative correlation between negative workplace gossip and work engagement ($r = -0.26$, $p < 0.001$), which supports investigating the negative impact of workplace gossip on work engagement.

4.4 Hypothesis testing results

4.4.1 Test results of the main effect

As shown in Model 6 in Table 3, negative workplace gossip negatively impacts work engagement ($\beta = -0.28$, $p < 0.001$). Hypothesis 1 was supported.

4.4.2 Test results of the mediating effect

From Model 8 in Table 3, we can know that negative workplace gossip has a significant negative relationship with work engagement ($\beta = -0.21$, $p < 0.01$), and professional commitment has a significant positive relationship with work engagement ($\beta = 0.15$, $p < 0.01$),

TABLE 1 Results of confirmatory factor analysis ($N = 334$).

Model	χ^2	df	$\Delta\chi^2$	RMSEA	SRMR	CFI	TLI
Five-factor model (hypothesis)	6451.11	1,529		0.07	0.07	0.91	0.90
Four-factor model (A + B)	11727.33	1,533	5276.22***	0.12	0.12	0.78	0.72
Four-factor model (A + C)	11963.87	1,533	5512.76***	0.14	0.15	0.58	0.56
Four-factor model (A + D)	11253.23	1,533	4802.12***	0.13	0.13	0.61	0.59
Three-factor model (B + C + D)	12870.50	1,536	6419.39***	0.14	0.11	0.54	0.53
Two-factor model (A + B + C + D)	15870.13	1,538	9419.02***	0.17	0.18	0.43	0.41
Single-factor model (A + B + C + D + E)	23015.23	1,539	16564.12***	0.20	0.29	0.35	0.33

A: negative workplace gossip; B: professional commitment; C: mindfulness; D: superior trust; E: work engagement; and "+" indicates fusion.

TABLE 2 correlation coefficient of variables.

Variables	Mean	Standard deviation	1	2	3	4	5	6	7	8	9
1. Gender	0.43	0.50									
2. Age	30.90	6.74	0.10								
3. Educational level	11.86	2.74	0.07	0.27**							
4. Working hours weekly	51.89	11.95	−0.01	0.02	−0.08						
5. Negative workplace gossip	2.61	1.03	0.16**	0.10	−0.35***	−0.04	**(0.95)**				
6. Professional commitment	3.53	0.82	−0.01	−0.06	0.23***	0.04	−0.48***	**(0.93)**			
7. Mindfulness	3.64	1.09	−0.13*	−0.09	0.15**	0.09	−0.53***	0.35***	**(0.88)**		
8. Superior trust	4.49	0.74	0.04	0.03	0.06	0.19**	−0.14*	0.17***	0.27***	**(0.85)**	
9. Work engagement	3.97	0.93	−0.06	−0.10	0.06	−0.05	−0.26***	0.23***	0.54***	0.04	**(0.92)**

***$p < 0.001$, **$p < 0.01$, * $p < 0.05$. Bold values means the alpha reliability of variables.

examined the indirect effect of negative workplace gossip on work engagement through professional commitment. In order to further clarify this indirect effect, Bootstrap (using the PROCESS program) (68) was used. Table 4 shows the mediating effect Bootstrap test. Direct and indirect effects of negative workplace gossip on work engagement are not zero at 95% confidence. Thus, professional commitment mediates the relationship between proactive negative workplace gossip and work engagement. Hypothesis 2 was supported.

4.4.3 Test results of the moderating effect

From Model 3 in Table 3, the interaction term between negative workplace gossip and mindfulness positively affects professional commitment ($\beta = 0.14$, $p < 0.05$). The Bootstrap test of the moderating effect is shown in Table 5. At the 95% confidence interval, when the level of mindfulness is low, the indirect effect of negative workplace gossip on professional commitment is higher (effect value is −0.40). When the level of mindfulness is high, the indirect effect of negative workplace gossip on professional commitment is lower (effect size is −0.19). In order to further clarify this moderating effect, the study was determined by using Aiken et al. (71) to adjust the high and low levels of the moderator. As shown in Figure 2, mindfulness reduces the negative relationship between workplace gossip and professional commitment. Hypothesis 3 is supported.

Examining the moderating role of perceived superior trust. From Model 4 in Table 3, we can see that the interaction term between negative workplace gossip and perceived trust in superiors has a significant positive relationship with professional commitment ($\beta = 0.15$, $p < 0.05$). At the same time, the Bootstrap test of the moderating effect is shown in Table 6. At the 95% confidence interval, under a low level of perceived superior trust, the indirect effect of negative workplace gossip on professional commitment is higher (effect value is −0.43). Under high levels of perceived superior trust, the indirect effect of negative workplace gossip on professional commitment is low (effect size is −0.25). The study used Aiken et al. (71) to adjust the moderating variable's high and low levels to clarify this effect. Figure 3 shows that negative workplace gossip and professional commitment are weaker when superiors are trusted. Hypothesis 4 was supported.

From Model 5 in Table 3, we can see that the interaction term between negative workplace gossip and mindfulness has a significant positive relationship with professional commitment ($\beta = 0.08$, $p < 0.05$); at the same time, the interaction term between negative workplace gossip and perceived superior trust has a significant positive relationship with professional commitment ($\beta = 0.13$, $p < 0.05$). In this study, the Bootstrap test (68) was used to explore the dual moderation effect. As shown in Table 7, on the 95% confidence interval, when mindfulness and perceived superior trust are both low, the indirect effect of negative workplace gossip on professional commitment is relatively high (effect value −0.44); When perceived superior trust is high, or when mindfulness is high and perceived superior trust is low,

TABLE 3 Hypothesis testing model.

Variables	Professional commitment					Work engagement			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model6	Model 7	Model 8	Model 9
Gender	0.01	0.07	0.09	0.07	0.08	−0.01	−0.05	−0.02	0.02
Age	−0.00	−0.01	−0.01	0.00	0.00	−0.09	−0.08	−0.08	−0.05
Education	0.23***	0.07	0.05	0.03	0.03	−0.07	−0.03	−0.08	−0.04
Working hours weekly	0.06	0.03	0.02	0.02	0.01	−0.06	−0.06	−0.07	−0.07
Negative workplace gossip		−0.47***	−0.37***	−0.41***	−0.35***	−0.28***	.	−0.21**	−0.06*
Professional commitment					.		0.24***	0.15*	0.09*
Mindfulness			0.09		0.08				0.59*
Superior trust				0.09	0.06				0.19*
Negative workplace gossip* Mindfulness			0.14*		0.08*				0.03*
Negative workplace gossip* Superior trust				0.15**	0.13*				0.05*
R^2	0.05	0.24	0.27	0.27	0.28	0.08	0.07	0.10	0.35
F	4.72**	20.74***	16.96***	17.15***	14.16***	5.86***	4.72***	5.93***	17.08***

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

TABLE 4 Bootstrap test of mediating role.

Mediating effect	Effect value	Standard error	95% confidence interval	
			Lower confidence limit	Upper confidence limit
Indirect effect	−0.06	0.03	−0.11	−0.01
Direct effect	−0.19	0.06	−0.30	−0.08

Bootstrap sample size $N = 5{,}000$.

TABLE 5 Bootstrap test for the moderating effect of mindfulness.

Moderating effect	Effect value	Standard error	95% confidence interval	
			Lower confidence limit	Upper confidence limit
Low (−1SD)	−0.40	0.06	−0.52	−0.29
Medium	−0.29	0.05	−0.39	−0.20
High (+1SD)	−0.19	0.07	−0.33	−0.05

Bootstrap sample size $N = 5{,}000$.

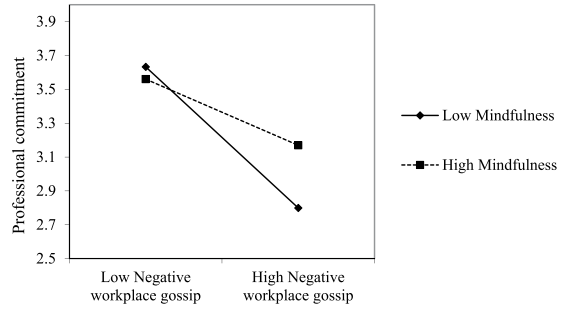

FIGURE 2
The moderating effect of mindfulness on the relationship between negative workplace gossip and professional commitment.

the indirect effect of workplace negative gossip on professional commitment is reduced (the effect values are −0.29 and −0.30 respectively); when mindfulness and perceived superior trust are both at a high level, the indirect effect of workplace negative gossip on professional commitment is low (effect value −0.14). It can be seen from Figure 4 that the higher the degree of mindfulness and perceived trust in superiors, the weaker the negative impact of negative workplace gossip on professional commitment.

4.4.4 Test results of the moderated mediating effect

To test whether mindfulness and perceived superior trust moderate the indirect effect of negative workplace gossip on work engagement via professional commitment. This study used the

TABLE 6 Bootstrap test for the moderating effect of superior trust.

Moderating effect	Effect value	Standard error	95% confidence interval	
			Lower confidence limit	Upper confidence limit
Low (−1SD)	−0.43	0.05	−0.53	−0.34
Medium	−0.33	0.04	−0.41	−0.25
High (+1SD)	−0.25	0.05	−0.37	−0.15

Bootstrap sample size $N = 5{,}000$.

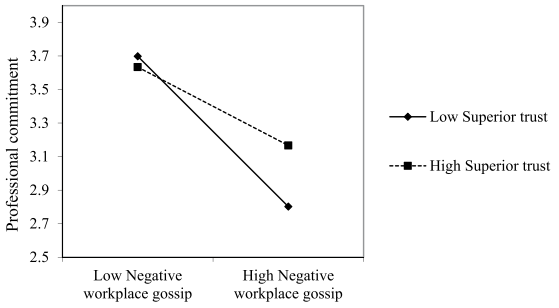

FIGURE 3
The moderating effect of superior trust on the relationship between negative workplace gossip and professional commitment.

Bootstrap method to test the effect size of the indirect effect under high and low levels of moderating variables (69). As can be seen from Table 8, under high levels of mindfulness and high levels of perceived superior trust, the indirect effect of negative workplace gossip on work engagement through professional commitment is −0.02, with a value of [−0.07, −0.003] in the 95% confidence interval. Under low levels of mindfulness and low levels of perceived superior trust, the indirect effect of negative workplace gossip on work engagement through professional commitment is −0.07, with a 95% confidence interval of [−0.14, −0.02]. At the same time, when the level of mindfulness and perceived superior trust are inconsistent, the indirect effects of negative workplace gossip on work engagement through professional commitment are −0.05 and − 0.05, respectively, which are still significant in the 95% confidence interval. It can be seen that the higher the degree of mindfulness and perceived trust in superiors, the weaker negative workplace gossip through professional commitment to work engagement. Hypothesis 5 was supported.

5 Discussion

5.1 Theoretical implications

Our findings contribute to the literature on negative workplace gossip, professional commitment, mindfulness, and superior trust in the following aspects:

First, utilizing the resource conservation theory, elucidates the adverse influence of negative workplace gossip on employees' work engagement while enhancing comprehension of its impact. Negative workplace gossip is prevalent in organizational contexts, aligning with scholarly projections (25). Given the contemporary landscape in China and within organizational settings, employees now place greater emphasis on work quality, psychological fulfillment, and self-value realization. Previous studies focused on employees' job performance, innovative behavior and creativity, etc. (7, 8, 10, 11). Our research found that workplace negative gossip will reduce employees' commitment and engagement to work, which may better explain the importance of damaging workplace negative gossip. Consequently, the investigation of factors shaping work engagement holds considerable significance.

Second, through empirical analysis, this study confirmed the mediating function of professional commitment in the connection between negative workplace gossip and work engagement, thus enhancing our comprehension of the mechanisms behind the influence of workplace negativity on work engagement. Workplace negative gossip, viewed as a stressful situational occurrence, induces a perceived threat of resource loss for employees (18), subsequently impeding their professional commitment and work engagement. This further augments our understanding of the constructive role of professional commitment and introduces novel research variables for the examination of workplace negative gossip. The findings of this study also provide a new mechanism perspective for future research on workplace gossip.

Third, this study examines how external resources (trust in superiors) and internal resources (mindfulness) impact individuals and affirms that supervisor trust and employee mindfulness counteract the proliferation of negative workplace gossip's adverse effects. This discovery answers the research call for investigating the multifaceted dynamics of workplace incivility and their influence on individuals (72, 73). Moreover, this study response their call and reveals that organizational trust appears to be a crucial boundary condition for workplace gossip (8). It broadens the parameters governing the influence of negative workplace gossip on employee work engagement.

5.2 Practical implications

This study centers on enhancing employees' work engagement and strives to offer practical management recommendations for mitigating the adverse effects of workplace negative gossip. These suggestions are framed within the context of employees' intrinsic and extrinsic resources.

5.2.1 Establishing a positive organizational system and climate while mitigating negative gossip

Firstly, managers should be vigilant about the detrimental effects of negative workplace gossip and take proactive measures to suppress its impact on employees' work engagement. Companies should promote a cultural and organizational environment characterized by

TABLE 7 Bootstrap test for dual moderating effect between mindfulness and superior trust.

Moderating variable 1 (mindfulness)	Moderating variable 2 (superior trust)	Effect value	Standard error	95% confidence interval	
				Lower confidence limit	Upper confidence limit
Low (−1SD)	Low (−1SD)	−0.43	0.06	−0.55	−0.31
Low (−1SD)	High (+1SD)	−0.29	0.08	−0.44	−0.14
High (+1SD)	Low (−1SD)	−0.30	0.08	−0.45	−0.14
High (+1SD)	High (+1SD)	−0.14	0.07	−0.29	−0.01

Bootstrap sample size $N = 5{,}000$.

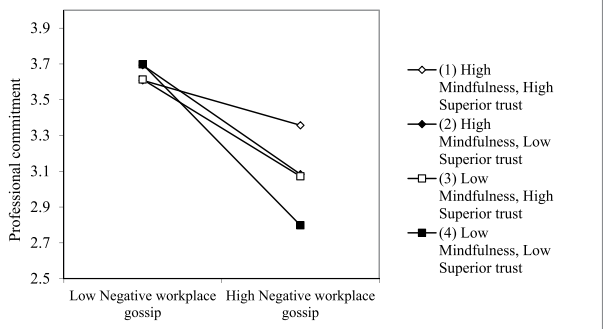

FIGURE 4
The dual moderating effect of mindfulness and superior trust on the relationship between negative workplace gossip and professional commitment.

fairness, justice, harmony, inclusivity, and mutual understanding (74). Additionally, they should bolster the development of systems that discourage the dissemination of negative gossip and penalize individuals spreading false information (10, 11). This not only fosters positive interpersonal relationships within the organization but also curtails the emergence of negative gossip at its roots.

5.2.2 Boosting professional commitment for sustaining high work engagement

Furthermore, managers should proactively address the work-related effects of gossip and offer resources to employees through extensive communication (75), personalized support, team-building activities (76), and other means. This approach helps prevent employee burnout, which can impede their professional commitment and high work engagement levels. The findings are in line with previous research that has also called for communication to mitigate the damaging effects of workplace gossip (26).

5.2.3 Trusting subordinates, improving employee mindfulness

Lastly, the mindfulness level of employees can influence their resilience against negative rumors. Therefore, the human resources department should consider mindfulness as an assessment criterion during recruitment, possibly by administering relevant psychological tests to job applicants (77). For example, Babalola et al. (14) found that employee mindfulness can regulate the impact of negative workplace gossip on customer service performance. Therefore, for employees with lower mindfulness, managers should implement supportive measures to help them navigate negative emotions in challenging work environments, effectively address incidents of negative gossip, and boost their work enthusiasm. Additionally, managers should prioritize building and nurturing trust-based relationships in daily management (78), offering positive psychological cues to employees to enhance their ability to handle workplace gossip.

6 Conclusion

As a key factor of employee performance and competitive advantage, work engagement has always been concerned by the field of workplace and organization management. This study, grounded in the context of pervasive negative workplace gossip and drawing upon the conservation of resources theory, delves into the internal mechanisms through which negative workplace gossip impacts work engagement, specifically through the lens of professional commitment. Furthermore, it aims to dissect the situational variables within this mechanism, taking into account the perspectives of both employees and their superiors, with a particular focus on mindfulness and the perception of trust in higher-ranking colleagues. From different perspectives, this paper proposes ways to alleviate the negative impact of negative workplace gossip, and expands new ideas in theory and new measures in practice to deal with negative workplace gossip.

7 Limitation and future research directions

This study is limited by subjective and objective conditions, and there are still the following shortcomings: First, the sample data was collected from front-line employees in mainland China, and the information was self-evaluated and reported by the employees themselves. This raises concerns about the universality and accuracy of the research results. Future studies could benefit from more diverse and objective data sources to enhance the generalizability of findings. Secondly, the research methodology employed in this study primarily consisted of questionnaire surveys, which can be considered a relatively singular research approach. It is suggested that future research could employ quasi-experimental methods to involve employees in relevant experiments, offering a more comprehensive exploration of negative workplace gossip and its impact on work engagement. Thirdly, this study reveals a dual-moderated mechanism based on individual psychological characteristics and perceived trust in superiors. Future research can consider organizational boundary conditions (such as organizational climate) and leadership styles [such

TABLE 8 Bootstrap test with moderated mediating effect.

Independent variable	Moderator 1 (mindfulness)	Moderator 2 (superior trust)	Indirect effect	Standard error	95% confidence interval	
					Lower confidence limit	Upper confidence limit
Professional commitment	Low (−1SD)	Low (−1SD)	−0.07	0.03	−0.14	−0.02
	Low (−1SD)	High (+1SD)	−0.05	0.02	−0.09	−0.01
	High (+1SD)	Low (−1SD)	−0.05	0.02	−0.10	−0.01
	High (+1SD)	High (+1SD)	−0.02	0.02	−0.07	−0.003

Bootstrap sample size $N = 5,000$.

as inclusive leadership (79)], so as to better provide practical suggestions for organizational management practices. Finally, future research may consider using different theories [such as cognitive-affective system theory (80)] to explore the impact of negative workplace gossip and work engagement.

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

XC: Conceptualization, Data curation, Writing – review & editing. JD: Formal analysis, Methodology, Writing – review & editing. WW: Resources, Validation, Writing – original draft. LL: Conceptualization, Investigation, Writing – original draft, Writing – review & editing.

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Burnout, emotional distress and sleep quality among Chinese psychiatric healthcare workers during the COVID-19 pandemic: a follow-up study

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Background: Different from the very early stages of the COVID-19 pandemic, burnout and chronic mental health problems among health care workers (HCWs) has become a challenge. Research is lacking on the relationship between burnout, stress, emotional distress and sleep quality.

Methods: The Chinese center has been involved in the Cope-Corona project since the second survey (T2). Named after the project, a total of three cross-sectional surveys were distributed: T2 (February 16–20, 2021), T3 (May 10–14, 2022), and T4 (December 20–24, 2022). Burnout, depression, anxiety, sleep quality, workplace factors and individual resources were measured. Using the T4 data, we conducted structural equation model (SEM) to examine the mediating role of burnout in predicting emotional distress and sleep quality.

Results: 96, 124, and 270 HCWs were enrolled at T2, T3, and T4, respectively. In line with the epidemic trends, the level of perceived COVID-19 related risks was significantly higher at T4, while the feeling of health and safety decreased significantly. At T4, the percentages of participants with clinically significant levels of depression and anxiety symptoms were 18.9% (51/270) and 9.3% (25/270), respectively, while 30.4% (82/270) of them reported poor or very poor sleep quality. According to the SEM, individual resources and workplace factors mainly had an indirect effect in predicting depression and anxiety via burnout. However, neither burnout nor stress was a mediator or predictor of sleep quality. Instead, individual resources, positive workplace factors, and younger age had a direct effect in predicting good sleep quality.

Conclusion: Measures designed to enhance workplace factors and individual resources should be implemented to improve psychosomatic wellbeing of HCWs.

KEYWORDS

anxiety, burnout, depression, healthcare workers, sleep quality, workplace factor

1 Introduction

After the COVID-19 pandemic first broke out in Wuhan, China (1), the Chinese government subsequently implemented strict quarantine and isolation measures to control the spread of the virus afterwards. These measures were successful in containing the outbreak, and by mid-2020 the number of new cases had dropped significantly, with only occasional small outbreaks due to the emergence of new variants (1, 2). Therefore, the first phase of the COVID-19 epidemic trends in China was characterized by a combination of strict government measures and relatively low numbers of new cases compared with other countries around the world (1, 3). However, due to the highly transmissible new variants and the reduced effectiveness of public health measures, an unprecedented outbreak started in November 2022.

The mental health impact of the COVID-19 pandemic on healthcare workers (HCWs) has been well documented in the literature (4). However, different from the very early stages of the pandemic (5), the phenomenon of overwork, burnout, and chronic mental health problems among HCWs has become a challenge that requires significant attention (6, 7).

Burnout is characterized as a psychological syndrome of emotional exhaustion, depersonalization, reduced personal accomplishment, and professional ineffectiveness (8, 9). Recently, the concept of burnout has been included in the 11th revision of the International Classification of Diseases (ICD-11) as an occupational phenomenon that may affect health status. According to ICD-11, burnout is a syndrome resulting from chronic workplace stress that has not been successfully managed (10). Based on a study conducted in Wuhan, China, approximately one-quarter to one-half of the sampled medical staff reported various dimensions of burnout symptoms (11). A high prevalence of professional burnout has also been reported from other international studies (12–15). In addition, our longitudinal Cope-Corona project found an increase in burnout during the pandemic (16). The results also examined the Job-Demands-Resources (JDR) model by showing that burnout level was associated with high job demands and low individual resources (17, 18).

Emotional distress of anxiety and depression, and sleep disturbances were also common among HCWs. According to a meta-analysis of HCWs in China, the prevalence rates of moderate to severe anxiety, depression, and sleep disturbances during the pandemic were 17, 15, and 15%, respectively (19). In addition, previous research has shown that burnout or high levels of stress have a negative impact on individuals' sleep and wellbeing (20, 21), and that heavy workloads, poor sleep quality or insufficient sleep may in return increase the risk of burnout (22–24). According to the 12-phase model, depression and insomnia also represent the final stages of burnout and exhaustion (25, 26).

However, the causal relationship and potential mediators among stress, burnout, resources, workload, emotional distress and sleep quality have remained elusive and inconsistent in the existing literature. For instance, a study involving frontline HCWs revealed burnout as a potential mediator and social support as a potential moderator in the association between prolonged working hours and depressive symptoms (27). Another cross-sectional study of French nurses indicated that emotional dissonance and workload indirectly influenced emotional exhaustion through their impact on sleep quality (8). Additionally, studies with medical staff indicated that anxiety and resilience might act as mediators in the association between perceived stress and depression following quarantine (28); conversely, a study involving psychiatric nurses suggested that stress did not exert a significant direct effect on depressive symptoms; instead, occupational burnout and sleep quality fully mediated their association (29). Additionally, a study conducted on German adults found that personal resources, particularly positive affect, played a moderating role in the relationship between stress and pre-sleep arousal (21). In summary, the inconsistent findings across these studies may stem from variations in the chosen variables of interest, as well as differences in study subjects. Furthermore, the preponderance of cross-sectional designs in most of these studies contributes to the complexity of drawing conclusive insights.

Therefore, we aimed to investigate the prevalence and changes in burnout, stress, emotional distress, and sleep quality, as well as work-related factors and individual resources among Chinese psychiatric HCWs during the COVID-19 pandemic. Additionally, we sought to identify factors associated with adverse mental health outcomes, and to explore the potential mediating influence of burnout using structural equation modeling (SEM). Our hypothesis was that the levels of burnout, stress, emotional distress, and unsatisfactory sleep would increase significantly following the outbreak in the T4 survey, and that burnout would play a mediating role in predicting emotional distress and sleep quality.

2 Materials and methods

2.1 Study design and participants

This study served as an important component within the framework of the Cope-Corona project, which was designed to investigate how medical staff have handled the challenged posed by the coronavirus pandemic, and to examine their resources and coping strategies. The overall project was a longitudinal, multi-center, international research established with the support of the European Association of Psychosomatic Medicine (EAPM). As reported in our prior publications (16, 30), the project encompassed three surveys: T1 in 2020, T2 in 2021, and T3 in 2022. Participation in the project extended across hospitals in Ireland, Andorra, Spain, Germany, Italy, Romania, Iran, Poland, and China.

This study focused only on the follow-up data of medical staff from a Chinese psychiatric hospital in Beijing. We obtained ethical approval from the Peking University Sixth Hospital (No. 2020–65). Prior to the survey, all participants were provide with the study's introduction to ensure full comprehension, and their consent was obtained by clicking the "I agree" button to proceed with questionnaires. Alternatively, participants had the option to decline participation by clicking the "I disagree" button. Indeed, the Chinese center actively joined the project starting from T2. Nevertheless, as shown in Figure 1, according to the data from World Health Organization (WHO) (1), unlike the trends worldwide, only small outbreaks occurred in China during the first two surveys (T2 February 16–20, 2021 and T3 May 10–14, 2022). Therefore, an additional T4 survey was conducted following the unprecedented outbreak in China in December 2022. Thus, this study focuses on data from three surveys (T2, T3, and T4) in China.

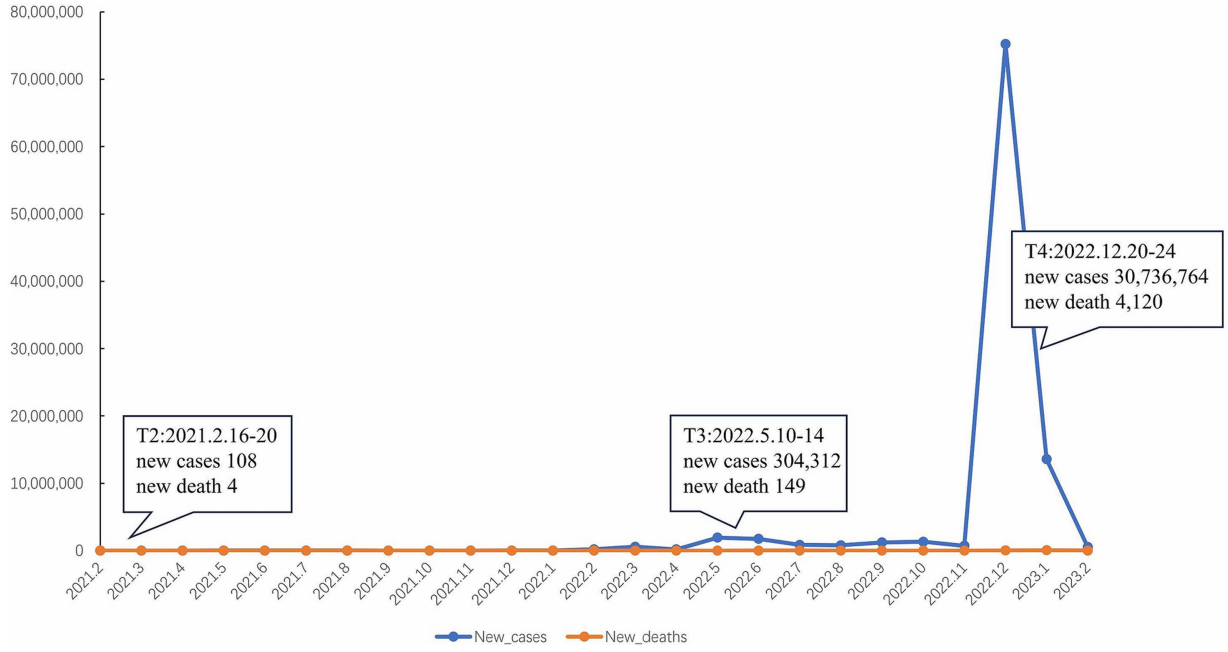

FIGURE 1
Trends in the number of new confirmed cases of COVID-19 and new deaths in China according to World Health Organization (WHO), and the time points of three surveys.

We designed the study as an online survey using the h6world platform[1] (31). This platform was supported by the Peking University and was used to ensure the safety and privacy of our data. If missing values were detected, the online system would remind participants to complete. As a result, for each variable of interest, no missing value was detected. The QR code was distributed in the staff group via WeChat. Normally, this WeChat group was used to disseminate important announcements in the hospital. All 500 employees of the psychiatric hospital were included in the group, including doctors, nurses, medical-technical staff, administrative workers, psychologists, researchers, trainee and medical students. Therefore, all adult employees of the psychiatric hospital were invited to participate in the survey at three measurement time points, regardless of their previous participation. The survey was anonymized. Subjects were asked to provide a self-generated identification code, which was a combination of the first letter of the participants' parents' first names, place of birth and house number, and the last digit of the year of birth, to match subjects at different assessment points.

2.2 Instruments

The following constructs were measured using established questionnaires. The validity and reliability of the Chinese versions of questionnaires have been reported in our previous publications (16, 30).

2.2.1 Demographic and occupational variables

Variables of gender, Age, hospital position, work experience, and The previous history and treatment of mental illness were measured.

2.2.2 Workplace factors

1) Contact with COVID-19 patients. Participants were asked the frequency of dealing directly with coronavirus-infected patients or suspected cases in their work. Responses were scaled from 1 = "not at all," 2 = "rarely," 3 = "sometimes," and 4 = "very much."
2) Risk perception. Personal risk regarding the coronavirus was measured with three items indicating the likelihood of becoming infected (1 = "extremely unlikely" to 5 = "extremely likely"), the danger of being infected oneself (1 = "completely harmless" to 6 = "I have been infected already"), and concern about infecting people in one's personal life (1 = "very little" to 5 = "very much"). Cronbach's alpha in the sample was 0.56. We used the average score to indicate the severity of the risks involved.
3) Workload. At T4, three additional items were added to measure the changes in workload during the pandemic. The questions were based on a study in Germany (32). Working conditions were rated on a 5-point scale from 0 "strongly disagree" to 4 "strongly agree": "I work more than before the COVID-19 pandemic"; "There are sufficient staff for the current work load"; and "I can recover sufficiently during my free time." The last two questions were scored in reverse order. A total sum score was used to indicate the level of workload, with higher scores indicating a heavier workload. Cronbach's alpha in the sample was 0.48.

1 https://www.h6world.cn

4) Health and safety in the workplace. Two items about the availability of personal protective equipment and the subjective feeling about the confident to stay healthy at work were rated on 5-point scales to measure health and safety in the workplace. A higher mean score indicates stronger feelings of health and safety. Cronbach's alpha in the sample was 0.67.
5) Support in the workplace. Five items were used to reflect this construct, including the quality of within-team collaboration, cross-team communication, trust in supervisors, recognition from supervisors, and information provided by the hospital. All items used 4-point scales from 1 = "strongly disagree," 2 = "disagree," 3 = "agree," and 4 = "strongly agree." Cronbach's alpha in the sample was 0.89.

2.2.3 Individual resources

1) Self-compassion. The State Self-Compassion Scale-Short (SSCS-S) was adopted to reflect the capacity for self-compassion (33, 34). It refers to the ability to hold a kind and understanding attitude toward one's stressful experiences, and to recognize it as part of the common human experience. Responses were scored on a 5-point scale (1 = "not at all true for me" to 5 = "very true for me"). The mean score was used to indicate the ability to be self-compassionate. Cronbach's alpha in the sample was 0.67.
2) Sense of coherence. The newly developed 3-item version of the sense of coherence (SOC) scale, the brief assessment of sense of coherence (BASOC), was used to reflect the ability to comprehend, manage and make sense of an experience (35). Responses were scored on a 7-point scale, with higher mean scores indicating better SOC. Cronbach's alpha in the sample was 0.69.
3) Altruism. A single item was used to measure COVID-19 related altruistic acceptance of risk. The item used a 5-point scale ranging from "fully agree" (5) to "completely disagree" (1). It has been shown to be a relevant factor against burnout regarding SARS viruses (36, 37).

2.2.4 Psychosomatic wellbeing

1) Perceived stress. The Perceived Stress Scale (PSS-4) was used to assess levels of psychological distress over the past month, especially regarding feeling of controllability and confidence in handling stressful situations. The psychometric properties of the PSS-4 are acceptable across cultures and countries (38). Responses for the four items were rated on a 5-point scale. The total score ranged from 0 to 16, with higher scores indicating higher levels of stress. According to our previous study and other similar studies, a cut-off score of 6 was recommended to categorize participants with high levels of stress (30). Cronbach's alpha in the sample was 0.89.
2) Burnout. We evaluated the level of burnout using the two-item version of the Maslach Burnout Inventory (MBI-2) (39). The two items represented the two dimensions of burnout, emotional exhaustion and depersonalization. Items were rated on a 7-point scale ranging from 0 ("Never") to 6 ("Every day"). As reported, a cut-off score of 4 was used to represent a high level of burnout (16). Cronbach's alpha in the sample was 0.75.
3) Depression and anxiety. Depression and anxiety were measured using the 4-item brief health questionnaire, which consists of a 2-item depression scale (PHQ-2) and a 2-item anxiety scale (GAD-2) (40, 41). For each scale, the total sum scores range from 0 to 6. A cut-off score of 3 has been suggested to detect probable cases of clinically significant levels of depressive and anxiety symptoms. Cronbach's alpha in the sample was 0.88.
4) Sleep quality. A single item from the Pittsburgh Sleep Quality Index (PSQI) (42) was used to assess overall sleep quality over the previous 2 weeks. It was rated on a 4-point scale (0 = "very good," 1 = "fairly good," 2 = "fairly bad," 3 = "very bad"). This item was newly added at T4.

2.3 Statistical methods

To compare demographic and occupational features between the three groups, the χ^2-test was used for categorical variables. To control for the potential confounding effects of position and work experience, analysis of covariance was used to compare workplace factors, individual resources and psychosomatic wellbeing between the three time points. The Bonferroni correction was adopted for multiple comparisons, although it has been criticized sometimes, particularly in cases of small sample sizes or a high number of conducted tests. In our study, we maintained a fair sample size, and the number of tests conducted was moderate. Therefore, the application of the Bonferroni correction is not expected to significantly impact the magnitude of effect sizes (43, 44). A $p < 0.05$ (two-tailed) was considered significant.

To test the mediating role of burnout, multiple linear regressions were first performed on the T4 sample to find potentially significant predictors for the mediators, and then predictors for the outcomes from both the latent variables and the mediators. We adopted the stepwise method, with a $p < 0.05$ required to enter and less than 0.10 required to remain in the model. Second, path models were constructed and tested within the T4 sample using the bootstrapped maximum likelihood method. Pathways with a non-significant contribution ($p > 0.05$) were deleted. Latent variables with a loading less than 0.4 were also removed. Reasonable correlations were allowed according to the modification indices to further improve the model fit. Model fit was assessed using Chi-square difference tests and inspection of the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI). A value of 0.05 or less for RMSEA was considered to be very good, while 0.05–0.08 was acceptable (39). A value of 0.95 or greater for CFI was considered to be adequate (40). Statistical analyses were performed using IBM SPSS Statistics 24.0 and AMOS 23.0 (45).

3 Results

3.1 Demographic and occupational characteristics

As a result (see Figure 2), 96, 124, and 270 HCWs were enrolled at T2, T3, and T4, respectively. Since the total number of HCWs in this

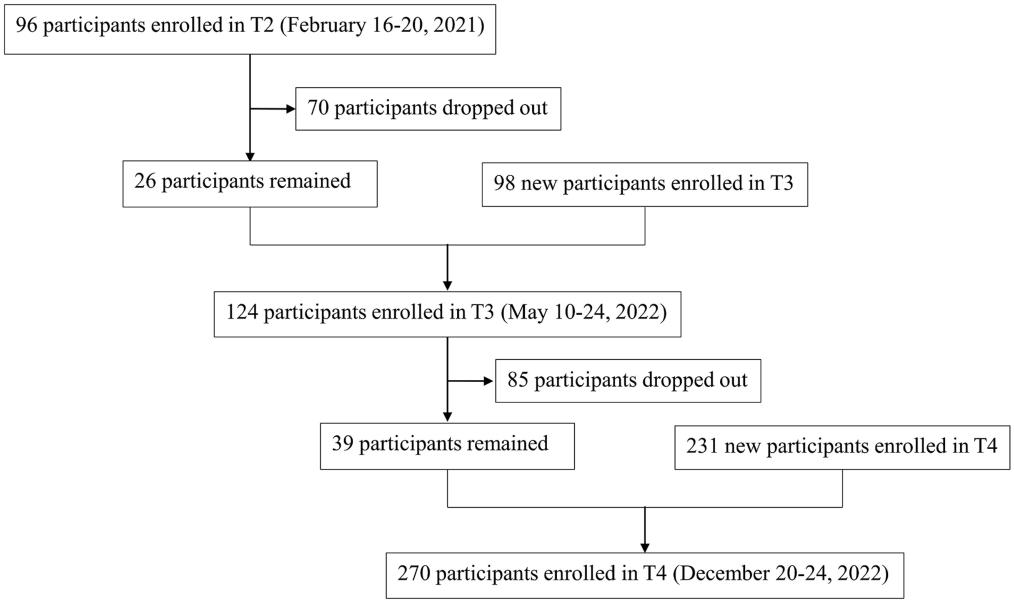

FIGURE 2
Flow diagram and the time points of three surveys.

hospital was 500, the response rates were estimated to be 19.2, 24.8, and 54.0%, respectively. Unfortunately, according to their self-generated identification code, only less than a third of them completed all three surveys. Therefore, the longitudinal cohort was underrepresented, and data from the three cross-sectional surveys were analyzed and compared separately.

As shown in Table 1, the majority of HCWs in our sample were female, middle-aged, nurses and doctors, and HCWs with more than 6 years' experience. In addition, between 3.2 and 8.5% of HCWs in this psychiatric hospital reported a positive history of mental disorders, and between 2.4 and 6.7% of them had received relevant treatment.

When comparing the three groups, the demographic characteristics were generally comparable across the three surveys, with the exception that the proportion of nurses was higher at T3 and T4, and the proportion of participants with more than 6 years' experience was higher at T2.

3.2 Workplace factors

In line with the epidemic trends in Beijing, the frequency of contact with patients with COVID-19 has increased significantly at T4, with 59.6% of mental health professionals reporting frequent contact with them (see Table 2). In addition, only 2.4% (3/124) of participants reported coronavirus infection at T3, but 83.5% (226/270) of them reported infection at T4.

Concerning workload, at T4 only 25.9% (70/270) of them agreed or strongly agreed that they were able to recover sufficiently in free time, while 18.5% (50/270) of HCWs agreed or strongly agreed that they were working more than before the pandemic.

Compared to T2 and T3, the level of perceived COVID-19 related risks has also increased significantly at T4, while the feeling of health and safety at work decreased significantly at T4. However, the level of perceived support from the workplace remained at similar levels across the three surveys.

3.3 Individual resources and psychosomatic wellbeing

As shown in Table 2, after controlling for the potential confounding factors, three dimensions of individual resources, and psychosomatic wellbeing of stress, burnout and anxiety, remained at similar levels across the three surveys. However, it was notable that the depression levels were significantly higher at T4 than at T2.

At T4, the percentages of healthcare workers with a high level of stress and burnout were 58.9% (159/270) and 29.6% (80/270), respectively. In addition, the percentages of participants with clinically significant levels of depression and anxiety symptoms were 18.9% (51/270) and 9.3% (25/270), respectively, while 30.4% (82/270) of all participants reported poor or very poor sleep quality. Moreover, the correlation analyses revealed a significant and moderate association between the level of burnout and both depression ($r = 0.526$, $p < 0.001$) and anxiety ($r = 0.544$, $p < 0.001$).

3.4 The mediating role of burnout in predicting psychosomatic symptoms

The mediating role of burnout was tested using data from T4. First, multiple linear regressions were performed to find potentially significant predictors of the mediator (burnout) among latent variables (stress, demographic and occupational characteristics, history of mental illness, workplace factors, and individual resources), and then predictors of the outcomes (psychosomatic symptoms of depression,

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TABLE 1 Demographic and occupational characteristics of HCWs.

Variables	T2 (n = 96)	T3 (n = 124)	T4 (n = 270)	χ^2	p
Female n(%)	75(78.1)	91(73.4)	208(77.0)	0.8	0.657
Age groups n(%)				9.2	0.323
<26 years old	15(15.6)	13(10.5)	42(15.6)		
26–35 years old	50(52.1)	52(41.9)	115(42.6)		
36–45 years old	21(21.9)	33(26.6)	63(23.3)		
46–55 years old	9(9.4)	21(16.9)	45(16.7)		
>56 years old	1(1.0)	5(4.0)	5(1.9)		
Position n(%)				19.8	**0.011**
Doctor	41(42.7)	48(38.7)	84(31.1)		
Nurse	18(18.8)[2]	43(34.7)[1]	102(37.8)[1]		
Technician	8(8.3)	13(10.5)	32(11.9)		
Administrator	7(7.3)	7(5.6)	20(7.4)		
Others	22(22.9)[1]	13(10.5)[2]	32(11.9)[2]		
Job experience n(%)				9.9	**0.042**
<3 years	27(28.1)	28(22.6)	80(29.6)		
3–6 years	22(22.9)	14(11.3)	37(13.7)		
>6 years	47(49.0)[2]	82(66.1)[1]	153(56.7)		
Positive history of mental illnesses n(%)	6(6.3)	4(3.2)	23(8.5)	3.8	0.147
Treatment for mental illnesses n(%)	4(5.2)	3(2.4)	18(6.7)	3.4	0.184

Time points of the three surveys: T2 February 16–20, 2021; T3 May 10–24, 2022; T4 December 20–24, 2022. The Bonferroni method was adopted for multiple comparisons: values with [1] were significantly higher than values with [2], and only values with different superscripts were significantly different from each other. p-values in bold type indicate significant differences.

TABLE 2 Epidemic-related working burden, workplace factors, individual resources and psychosomatic wellbeing of HCWs.

Variables	T2 (n = 96)	T3 (n = 124)	T4 (n = 270)	F/χ^2	p
Workplace factors					
Corona contact n(%)				154.6	**<0.001**
Hardly any	94(97.9)	114(91.9)	109(40.4)		
Much	2(2.1)[2]	10(8.1)[2]	161(59.6)[1]		
Risk perception	2.6 ± 0.8[1]	2.7 ± 0.7[1]	4.0 ± 0.6[2]	272.4	**<0.001**
Workload	–	–	5.4 ± 2.5	–	–
Health and safety	2.0 ± 0.6[1]	1.9 ± 0.6[1]	1.6 ± 0.7[2]	18.9	**<0.001**
Workplace support	3.0 ± 0.5	3.0 ± 0.5	3.0 ± 0.5	0.1	0.948
Individual resources					
Self-compassion	3.6 ± 0.6	3.7 ± 0.6	3.7 ± 0.6	0.4	0.649
Sense of coherence	5.2 ± 1.4	5.4 ± 1.2	5.5 ± 1.3	1.0	0.365
Altruism	3.7 ± 0.7	3.7 ± 0.8	3.6 ± 0.9	0.6	0.533
Psychosomatic wellbeing					
Stress	5.8 ± 2.2	6.3 ± 2.4	6.0 ± 2.5	0.9	0.405
Burnout	3.1 ± 2.9	3.2 ± 2.7	2.9 ± 2.8	0.5	0.621
Depression	1.2 ± 1.1[2]	1.4 ± 1.3	1.6 ± 1.3[1]	3.5	**0.030**
Anxiety	1.1 ± 1.3	1.2 ± 1.2	1.2 ± 1.3	0.8	0.468
Sleep quality	–	–	1.2 ± 0.8	–	–

Time points of the three surveys: T2 February 16–20, 2021; T3 May 10–24, 2022; T4 December 20–24, 2022. All comparisons above have been controlled for the covariate of position and job experience, and the Bonferroni method was adopted for multiple comparisons: values with [1] were significantly higher than values with [2], and only values with different superscripts were significantly different from each other. P-values in bold type indicate significant differences.

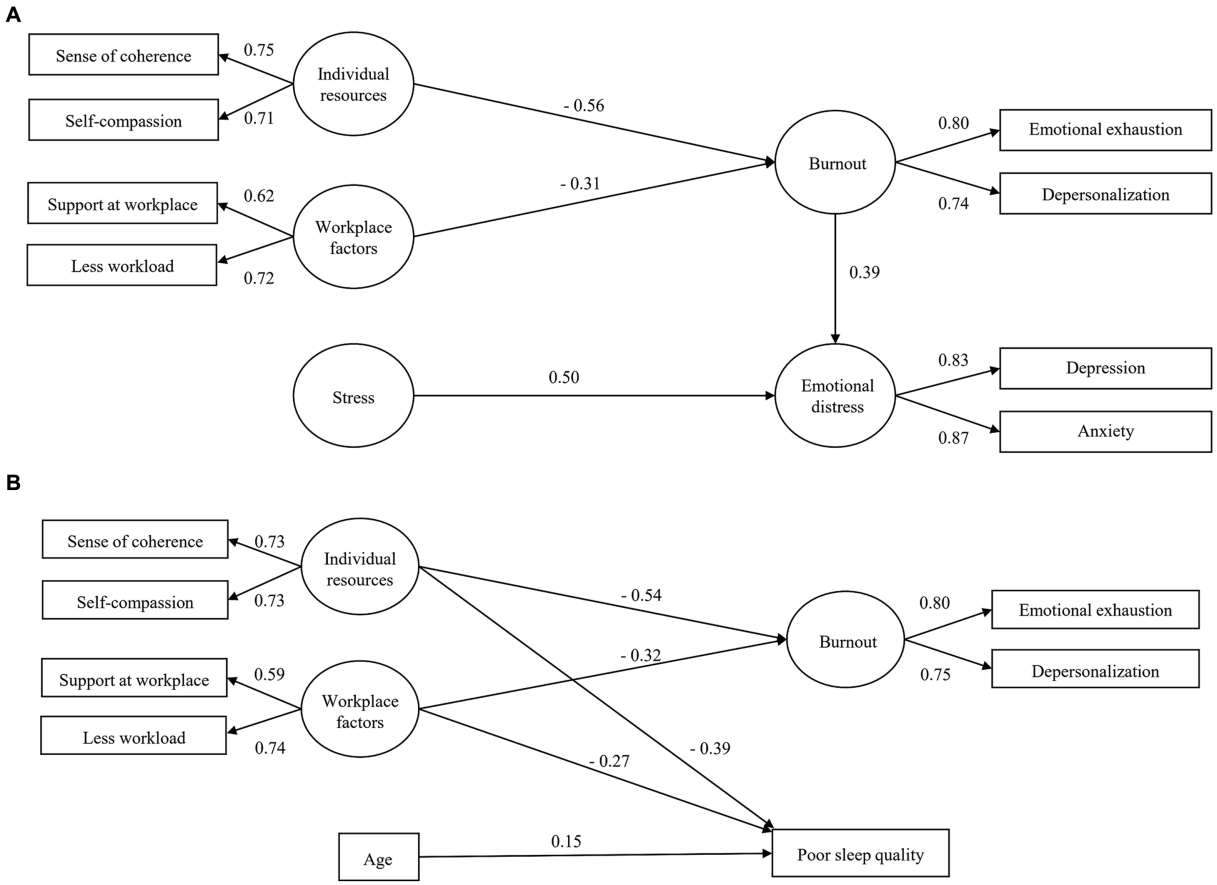

FIGURE 3
The structural equation model (SEM) of the mediating role of burnout in predicting emotional distress and sleep quality within data from T4 ($n = 270$). **(A)** Burnout mediated the relationship between individual resources, workplace factors and emotional distress, while stress had a direct effect in predicting depression and anxiety. **(B)** Individual resources, workplace factors and age only had a direct effect in predicting sleep quality. Standardized estimates are shown for the significant regression paths. Residual errors are omitted from the figure.

anxiety and poor sleep quality) from both the latent variables and the mediators.

As a result, we confirmed that variables of stress, working years, workload, support at workplace, and sense of coherence were the independent predictors of burnout, with 37.1% of the total variance explained. In addition, burnout, together with other latent variables, were also the independent predictors of psychosomatic outcomes of depression, anxiety, and sleep quality. However, the predictors of emotional distress of depression and anxiety differed from sleep quality. Therefore, SEMs were constructed separately for the psychosomatic outcomes of emotional distress and sleep quality.

As shown in Figure 3A, individual resources (sense of coherence and self-compassion) and workplace factors (support and workload) mainly had an indirect effect in predicting emotional distress of depression and anxiety via burnout, whereas stress mainly had a direct effect in the association. The loadings of all latent variables were higher than 0.4. The model fit indices were very satisfactory [χ^2(df) = 62.3 (46), $p = 0.055$, RMSEA (90% CI) = 0.036 (<0.001–0.058), CFI = 0.987].

For sleep quality in Figure 3B, stress was removed from the model due to the non-significant contribution. In addition, no mediating role via burnout was detected. As a result, individual resources and workplace factors only had a direct effect in predicting sleep quality or burnout, separately. Older age also had a direct effect in predicting poor sleep quality. Fit indices of the model were acceptable [χ^2(df) = 28.7 (16), $p = 0.026$, RMSEA (90% CI) = 0.054 (0.019–0.086), CFI = 0.975].

4 Discussion

As part of the Cope-Corona project (16), this follow-up study allowed us to examine trends in the frequency and risks of COVID-19 exposure, workplace factors, and the psychosomatic wellbeing of HCWs before and during the outbreak of the pandemic. We also explored the predictive and mediating factors for emotional distress and sleep quality.

As expected, the frequency of contact with COVID-19 patients, the percentage of infection, the level of perceived risks, and the workload increased significantly during the outbreak of the epidemic compared with the previous period of occasional small outbreaks. However, perceived support from the workplace remained at similarly high levels across the three surveys. Regarding the mental health of HCWs, it is interesting to note that only depression increased significantly during the outbreak period, while levels of stress, burnout, and anxiety were comparable at all three time points.

During the peak of the pandemic, the levels of depression, anxiety, sleep disturbance, and stress were generally comparable to previous international studies (19, 32, 46–48). However, the prevalence of burnout in our study, at 29.6%, was relatively low compared with other studies. For example, 2 years after the pandemic in Wuhan, China, up to 67.09% of medical staff still met the criteria for burnout as defined by the Maslach Burnout Inventory General Survey (49). Studies of HCWs in Ireland and Singapore reported that burnout thresholds, as measured by the Oldenburg Burnout Inventory (OLBI), were reached by 74–80% of respondents (12, 50). However, a number of studies have also reported prevalence similar to our results. For example, a study in Poland reported a prevalence ranging from 27.7% among non-medical staff to 36.5% among nurses (51); 8 months after the initial peak of the pandemic, a US study reported rates of depersonalization and emotional exhaustion of 21.6 and 46.0%, respectively (52). The utilization of diverse scales and cut-off points may potentially contribute to variations in reported burnout prevalences, alongside disparities in healthcare systems, workload conditions, and the severity of the pandemic across distinct research studies. Additionally, another possible reason for the differences in prevalence of burnout should not be neglected: our research focused on a specific group of mental health workers. On the one hand, they faced with unique emotional challenges when caring for patients with mental illness; on the other hand, they were supposed to have better professional skills in managing negative emotions and team communication. Furthermore, the correlation analyses unveiled a significant and moderate association between the degree of burnout and depression as well as anxiety, shedding light on the potential overlap between these constructs. Nevertheless, the observed moderate correlation implies that burnout is more than simply a manifestation of depression or anxiety.

According to the JDR model, high job demands could increase burnout, whereas workplace and individual resources could reduce burnout (17, 18). Therefore, the relatively high level of support at work, and the availability of individual resources in this research may have played an important role in preventing burnout among the psychiatric HCWs during the peak of the epidemic. This phenomenon may be attributed, in part, to the likelihood that mental health workers possess a heightened capacity to mobilize individual resources and facilitate teamwork to cope with challenging experiences. In addition, previous research has suggested that gender may be another factor influencing burnout. For example, a large sample of Chinese nurses showed that women had significantly higher levels of emotional exhaustion, while another study showed that men had significantly higher levels of depersonalization (22.3% vs. 17.9%) (13). However, we did not find a difference in burnout between women and men.

Our study also extends previous research by examining the differential mediating role of burnout in predicting adverse psychosomatic outcomes. According to our results, individual resources and workplace factors influenced depression and anxiety mainly through the mediating effect of burnout, whereas stress level mainly through a direct effect. In contrast to our findings, a small sample study of nurses in Saudi Arabia found that work-related stress had negative indirect effects on emotional wellbeing through compassion fatigue (53). In their study, the concept of compassion fatigue consisted of two dimensions: burnout (exhaustion, frustration and anger) and secondary traumatic stress. Therefore, the different measurements, positions of the medical staff, and the medical system could account for the different mediative role of burnout. Similarly, two other studies of frontline medical staff in Wuhan and Jiangsu, China, both found that long working hours had a negative effect on depressive symptoms via burnout, and that social support was a potential moderator of the association (27, 49). Unfortunately, neither study measured individual resource variables.

Furthermore, although previous literature suggests that burnout may affect sleep quality (25), the relationship among stress, burnout and sleep quality have remained elusive and inconsistent in the existing literature, particularly among HCWs during the COVID-19 (8, 27). According to our results, in contrast to the model of emotional distress, stress and burnout were not significant independent predictors or mediators of sleep quality. Instead, variables related to individual resources, work related factors, and age were able to directly predict sleep quality. Therefore, we hypothesize that, unlike the significant predicting or mediating effect on emotional distress, stress and burnout may not have a direct effect on sleep quality. On the other hand, a study involving German outpatient nurses found that pandemic-related stress predicted a decline in sleep quality and work engagement (54). Similarly, a study conducted in China explored the direct and indirect relationships between perceived stress, anxiety and depression, and sleep quality (55). Their findings revealed that the initial association between perceived stress and sleep quality diminished after introducing anxiety and depression as mediating variables. Moreover, numerous studies have explored factors associated with sleep disturbances among healthcare workers during the pandemic. For example, a meta-analysis suggested that female sex and location in China were associated with fewer sleep disturbances (56), but some other studies also reported that female HCWs slept worse (57). Working long shifts, experiencing a death in the family, and being a frontline worker have also been suggested to be associated with increased odds of insomnia or poor sleep quality (58). In addition, levels of burnout have been found to correlate with insomnia in frontline nurses (59), and burnout has been found to be particularly high in nurses who start to use sleep medication (60).

This study has several limitations. Firstly, only a small proportion of HCWs participated in all three surveys, making it impossible to directly compare changes at an individual level, or to examine the predictive value of certain variables at baseline within the cohort. In fact, the self-generated identification code used was probably one of the causes of the low match rates itself. Because participants' house numbers may have changed over the last 2 years, and because Chinese participants may think of province, city, or county when filling in information about their place of birth in different surveys. Therefore, the same participant could generate different identification codes in three surveys, leading to a match failure. To overcome this problem, we had to treat the data as three cross-sectional studies, and the regression analyses were only carried out on the T4 sample. Secondly, the workload and sleep quality items were only added at T4, making it impossible to compare across the three surveys. Thirdly, to streamline the survey process and conserve time, concise measurement versions were employed in this study. However, it is acknowledged that this approach may potentially result in an overestimation of outcomes. To address this concern, we have opted for validated versions of the measurements. Fourthly, only HCWs from one psychiatric hospital were recruited, and the results should be interpreted with caution regarding mental health workers from different backgrounds. Compared to HCWs in general hospitals,

especially those frontline workers in respiratory, emergency and intensive care units, mental health workers were not directly faced with critically ill or dying patients, but they have to deal with COVID-19 patients with severe mental illness, and at the same time with increased workload and pressure during the outbreak. In addition, as discussed above, psychiatric HCWs were expected to have better professional skills in coping with stress and emotional distress, and to provide psychological support to other colleagues in general hospitals as well as to the general population.

In sum, this study found that during the outbreak, Chinese psychiatric HCWs were under significant pressure, with 58.9 and 29.6% of them reporting high levels of stress and burnout, respectively. In addition, we found that individual resources of self-compassion and sense of coherence, and positive workplace factors of workplace support and lower workload were the independent significant protective factors against emotional distress and poor sleep. However, unlike the significant predicting or mediating effect on emotional distress, stress and burnout may not have a direct effect on sleep quality. Future studies should further explore the associated factors of sleep quality with the longitudinal data.

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 Peking University Sixth 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

N-nX: Conceptualization, Formal analysis, Funding acquisition, Writing – original draft, Writing – review & editing. T-tF: Conceptualization, Funding acquisition, Writing – original draft, Writing – review & editing. QL: Conceptualization, Supervision, Writing – review & editing. KF: Conceptualization, Methodology, Supervision, Writing – review & editing. RL: Formal analysis, Methodology, Supervision, Writing – review & editing. BS: Methodology, Supervision, Writing – review & editing. CW: Methodology, Supervision, Writing – review & editing. MM: Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – review & editing.

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Conflict of interest

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

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Role of stressful life events and personality traits on the prevalence of wish to die among French physicians

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Background: Suicide rates are higher among physicians than in the general population. We aimed to investigate the role of stressful life events (related or not to work conditions) and personality traits on wish to die, a proxy measure of suicidal ideation.

Methods: This cross-sectional study took place in France from March 2018 to September 2018. Physicians completed an online questionnaire. A multiple logistic regression model estimated factors associated with wish to die. Moderated moderation models were used to assess the effect of personality traits on the relationship between stressful events and wish to die.

Results: 1,020 physicians completed the questionnaire. Most (75%) had endorsed a work-related stressful event and one in six (15.9%) endorsed a wish to die the year before. Wish to die was associated with burnout (OR = 2.65, 95%CI = 1.82–3.88) and work-related stressful events (OR = 2.18, 95%CI = 1.24–3.85) including interpersonal conflicts, harassment and work-overload. Emotional stability was the only personality trait associated with wish to die in the logistic regression (OR = 0.69, 95%CI = 0.59–0.82). In moderation models, we observed a significant interaction involving three personality traits—emotional stability, extraversion, and agreeableness—along with gender, influencing the impact of stressful events on the wish to die.

Limitations: Our study is limited by the impossibility to control for risk factors associated with suicide like psychiatric comorbidities.

Conclusion: Work-related stressful events significantly contribute to the manifestation of a wish to die among physicians. The impact of stressful events on the wish to die is moderated by factors such as gender and personality traits, including emotional stability and extraversion. These results are overall consistent with prior studies concerning the risk of burnout and suicide among physicians.

KEYWORDS

occupational stress, personality, physicians, psychological stress, suicidal ideation, suicide

Introduction

Suicidal behavior is a major public health concern worldwide. In the literature there is increasing interest in vulnerable groups like health workers, including physicians (1–4). Nowadays, health programs with specific preventive strategies targeting physicians are emerging in some countries (1, 2). A recent systematic review and meta-analysis has found that physicians are at a high risk of suicide with an overall Standardized Mortality Ratio of 1.44 (5). The lifetime prevalence of suicidal ideation (SI) varies from 20% (6, 7) to 50% (8) and 1.6% of physicians attempt suicide at least once (8). Indeed, physicians are more exposed to mental illness than the general population, notably for depressive-anxiety disorders and substance use disorder (2). More precisely, female physicians are associated with higher risk ratios for suicide, suicide attempts (SA) and SI than men (2, 4–6, 8–11). Furthermore, certain specialties such as general practitioners, psychiatrists, interns, anesthesiologists, general surgeons, obstetricians and orthopedists tend to be associated with a higher suicide risk (5). In 2016, a systematic review of medical students found that 11% of them had SI in their final year (12) [a prevalence of SI up to 18% in some studies (13) or even 30% of the sample (14)]. Moreover, 4 to 7% of medical students have already attempted suicide (13, 14). Indeed, the prevalence of depressive symptoms is estimated at around 20–30% among these students (15, 16), the difficulty for them to reconcile their studies with their personal life being associated with SI (17).

Generally speaking, physicians are exposed to high levels of professional stress: high workloads with long hours (1, 18–20), sleep disruptions (20, 21), shift-related and on-call-related stress symptoms (1, 22), an aggressive administrative working environment (19), lack of resources (1, 19), poor social support (19, 23) and violence (24). These can all lead to difficulties in sharing personal and professional responsibilities (1, 20) with an unfulfilled work-life balance (20, 25).

Several studies in the literature have established a link between the particularly high suicide risk among physicians and their working conditions (8, 17, 26). More precisely, harassment (26), conflicts with co-workers (22, 26), and lack of cohesive teamwork with poor social support (22, 26, 27) have been specifically associated with suicide risk. Indeed, these elements can lead to a poor quality of life (24) and less job satisfaction (28) associated with SI (29). However, many health professionals are loath to seek help for fear of social and professional discrimination (2, 30–33).

The increase in suicidal risk among doctors could be linked to variables other than working conditions themselves, such as personality traits. Indeed, specific personality traits are correlated with an increased risk of suicide, with some being more prevalent among doctors. A comparative analysis is necessary to further explore this association. On one hand, hopelessness (34), neuroticism (34–36), agreeableness (34–36), openness (36), anxiety (37) and extraversion (34–37) are involved in suicide risk. On the other hand, even if there is no evidence for one specific physician personality (38), obsessive compulsive (39), dysthymic (39), achievement-oriented (40), conscientious (40), introverted (41), and anxious (41) traits may be more prevalent among physicians than in the general population (42). These traits are probably adaptive to a certain extent but they could also mediate vulnerability to suicide due to working conditions. Very few studies have investigated the suicidal risk specifically associated with physicians' personality traits. An association between neuroticism and suicide risk among physicians has already been suggested (43). Indeed, neuroticism is associated with high levels of perceived job stress and depression or anxiety symptoms among physicians (44). At the opposite, openness, agreeableness and extraversion have already been associated with well-being at work and differ according to the medical specialty (45).

Research is thus required to identify specific suicide risk factors among physicians in order to improve targeted prevention in their workplace (46). In this cross-sectional study, we contacted physicians from all specialties in France with the aim of examining the association of stressful life events, especially work-related events, on a proxy measure related to suicide risk: the wish to die. Additionally, we examined the role of personality characteristics as moderators between stressful life events and the wish to die, taking into consideration the effect of gender as well.

Methods

Participants

In total, 1,020 doctors and resident doctors working in France took part in this study from March to September 2018. The sample includes participants from diverse medical specialties and practice modes, such as those involved in internships, freelancing, and working in both private and public hospitals. We did not apply any exclusion criteria. Several organizations, including resident associations in France, regional unions for health professionals, and regional councils of the college of physicians, played a role in facilitating communication with participants by sending them email invitations. While not all organizations agreed to send the invitation, those that did represent a collective total of more than 30,000 physicians in France. All the physicians who agreed to participate in the survey, received a link to a Google Form and answered a brief online questionnaire (see Appendix 1). Answers to the questionnaire were completely anonymous.

The physicians in our study were mainly women ($n = 634$, 62.2%) aged 38.0 years on average (±13.6; Table 1). Of these, 41.7% were residents and 58.3% were senior physicians. Over half of the sample comprised general practitioners ($n = 581$, 57%), while surgical specialists accounted for 6.8% ($n = 69$), and medical specialists constituted 36.3% ($n = 370$).

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Assessment

The questionnaire comprised several sections, namely: basic demographic data (sex, age, medical specialty and mode of medical practice), exposure to stressful events (personal and work-related), personality traits, a single-item assessment of burnout and a single question about the wish to die. Participants could answer "yes" or "no" to the following question: "in the last 12 months, have you ever wanted to be dead or wanted to sleep and never wake up?." We aimed to refrain from using the term "suicide" and opted for an indirect

TABLE 1 Wish to die according to demographics, professional status and personality.

Categorical Covariates		Wish to die		χ^2/F	*p*
		YES *N* = 162 (%) or Mean ± SD	NO N = 858 (%) or Mean ± SD		
Female gender		111 (68.5)	523 (61)	3.31	0.069
Age		37.86 ± 14.68	38.07 ± 13.33	0.032	0.857
Professional status	Resident	79 (48.8)	346 (40.3)	3.99	**0.046**
	Senior	83 (51.2)	512 (59.7)		
Residents	General medicine	31 (39.2)	120 (34.7)	1.25	0.536
	Surgical specialty	5 (6.3)	34 (9.8)		
	Medical specialty	43 (54.4)	192 (55.5)		
Seniors	General medicine	62 (74.7)	368 (71.9)	3.72	0.156
	Surgical specialty	7 (8.4)	23 (4.5)		
	Medical specialty	14 (16.9)	121 (23.6)		
Type of medical practice (seniors)	Private	68 (81.9)	447 (87.3)	1.78	0.183
	Public	15 (18.1)	65 (12.7)		
Personality traits	Emotional stability	3.75 ± 1.07	4.42 ± 1.19	44.52	**<0.001**
	Extraversion	4.48 ± 1.34	4.59 ± 1.17	1.21	0.271
	Openness	4.68 ± 1.20	4.53 ± 1.14	2.33	0.127
	Agreeableness	5.16 ± 0.92	5.28 ± 0.89	2.47	0.116
	Conscientiousness	5.15 ± 1.01	5.26 ± 0.88	2.43	0.119

SD, standard deviation; χ^2, chi-square test; F, T-test statistic.
Bold values which are significative.

approach to mitigate the emotional sensitivities associated with the term. To ensure the completeness of data, participants had to provide an answer for each question before moving on to the next one. Many validated scales of suicidal risk in the literature are relatively long to complete. In our study the questionnaire was deliberately built in a short form in order to reinforce participation in a population where significant time constraints are generally experienced (estimated completion time 2 to 5 min).

Exposure to stressful events over the past 12 months was evaluated via two closed-ended questions, one about work-related stressful events ("Have you experienced one (or more) stressful events related to the practice of medicine?"), and the other about stressful personal events ("Have you experienced one (or more) stressful events outside your medical practice?"). The term "stressful event" was defined in the questionnaire as "an event that has a sufficiently stressful impact to exceed a person's capacity to adapt to the situation." Whenever the answer was "Yes," participants had to answer a multiple-choice question about the nature of that event. The list of stressful events was constructed based on the List of Threatening Experiences (47, 48) and the Social Readjustment Rating Scale (49), which includes a list of life events with a social impact that may cause stress. An additional "Miscellaneous" option opened a free text field to describe any events that did not fit in with the list. Participants could choose an unlimited number of events. Subsequently, they described the impact of the event (or events) on their life according to its degree on a Likert scale (none/mild, moderate or severe/catastrophic).

Burnout was screened using the Single Maslach Burnout Inventory—Emotional Exhaustion, based on the Maslach Burnout Inventory (50). The validity of this questionnaire has been demonstrated (51) and already used for the medical population (52). Participants had to choose one item from among 5 graded items to best describe their current work-related feelings. Passive SI was assessed by a single closed-ended question concerning the wish to die: "In the last 12 months, have you ever wanted to die or go to sleep and never wake up?." By using this single question, we aimed to maximize the acceptability of our questionnaire. The assessment of death desire for detecting suicidal risk was studied in 2011 (53) and showed an efficiency equivalent to the questions used to screen for SI.

Personality was evaluated via the short version of the Big Five Inventory questionnaire (BFI-S), a short version of the Big-Five Personality questionnaire (54, 55). The BFI-S includes 15 items and participants must report their level of agreement with each one on a Likert scale from 1 to 7 (in which 1 = "strongly disagree" and 7 = "totally agree"). The BFI-S scores provide information regarding the intensity of five personality traits: emotional stability (neuroticism), extraversion, openness, agreeableness and conscientiousness. This questionnaire included the main personalities that have been considered to have an impact on physicians' feeling of well-being at work and the risk of suicide.

Statistical analysis

First, a descriptive analysis was performed to characterize our sample by means of univariate analyses. Chi-squared tests were employed for categorical variables and T-tests for continuous ones to compare the presence or absence of wish to die for each covariate.

Secondly, logistic regression analyses were conducted with all predictor variables, excluding the type of practice, to examine the

TABLE 2 Wish to die according to the exposure to stressful events.

Exposure to stressful events	Wish to die		χ^2	p
	YES $N = 162$ (%)	NO $N = 858$ (%)		
Total number of events	3.12 ± 0.15	2.02 ± 0.06	55.280	**<0.001**
Work-related stressful events	146 (90.1)	623 (72.2)	22.527	**<0.001**
†Severe/catastrophic impact	74 (76.3)	348 (65.8)	9.219	**0.010**
Assaults/threats at workplace	49 (30.2)	202 (23.5)	0.070	0.792
Conflict/claim/complain from patient and/or family	59 (36.4)	227 (26.5)	0.800	0.371
Harassment	12 (7.4)	14 (1.6)	12.913	**<0.001**
Adverse event related to care	44 (27.2)	171 (19.9)	0.425	0.515
Conflict with a colleague/superior	57 (35.2)	144 (16.8)	15.542	**<0.001**
Conflict with the administrative hierarchy	33 (20.4)	71 (8.3)	12.701	**<0.001**
Change of position/increased responsibilities	29 (17.9)	108 (12.6)	0.516	0.473
Work overload	80 (49.4)	315 (36.7)	0.848	0.357
Number of events	2.24 ± 0.13	1.45 ± 0.05	42.74	**<0.001**
Personal stressful events	100 (61.7)	420 (49)	8.902	**0.003**
†Severe/catastrophic impact	43 (84.3)	243 (74.3)	4.392	0.111
Serious illness/injury/assault	16 (9.9)	52 (6.1)	0.931	0.335
Serious illness/injury/assault of a loved one	23 (14.4)	127 (14.8)	2.062	0.151
Death of a loved one	22 (13.6)	89 (10.4)	0.032	0.859
Separation of the couple	16 (9.9)	43 (5)	2.666	0.103
End of a lasting relationship	9 (5.6)	15 (1.7)	5.407	**0.020**
Serious problems with a loved one or a neighbor	15 (9.3)	40 (4.7)	2.561	0.110
Financial problems	24 (14.8)	41 (4.8)	14.970	**<0.001**
Loss/theft of valuables	4 (2.5)	12 (1.4)	0.354	0.552
Wedding	4 (2.5)	13 (1.5)	0.209	0.647
Arrival of a new child	7 (4.3)	46 (5.4)	1.378	0.240
Number of events	0.88 ± 0.08	0.56 ± 0.03	20.02	**<0.001**

†Severity categories: None/mild, Moderate, Severe/catastrophic. Data from continuous variables are mean and standard error of the mean.
Bold values which are significative.

influence of personality and gender on the relationship between stressful events and the desire to die. The type of practice variable (private/public) had no discernible effect on the wish to die. Since it could not be applied to residents, we deliberately chose to exclude it. Including this variable did not alter the results.

Thirdly, separate moderated moderation analyses were performed to examine the effect of each personality trait and gender on the relationship between stressful events and the wish to die. The analyses were conducted using the Hayes PROCESS macro with the Model 3 function and a bootstrapping approach comprising 5,000 bootstrap moderated regressions. "Impact of work-related stressful event(s)" or "impact of personal stressful event(s)" was used as a predictive variable, while "wish to die" served as the dependent variable. Personality trait scores were included as primary moderators (W), and gender (women/men) was considered a secondary moderator (Z). Professional status (resident/senior) and age were used as covariates, as they demonstrated significant associations with the wish to die in the logistic regression model. Burnout was not included due to its high collinearity with work-related stressful events ($p < 0.001$). Personality trait levels were categorized into three groups based on standard deviations: below the mean (−1 SD), at the mean, and above the mean (+1 SD). The Johnson-Neyman analysis was employed to identify the region of significance for the conditional effect of personality trait levels, contingent upon gender.

All statistical analyses were carried out using SPSS v.24 software. The significance threshold was set at $p < 0.05$.

Results

A large majority of the study participants (n = 769, 75.4%) reported exposure to a work-related stressful event in the previous 12 months (Table 2). The most common work-related stressful events were: (1) exposure to "work overload" ($n = 385$, 51.3%), (2) conflicts or complaints from a patient and/or family ($n = 286$, 37.1%), and (3) verbal or physical aggression while at work ($n = 251$, 32.7%). Nearly half ($n = 318$, 41.4%) the participants who had been exposed to work-related stressful events considered their impact as severe/catastrophic. Burnout was screened as positive in 25.6% of participants ($n = 261$).

One in two participants ($n = 520$, 51%) had experienced recent personal stressful events unrelated to their work, and half of them reported that these events had a severe impact on their life ($n = 280$,

TABLE 3 Wish to die according to answers to the Single Maslach Burnout Inventory—Emotional Exhaustion questionnaire (MBI-EE).

Burnout	Desire for death		χ^2	df	*p*
	YES *N* = 162 (%)	NO *N* = 858 (%)			
Burnout (Yes)	80 (49.4)	181 (21.1)	57.27	1	**<0.001**
No burnout (Item 1) *N* = 254	10 (3.9)	244 (96.1)	80.05	4	**<0.001**
No burnout (Item2) *N* = 505	72 (14.3)	433 (85.7)			
Severity 1 (Item 3) *N* = 200	54 (27)	146 (73)			
Severity 2 (Item 4) *N* = 24	9 (37.5)	15 (62.5)			
Severity 3 (Item 5) *N* = 37	17 (45.9)	20 (54.1)			

Bold values which are significative.

TABLE 4 Logistic regression model on wish to die according to clinical features, life events and personality traits.

Variables	B	*p*-value	OR	95% CI	
				Lower	Upper
Gender	0.168	0.427	1.183	0.781	1.794
Age	0.024	**0.022**	1.025	1.004	1.046
Professional Status (resident/senior)	0.793	**0.007**	2.210	1.237	3.947
Specialty (reference: GP)					
Surgical specialty	−0.081	0.825	0.922	0.450	1.889
Medical specialty	−0.258	0.224	0.772	0.509	1.172
Work-related stressful event (y/n)	0.782	**0.007**	2.185	1.240	3.849
Burnout (y/n)	0.977	**0.000**	2.657	1.821	3.877
Personal stressful event (y/n)	0.158	0.406	1.171	0.806	1.702
Emotional Stability	−0.365	**0.000**	0.694	0.586	0.822
Extraversion	−0.018	0.817	0.982	0.843	1.144
Openness	0.133	0.113	1.143	0.969	1.348
Agreeableness	−0.060	0.559	0.942	0.769	1.153
Conscientiousness	−0.170	0.103	0.844	0.688	1.035

CI, Confidence Interval; OR, Odds ratio; Degrees of freedom, 1. Specialty values: general medicine, surgical specialty, and medical specialty. Categorical values are shown in brackets.
Bold values which are significative.

27.4%). One in six physicians had endorsed a wish to die in the previous 12 months (n = 162, 15.9%). In terms of personality, agreeableness (n = 433, 42.5%) and conscientiousness (n = 378, 37.1%) were the most common dominant traits among the participants (Table 1).

Comparison by presence of death desire

In our study, we found no significant difference in the prevalence of wish to die according to gender, age, type of practice, or medical specialty (Table 1). Henceforth, we present only significant results unless otherwise specified. Residents were more likely to endorse a wish to die than seniors (p = 0.046). Regarding personality traits, the sole noteworthy distinction revolved around the trait of emotional stability, which exhibited lower levels among physicians endorsing a wish to die compared to the rest of the sample (3.75 ± 1.07 vs. 4.42 ± 1.19; p < 0.001).

Among participants reporting a wish to die, 90.1% had recently experienced at least one work-related stressful event and only 9.9% had not (p < 0.001). Specifically, a high percentage of participants (n = 466, 45.7%) who wished to die endorsed a severe to catastrophic stressful event on their life (p = 0.010). All types of work-related stressful events except two ("assaults/threats at the workplace" and "change of position/increased responsibilities") were significantly associated with the wish to die (Table 2). Physicians in burnout were more likely to endorse a wish to die (p < 0.001; Table 3). Almost half of burnt-out physicians reported a wish to die (n = 80, 49.4%), compared to one in five for those who were not (n = 181; 21.1%).

Most participants who reported a wish to die (n = 629, 61.7%) had also experienced recent personal stressful events (p = 0.003). Among them, 26.5% estimated the impact on their life as severe to catastrophic. Certain types of events were significantly associated with the wish to die, namely: "end of a lasting relationship," "financial problems," "separation of the couple," and "serious problems with a loved one or a neighbor" (Table 2).

Logistic regression

The logistic regression model with all predictor variables (Table 4) reveals that advancing age (OR = 1.03; 95%CI = 1.01–1.05; p = 0.010), being in training as a resident rather than a senior physician

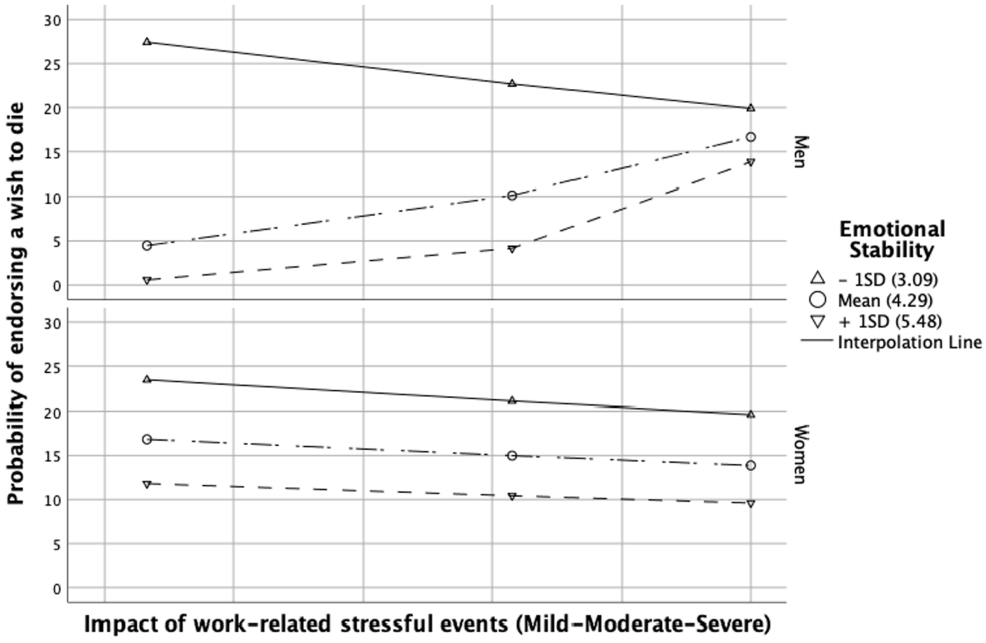

FIGURE 1
Conditional effect of the impact of work-related stressful event(s) on wish to die depending on the level of emotional stability. Conditioning values are at minus one standard deviation (SD), the mean, and plus one SD.

(OR = 2.21; 95%CI = 1.24–3.95; $p = 0.007$), experiencing a work-related stressful event (OR = 2.18; 95%CI = 1.24–3.84; $p = 0.007$), and a positive burnout screen (OR = 2.66; 95%CI = 1.82–3.88; $p < 0.001$) are independently associated with a desire to die in the prior 12 months. Conversely, each incremental point in emotional stability predicts a reduced risk of desiring to die (OR = 0.69; 95%CI = 0.69–0.82; $p < 0.001$).

Moderated regressions

Separated moderation analyses on the impact of stressful events were carried out for each personality trait. Coefficients for significant results can be found in Supplementary Tables 1–3. Emotional stability and extraversion had a significant moderating effect on the relationship between the impact of work-related stressful events and the wish to die. The interaction term between work-related stressful events and emotional stability had a positive significant effect on wish to die (3.34, 95% CI = [0.62–3.94], $p < 0.007$). There was also a significant effect of the three-way interaction "impact of work-related stressful events" + "emotional stability" + "gender" ($\gamma^2 = 9.07$, $p = 0.003$). Johnson-Neyman analysis revealed that, moderate (Effect = 1.55, $p = 0.025$) or high (Effect = 3.54, $p = 0.008$) emotional stability enhanced the impact of work-related stressful events on the likelihood of wishing to die in men, but not in women. Graphical probing was performed to understand the trend of the moderated moderation effect (see Figure 1).

The interaction term between work-related stressful events and extraversion had also a positive significant effect on wish to die (2.28, 95% CI = [0.91–5.77], $p = 0.007$). There was a significant effect of the three-way interaction "impact of work-related stressful events" + "extraversion" + "gender" ($\gamma^2 = 9.74$, $p = 0.002$). Johnson-Neyman analysis revealed that, moderate (Effect = 1.29, $p = 0.020$) or high (Effect = 2.47, $p = 0.011$) extraversion increased the impact of work-related stressful events on the likelihood of wishing to die in men, but not in women. This effect can be observed in Figure 2.

The effect of personal stressful events on the probability of endorsing a wish to die was found to be only partially moderated by agreeableness. Although with a non-significant trend, the interaction term between personal stressful events and agreeableness had a positive effect on wish to die (2.99, 95% CI = [−0.41–6.39], $p = 0.085$). There was a significant effect of the three-way interaction "impact of personal stressful events" + "agreeableness" + "gender" ($\gamma^2 = 7.22$, $p = 0.007$). Johnson-Neyman analysis revealed that low agreeableness enhanced the impact of personal stressful events on the likelihood of wishing to die in women only (Effect = 4.72, $p = 0.011$), not in men. This effect can be observed in Figure 3.

Discussion

In our study, one in six physicians (15.9%) had endorsed a wish to die in the 12 months preceding the survey. A quite similar prevalence of SI (13%) had been found in a study among French general practitioners (56). This lends support to the viability of utilizing a single question on the wish to die as a screening instrument for SI among physicians, as found in the literature (53). Nevertheless, other studies have found a prevalence of SI varying from 11% to 50% (6, 8, 12–15). Indeed, some studies have found a higher prevalence of SI than in our study but these consider lifetime prevalence rather than prevalence over the previous year. The variability in prevalence and the comparatively lower range observed in our study may be explained by the majority of respondents being senior physicians (58.3%), with the wish to die statistically more associated with residents than seniors. Prior studies have already reported a higher suicide risk during residency

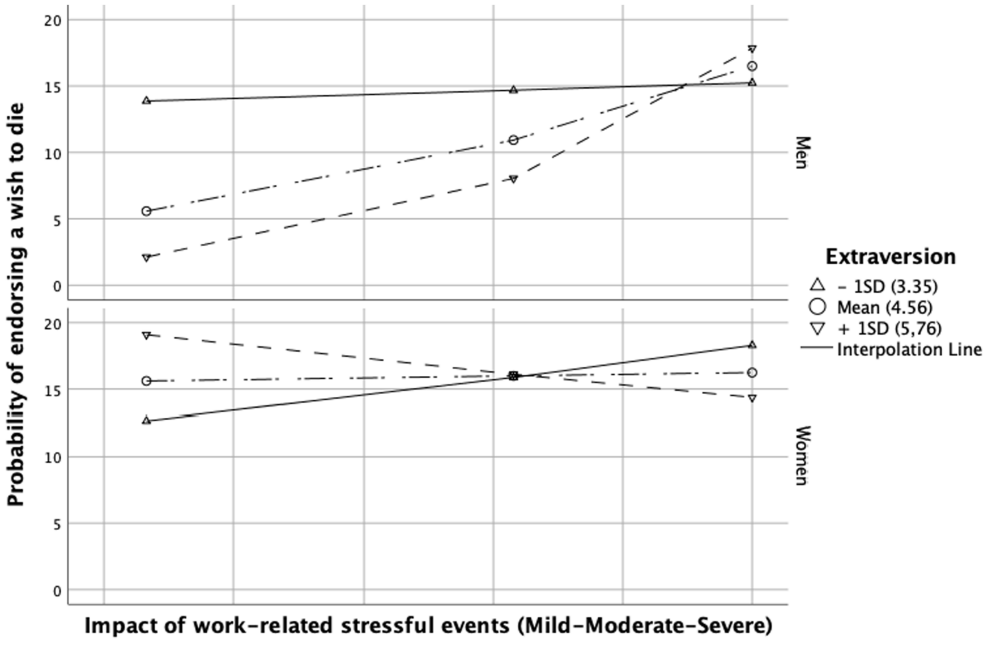

FIGURE 2
Conditional effect of the impact of work-related stressful event(s) on wish to die depending on the level of extraversion. Conditioning values are at minus one standard deviation (SD), the mean, and plus one SD.

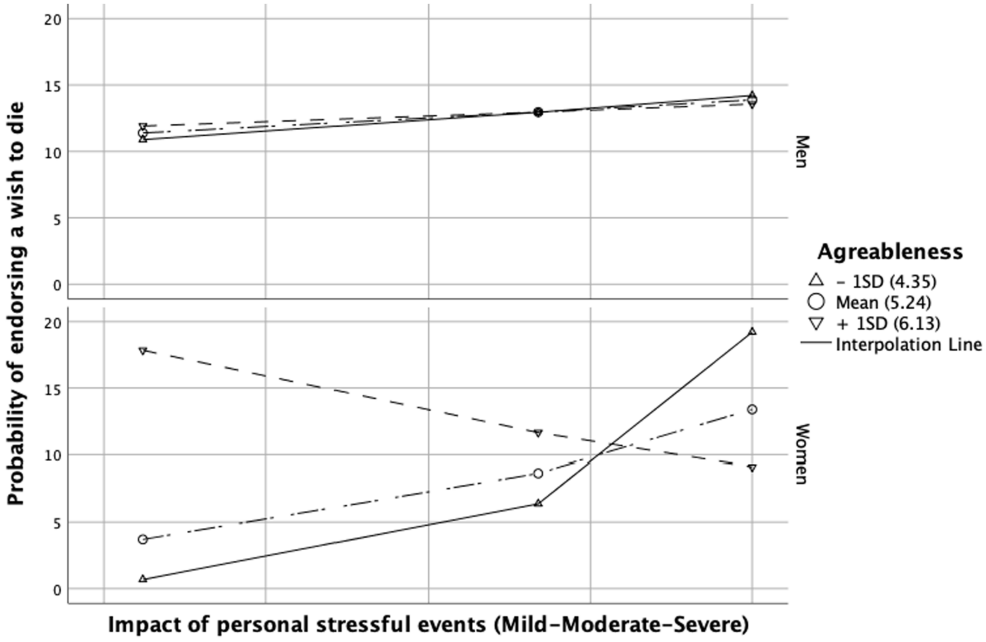

FIGURE 3
Conditional effect of the impact of personal stressful event(s) on wish to die depending on the level of agreeableness. Conditioning values are at minus one standard deviation (SD), the mean, and plus one SD.

which declined with the physicians' experience and changing lifestyles (2, 43). Finally, with regard to the gender distribution in our sample, it closely mirrors that of the broader physician population, encompassing approximately 60% women. Additionally, our sample exhibits a slightly younger age profile, averaging around 40 years, compared to the reference population's average age of 50 years (data sourced from the French Medical Association). These demographic variations do not account for the observed low prevalence of SI in our sample.

A notable 25.6% of participants in our sample reported experiencing burnout within the past 12 months but the prevalence of burnout in other studies is even higher (7, 23, 25, 57, 58). For instance, a systematic review and meta-analysis aggregated 26 studies including 4,664 residents of several disciplines and found a prevalence of

burnout of 35.7% (57). Once more, most of these studies have focused only on medical students or have heterogeneous samples with medical students. Furthermore, certain medical specialties at a particular risk of burnout, like surgery (5) were under-represented in our sample. Last but not least, in our study, burnout was associated with wish to die and the impact seems to be severity-dependent. Today the subject of the complexity between burnout and depression is still under debate (2, 59, 60). The association between burnout and SI may be explained by the overlap of these concepts. Therefore, no adjustment was made for depression in considering the association between SI and burnout.

In our study, wish to die is particularly associated to stressful events during medical practice, often described as having a severe or catastrophic impact. In line with earlier studies, our findings show an association between work-related stressful events such as work overload, conflicts with colleagues and superiors (22) or administrative hierarchy and harassment (27) and the risk of experiencing a wish to die. Indeed, little participation in decisions about working life (little control over work-related stress factors) has already been identified as a powerful stress factor among physicians (61) and is associated with the risk of suicide (26). Moreover, we also found that the usual suicide risk factors like relational (62) and financial issues (63) were associated with the wish to die. These results argue for the external validity of our study and good representativity of our sample.

According to our results, the effect of stressors on wish to die was moderated both by personality traits and gender. Emotional stability, usually referred to as its counterpart neuroticism, was associated with wish to die specifically among physicians (43) and in the general population (34–37, 64–69). It constituted the sole personality trait linked to the presence of a wish to die in our sample, and this association was robust and independent of potential confounding factors. Overall, the higher the emotional stability, the lower the risk of endorsing a wish to die. Nevertheless, a closer examination through moderation analyses indicates that men with intermediate or high levels of emotional stability might exhibit a higher likelihood of endorsing a wish to die when exposed to moderate, and particularly severe, work-related stressful events. This finding is unexpected, as high levels of emotional stability are generally seen as a buffering factor against stressors in the workplace while low emotional stability has been linked to the perception of elevated job stress in young physicians (44). One interpretation could stem from the perceived greater significance of work status for men compared to women (70). Adverse life events in the workplace, coupled with the loss of work status, may have a more profound impact on men with high emotional stability who may not have anticipated such possibilities, intensifying the shock of the experience for them. However, for both genders, lower levels of emotional stability show higher probabilities of endorsing a wish to die when confronted with work-related stressors of comparable severity (Figure 1). There is evidence supporting the influence of low emotional stability on an increased risk of suicide when individuals are exposed to stress factors (71), but also conflicting perspectives. Notably, one study identified low emotional stability as a potential protective factor even after adjusting for depression (37). Psychiatric comorbidities could also introduce bias to the data concerning this trait (72).

In our findings, men with high and intermediate levels of extraversion, when exposed to work-related stressful events, were more prone to expressing a wish to die. The results concerning women were not significant. This observation converges with the conclusions of one study in favor of an association between extraversion and SI (36, 37), but to date, to our knowledge, no study has examined this variable as a moderator of the impact of work stressors on SI. More broadly, one study was able to hypothesize that the personality trait of extraversion may intensify the impact of low social support on suicide risk (73). The relationship between extraversion and suicide risk remains a subject of debate, with conflicting or non-significant data in the existing literature (66–69, 74–77). More research is needed on this association.

Finally, female physicians with low levels of agreeableness were more likely to endorse a wish to die when exposed to adverse personal events. These results confirm previous data about the protective role of agreeableness against SI or the risk of suicide (34–36, 66). Low levels of agreeableness in interpersonal relationships might be associated with poor social outcomes due to inadequate social support (78). In turn, low social support has been associated with well-being (45) and suicide risk, both in general and in the workplace (22). For men, the lack of significant findings might be related to the smaller sample size, as well as a differential impact of the trait agreeableness on both social and professional outcomes compared to women. It has been shown that men with high agreeableness tend to achieve less favorable outcomes professionally (79). It should be also noted that female physicians are more often associated with the risk of suicide than men (4, 10). Notably, 21.2% of women in our sample expressed a wish to die, in contrast to 15.2% of men.

Limitation

Although the assessment of wish to die has been shown to be an effective means of assessing SI, it remains an indirect proxy for suicidal risk. Moreover, because the questionnaire only included a single question on the presence or absence of SI, we lack information on the frequency and intensity of these ideas. Future studies could assess SI more closely and may adjust their results on these variables. Thirdly, our study is also limited by the impossibility to control for risk factors associated with suicide like depressive symptoms, addictive behaviors or other psychiatric comorbidities. Finally, only physicians from the French population were studied, limiting the generalization of results to other countries. Recent studies have shown the possibility of extracting large population data on SI from social networks and analyze it using artificial intelligence for similar research objectives (80, 81).

However, certain strengths should also be mentioned. First, only a few studies have investigated the direct association between suicide risk and job stress (8, 43, 82, 83) or more precise work-related factors (22, 27, 84, 85) among physicians. Furthermore, there's a scarcity of studies examining work-related factors in conjunction with personality traits (43), and to the best of our knowledge, few studies have investigated both, along with their interaction (71). Secondly, a substantial number of physicians participated in the survey and senior professionals were well-represented. This sample is reasonably reflective of the physician population in terms of gender and age. Thirdly, as our aim was to optimize the acceptability of the questionnaire, we were very careful not to mention the term "suicide" anywhere on it and suicidal risk was indirectly assessed by one single question about wish to die.

Conclusion

In conclusion, our study revealed that approximately one in six physicians (equivalent to about one in five residents) reported a wish to die in the year preceding our investigations, and a quarter of them cited experiencing burnout. The desire to die among physicians is influenced by various factors, including personal stressful events (such as affective and financial issues) and specific work-related stressors like work overload, harassment, and interpersonal conflicts. Notably, certain personality traits—namely, emotional stability, extraversion, and agreeableness—appear to modify the impact of stressful events on the wish to die in certain scenarios. Emotional stability and extraversion levels moderate the influence of workplace stressors, while agreeableness moderates the effect of personal events. Consistent with existing literature, these findings underscore the significant concern about suicide risk among physicians and the noteworthy impact of work-related stressors. Nevertheless, further research is essential before targeted preventive strategies for the medical profession can be implemented.

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 Institutional Review Board, Nimes University 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

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

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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/fpubh.2024.1244605/full#supplementary-material

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Burnout in residents during the first wave of the COVID-19 pandemic: a systematic review and meta-analysis

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Introduction: The high prevalence of burnout in resident physicians is expected to have increased as a result of the expansion of the pandemic. We conducted a systematic review with a meta-analysis of studies conducted during the first wave of the COVID-19 pandemic on burnout in residents and potential associated risk factors.

Methods: The search was done in the Web of Science, MEDLINE, Scopus, and Lillac databases (April 2020–October 2021) using *a priori* protocol based on the PRISMA guidelines. The Newcastle Ottawa Scale was used to assess the risk of bias in the included studies. We estimated the pooled prevalence (95% CI) of burnout and the prevalence ratio (95% CI) of each risk factor associated.

Results: We included 23 studies from 451 potential initial articles and those written in the English language; all of the collected studies were cross-sectional with anonymous online surveys, involving 4,998 responders (34%), of which 53.2% were female responders, 51% were R1-2, and 71% were in direct contact with COVID-19 patients. Eighty-seven percent presented a low-to-moderate risk of bias. Publication bias was not shown. The estimated pooled prevalence of burnout was 40% (95% CI = 0.26 – 0.57). Burnout was associated with psychiatry history (PR = 4.60, 95% CI = 1.06 – 20.06). There were no differences by gender, civil status, children in-charge, year of residency, or time exposure to COVID-19.

Discussion: The overall prevalence of burnout in residents during the first wave of the pandemic was in line with the results described in this collective before the pandemic. The presence of a psychiatry history was a potential burnout risk factor, suggesting a high vulnerability during the peak of the stress period and the need to implement mental health surveillance for this subgroup.

KEYWORDS

systematic review, meta-analysis, burnout, residents, COVID-19, risk factors

1 Introduction

The COVID-19 pandemic has made a significant impact on the mental health of workers, especially those who work on the frontline or who have been exposed to extreme and continuous pressure (1–5).

Before the pandemic, health professions were already considered "highly stressful" in themselves and, therefore, had frequent professional leave (6). Research on stress in resident physicians shows that this group of professionals is especially vulnerable (7). Chronic uncontrollable work stress is associated with a minor motivation, insight, and empathy, with a loss of concentration, impaired cognitive skills, and detachment from work, which are the characteristics of a worker with burnout (8, 9). The WHO, in the new version of the international diagnostic classification (10), includes burnout as an "occupational phenomenon" and incorporates in its description, in addition to feelings of exhaustion, greater mental distancing toward work, feelings of negativism or cynicism related to work, and decreased professional effectiveness[1].

The "burnout syndrome" has been assessed clinically by the Maslach Burnout Inventory (MBI) (11, 12), which measures its three dimensions: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). EE refers to the experience of being emotionally exhausted by the demands of work. DP assesses the degree to which each one recognizes attitudes of coldness and distance from people. Finally, PA measures feelings of self-efficacy and personal accomplishment at work. Systematic reviews with meta-analysis carried out on residents in the previous years of the COVID-19 pandemic, using the MBI as a burnout tool, found a high prevalence of burnout syndrome in residents, ranging from 35 to 51% (13, 14). National longitudinal studies of burnout in a similar period and using the MBI tool for burnout assessment showed that female gender, few sleep hours, surgery specialties, work overload, and young and older residents were risk factors of burnout in residents (15–19). Meanwhile, empathy and quality of life were protective factors in the period of training (15, 18).

The prevalence of burnout in resident physicians as a result of the expansion of the pandemic, being already high in this group, is expected to have increased, with potential negative effects on their physical and mental health. In this context, the objective of this study was to systematically review the web-based surveys published since the declaration of the pandemic in March to the end of the first wave in July 2020 on the prevalence of burnout syndrome and its associated potential risk factors.

2 Methods

2.1 Registration and reporting

We performed a systematic review of the literature to identify articles discussing the prevalence of burnout in residents and the potential risk factors associated with the pandemic. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (20) consensus was followed in the completion of this systematic review and meta-analyses and elaboration in advance of the protocol study (see Supplementary material). We electronically searched the literature in more than four databases (Web of Science, Scopus, Lilacs, and PubMed) with MeSH and keywords with subject headings "resident burnout" OR "trainee burnout" AND "COVID-19" for entries published from database inception through March 2020 to October 2021. Potential articles were reviewed first by title and abstract only, next by full text, and finally by analyzing eligible studies in detail by two reviewers. References of the included articles were reviewed to identify additional citations.

The inclusion criteria were as follows: (1) confirmed burnout syndrome in residents during the COVID-19 pandemic using a validated tool (i.e., MBI) (11, 12); (2) cross-sectional studies with and without comparator and before- and after-pandemic studies; (3) studies conducted during the first wave of the pandemic; and (4) studies published in English or Spanish in a peer-reviewed journal. The exclusion criteria were as follows: (1) other physicians apart from residents in training; (2) studies that assessed burnout exclusively outside the pandemic period; (3) editorials, reviews, case reports, commentaries, experimental, interventional, and qualitative studies; and (4) studies with a sample size of $N \leq 50$ participants.

The main outcome was the prevalence of burnout syndrome during the COVID-19 pandemic or burnout dimensions. Additional outcomes were the factors associated with burnout prevalence in residents during the first wave of the pandemic.

We used the Newcastle Ottawa Quality Assessment Scale for observational studies to assess the quality and risk bias of eligible articles, which includes nine items related to selection, comparison, and outcomes (21). For each item, a start is awarded, except for comparison and clear variables that can receive up to two starts. The studies with more than six starts (maximum 8) were classified as having a low risk of bias, studies with 5–6 starts as having a moderate risk of bias, while studies with <5 starts were considered as having a high risk of bias. Two reviewers rated each study, assessing a score out of eight possible points. Discrepancies were resolved by consensus.

Data were extracted independently by two authors including authors' names, date of publication, country, study type, sample size, type of specialty, gender, mean (SD) age and range, civil status, children in-charge, year of residence, direct contact with COVID-19 patients, burnout tool, burnout prevalence of syndrome and/or dimensions, and risk/protector factors associated with burnout [sociodemographics, history of mental disorders (i.e., depression/anxiety), frequency or a number of COVID-19 patients attended, positive COVID-19 one-self or colleague, having adequate access to personal protective equipment (PPE), changes per rotation/vacation, or increase/decrease of weekly work hours]. Discrepancies were resolved by consensus with a third MD researcher.

2.2 Strategy analysis

First, we did a systematic synthesis of the findings from the included studies around burnout outcomes and risk factors. Second, a quantitative synthesis was used if the included studies

1 http://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases. Last enter: 27th April 2023.

were sufficiently homogeneous. We performed meta-analyses using, as a primary effect size, the prevalence of burnout and dimensions, and, as secondary effect sizes, the prevalence ratios associated with burnout prevalence during the pandemic. Statistical heterogeneity among studies was inspected through the I^2 index (low heterogeneity ≤25%, moderate 50%, and high >75%) and Cochrane's Q statistic ($p < 1$) and is reported for all analyses. Independent of the corresponding χ^2-test for homogeneity, for the sake of coherence, the random-effects models were employed for the estimation of both burnout prevalence and prevalence ratios. Furthermore, in the case of the estimation of the prevalence ratios, the weights given to each study, i.e., the proportion of the total variability in the effect size estimates using random-effect models, are provided in the forest plots.

Subgroup meta-analysis estimates were pooled based on population characteristics such as gender, civil status, children in-charge, year of residency and specialization; burnout tool; and different settings (direct or no direct contact with COVID-19 patients) if we found data to carry out the meta-analysis. A prevalence ratio (PR) of 1 means that the prevalence of the event, in this case, burnout, is identical in the exposed and control or reference group, whereas a PR greater (less) than 1 indicates that the prevalence of burnout is higher (lower) in the exposed group. The statistical significance at a significance level of 0.05 of the estimated PR can be inferred from the 95% CI. If the CI includes the value 1, the estimated PR is not statistically significantly ($p > 0.05$) different from 1. A graphical exploration of a potential publication bias by means of a funnel plot was carried out if, at least, 10 or more studies were included in the analysis.

All analyses were performed with the statistical software package R (The R Foundation for Statistical Computing), version 4.1.1; in particular, we used the contributed R meta package (22).

3 Results

3.1 Search results

The preliminary research of electronic databases yielded 451 potential articles. After removing 280 duplicated records, 138 articles were excluded based on the review of titles and abstracts, and 33 were retrieved for full-text evaluation. After the application of the exclusion criteria, 23 articles met the criteria for final inclusion. The flowchart of the systematic review is shown in Figure 1.

3.2 Characteristics of included studies

The characteristics of the 23 studies included in the systematic review and meta-analysis are summarized in Table 1 (23–45). All studies were cross-sectional with an anonymous online survey. In total, eight of 23 (34.8%) studies were conducted in North America (23–29, 45), 6 (26.1%) in Europe (30–35), 5 (21.7%) in Asia (36, 37, 39–41), 2 (8.7%) in South America (42, 43), and 1 in Africa (4.4%) (38), but 1 (4.4%) was an international study with countries from different continents (44). Twelve studies (52.2%) were national studies (23, 25, 27–31, 34–37, 39). The response rate ranged from 94.8 to 7.9%. Ten studies included residents from all specialties (30.3%) (26, 32, 37–40, 42–45), and eight were doing surgery (34.8%) (23, 25, 27–29, 34, 35, 41). Our pooled studies included ≥ 35,230 residents, and 71% of them were in direct contact with COVID-19 patients. Female residents represented 53.2% of the participants, and young residents (R1, R2) represented 51% of the participants.

Overall, 15 of 23 (65.2%) studies used the original MBI or its validated modifications as a method for burnout diagnosis or measurement (11, 12) (Table 1 and Supplementary Table 1). Fourteen studies (60.9%) provided the prevalence of burnout syndrome in residents (23–26, 29–31, 35–37, 39, 42–44), six studies (26.1%) provided the prevalence of high/low dimension (EE, DP, PA) (23, 30, 31, 33, 36, 37), and finally, three studies (13%) presented the results as mean (SD) or median (range) of each dimension (25, 30, 37). Some of the studies presented the burnout results in more than one way (Supplementary Table 2).

Eleven articles (47.8%) studied point-prevalence of burnout during the first wave of the pandemic without any comparator group (23–26, 30, 31, 36, 37, 42, 44) and eight studies (34.7%) compared the prevalence of burnout between residents and other physicians, students, or other health-workers during the period studied (27, 28, 32, 33, 38, 40, 43, 45). Four studies (17.4%) showed burnout prevalence in comparison with previously collected data (29, 34, 35, 41).

3.3 Risk of bias assessment

The quality assessment of the selected papers indicated that 3 of 23 studies (13%) presented a high risk of bias (29, 42, 43), and the rest of the studies had a low-to-moderate degree of bias (see Supplementary Table 3).

3.4 Meta-analysis results

3.4.1 Overall prevalence of burnout

Figure 2 shows the funnel plot of the overall prevalence of burnout syndrome. From the 15 studies of burnout syndrome (categorical definition), we included, in the analysis, 11 studies that made the diagnosis of burnout syndrome with the original validated MBI (11, 12) or posterior validated versions (23, 25–27, 29, 30, 35–37, 43, 44). The estimated overall pooled prevalence (95% CI) was 0.40 (0.26–0.57). Figure 3 presents the funnel plot of the overall prevalence of burnout by type of specialty: surgical (general, neurosurgery, obstetrics, orthopedics, ophthalmology, urology, plastic surgery, thoracic surgery, and vascular surgery) (25–27, 29, 35, 37), with an overall prevalence (95% CI) of 0.27 (0.15–0.45); internal medicine and medical specialties (26, 37), with an overall prevalence (95% CI) of 0.31 (0.15–0.54); hospital-based specialties (anesthesia, radiology, and emergency) (26, 37), with an overall prevalence (95% CI) of 0.19 (0.10–0.32); and others (psychiatry, pediatrics, and dermatology) (26, 30, 31, 36, 37), with an overall prevalence (95% CI) of 0.18

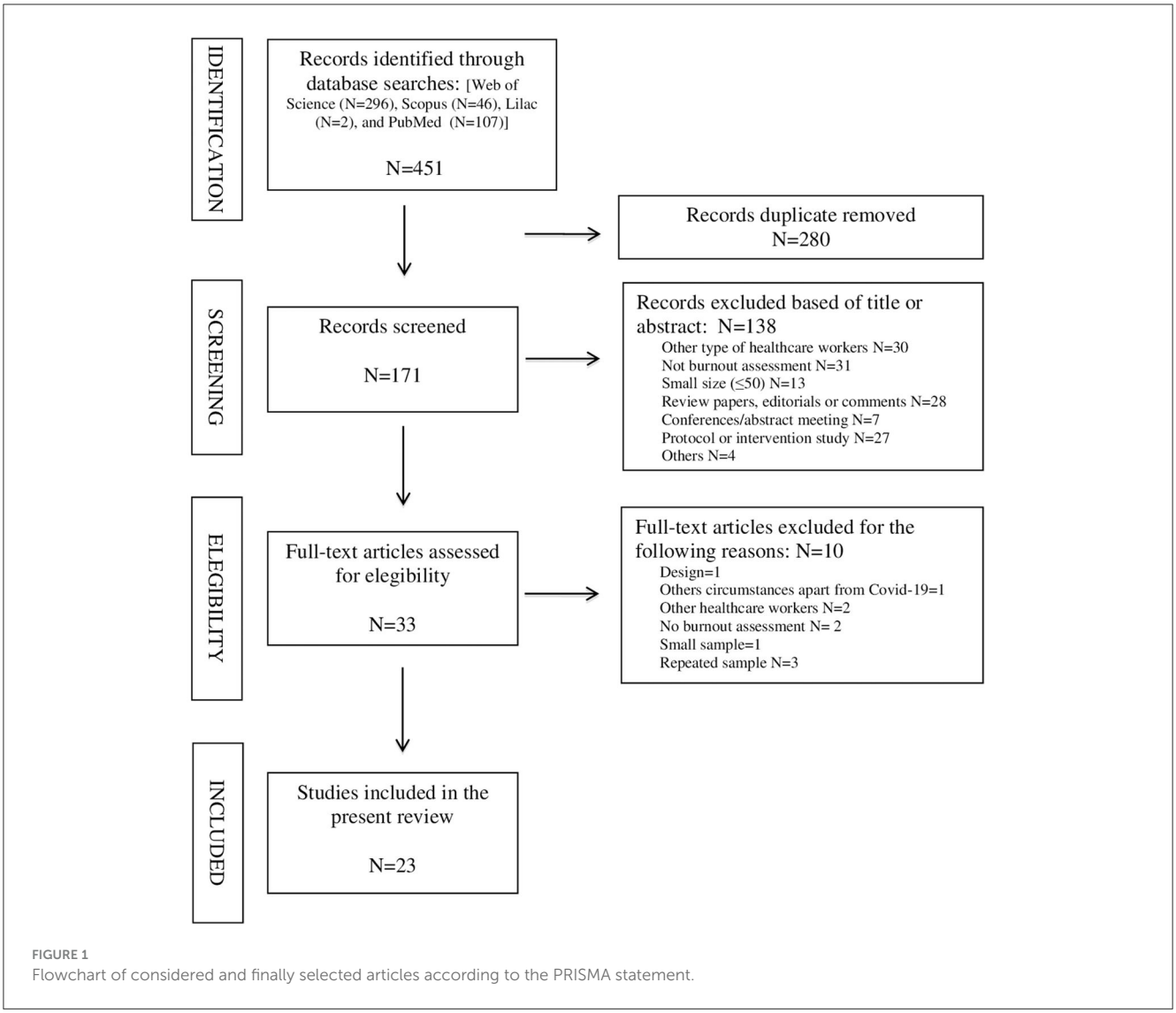

FIGURE 1
Flowchart of considered and finally selected articles according to the PRISMA statement.

(0.10–0.33). Figure 4 shows according to the geographic area where the study was conducted (grouped by continents), the overall prevalence (95% CI) of burnout in studies from North America (25–27, 29) was 0.39 (0.25–0.56), from Europe (30, 31, 35) was 0.14 (0.05–0.32), and from Asia (36, 37) was 0.19 (0.12–0.30).

3.4.2 Overall prevalence of dimensions of burnout (high emotional exhaustion, high depersonalization, and low personal accomplishment)

Five studies presented data on the percentage of high EE (23, 30, 31, 36, 37), and high DP (30, 31, 36, 37) and four studies of low PA (30, 31, 36, 37). The overall prevalence of high EE in residents according to MBI during the pandemic was 0.23 (0.13–0.38); the overall prevalence of high DP was 0.22 (0.15–0.30); and the overall prevalence of low PA was 0.25 (0.17–0.35). Figure 5 presents the three funnel plots, one for each dimension.

3.4.3 Prevalence ratio of burnout in residents vs. non-residents

In the analysis, we included two studies comparing the presence of burnout diagnosed using the original validated MBI tool or posterior validated versions in residents vs. non-resident healthcare workers (27, 43) (Figure 6). The estimated prevalence ratio of burnout associated with residency was 1.59 (1.12–2.25).

3.4.4 Subgroup analysis: risk factors

Supplementary Figure 1 shows the funnel plots of the subgroup analysis-based studies that investigated sociodemographics and potential occupational risk factors for residents' burnout during the COVID-19 pandemic.

Five articles studied gender and civil status (26, 31, 36, 37, 44), three of them children in-charge (36, 37, 44), and four of them young/older residents (26, 31, 36, 37). All prevalence ratios of these sociodemographic variables were close to 1, and all the corresponding 95% confidence intervals included 1. The results of sociodemographic variables such as gender, civil status, or having

TABLE 1 Characteristics of the cross-sectional, anonymous online survey studies included in the systematic review.

References/ period survey	Country/ setting	Specialty	Total eligible sample *N*	Responders *N* (%)	Age mean (SD)/median (IQR)	Women *N* (%)	Year R *N* (%)	Direct-care C19(D)/Non-D C19 (ND) *N* (%)	Burnout tool	Newcastle Ottawa score
Whithout comparator group										
Alkhamees et al. (36) (March 15th–April 23th, 2020)	Saudi Arabia National study	Psychiatry	150 R	121 (80.1%)	24–28 (67.8%) 29–33 (31.4%) 34–38 (0.8%)	51 (42.1%)	R1: 27 (22.3%) R2: 33 (27.3%) R3: 32 (26.4%) R4: 29 (24.0%)	NA	MBI-HSS	7
Chow et al. (23) (March 31th–April 6th, 2020)	USA National study	ORL	1,551 R	119 (7.9%)	NA	54 (45.4%)	R1: 26 (21.8%) R2: 24 (20.2%) R3: 20 (16.8%) R4: 26 (21.9%) R5: 23 (19.3%)	COVID-19 cases/100.000 people: Low: 20 = 42 Medium: 20–40 = 46 High: >40 = 31	SMDM OQB	6
Farsi et al. (37) (May, 2020)	Saudi Arabia National study	All specialties	346 R	328 (94.8%)	27.9 (2.25)	169 (51.5%)	R1: 81 (24.7%) R2: 76 (23.2%) R3: 76 (23.2%) R4: 71 (21.6%) R5: 24 (7.32%)	312 (95%) (D)	MBI-HSS	7
Kannampallil et al. (24) (April 10–25th, 2020)	USA Single center	All clinical	1,375 TR	393 (29%) T −261 (66.4%) R −132 (30.7%) F	NA NA NA	218 (55%) T NA NA	R1–R5 R1–R3 (80%)	218 (55%) (D) 175 (45%) (ND)	PFI	6
Khalafallah et al. (25) (May, 2 weeks, 2020)	USA National study	Neurosurgery	1,374 R	167 (12.2%) 111 complete response	<30: 28 (25.2%) 30–40: 83 (74.8%)	57 (34.2%)	R1: 20 (18.0%) R2: 55 (49.5%) R3: 30 (27.0%) R4: 6 (5.4%)	102 (91.9%) (D) 9 (8.1%) (ND)	*a*MBI	6
Kaplan et al. (26) (April 14th-May 11th, 2020)	USA Single center	All specialties	991 TR	560 (56.6%)	<35: 512 (91.4%) ≥35: 48 (8.6%)	280 (50.2%)	<R3: 207 (41.4%) ≥R3: 293 (58.6%)	560 (100%) (D)	Mini-Z	7
Mendoça et al. (42) (April, 2020)	Brazil All teaching hospital (São Paulo)	All specialties	1,392 R	Not calculate (convenience sample)	27.9 (3.0)	1,010 (72.5%)	R1: 493 (35.4%) R2: 407 (29.2%) R3: 273 (19.6%) R4: 153 (11%) R5: 53 (3.8%) R6: 13 (0.9%)	(69.8%) (D)	OLBI	2
Mion et al. (30) (March 7–21th, 2020)	France National study	Anesthesia (58%) Dermatology Others	1,055 R	NA	27 (2) (22–37)	609 (58%)	NA	100% (D)	MBI	5
Treluyer and Tourneux (31) (1st week of May, 2020)	France National study	Pedriatrics	1,300 R	340 (26.1%)	27 (25–28)	285 (83.8%) (79.5–87.6%)	R1: 79 (23.2%) R2: 74 (21.8%) R3: 81 (23.8%) R4: 96 (28.2%)	136 (40.0%) (D) 204 (60.0%) (ND)	MBI-HSS	6

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TABLE 1 (Continued)

References/ period survey	Country/ setting	Specialty	Total eligible sample *N*	Responders *N* (%)	Age mean (SD)/median (IQR)	Women *N* (%)	Year R *N* (%)	Direct-care C19(D)/Non-D C19 (ND) *N* (%)	Burnout tool	Newcastle Ottawa score
Cravero et al. (44) (April 20th–May 11th, 2020)	International study*	All specialties**	1,420 TR 1,101 R 319 F	Not calculated (opportunistic sampling strategy)	≤25: 92 (30.9%) TR 26–30: 664 (59%) TR ≥31: 378 (33.4%) TR	767 (54%) TR NA NA	NA	623 (83%) R (D) 478 (75%) R (ND) 289 (53.7%) F (D) 158 (11%) F (ND)	*aa*MBI	5
Khooduruth et al. (39) (May 17th–June 16th, 2020)	Qatar National study	All specialties	640 T	127 (20%)	25–30: 94 (74%) 30–35: 31 (24%) >35: 2 (2%)	48 (37%)	R1–R2: 71 (56%) R3–R5: 57 (44%)	80 (63%) D 47 (27%) ND	ProQOL	6
With comparator group										
Aebischer et al. (32) (May 9th—14th)	Switzerland Single center	All specialties	227 R 550 S	Not calculated (snowball recruitment)	30 (28–32) 23 (21–24)	160 (70.5%) 412 (75%)	R1–R5	140 (61.7%) R (D) 51 (22.5%) R (ND) 160 (29%) S (D) 390 (71%) S (ND)	*aa*MBI	5
Al-Humadi et al. (45) (March 24th–May 15th, 2020)	USA Single center	All specialties	478 TR 901 P	113 (50.2%) TR 112 (49.8%) P	30.15 (2.76) TR 47.06 (3.01) P	58 (51.3%) TR 71 (63.4%) P	NA	NA	Two single items MBI	7
Civantos et al. (27) (April 14th—25th, 2020)	USA National study	ORL	1,614 R 2,849 P	165 (10.22%) R 184 (6.46%) P	26–30: 93 (56.4%) R 31–35: 66 (40.0%) R ≥36: 6 (3.6%) R 26–30: 1 (0.5%) P 31–35: 48 (26.1%) P ≥36: 135 (73.4%) P	76 (46.1%) R 61 (33.2%) P	NA	135 (82%) R (D) 25 (18%) R (ND) 125 (68%) P (D) 59 (32%) P (ND)	Mini-Z burnout assessment	6
Coleman et al. (28) (July, 2020)	USA National study	Surgery	10,991 R 16,257 P*	465 (4.2%) R 695 (4.3%) P*	26–30: 173 (37.6%) R 31–35: 241 (52%) R ≥36: 51 (11%) R 26–30: 10 (2%) P* 31–35: 168 (24%) P* ≥36: 508 (74%) P*	247 (53%) R 298 (43%) O NA	NA	381 (82%) R (D) 84 (18%) (ND) 473 (68%) P* (D) 220 (32%) P* (ND)	*a*MBI	6
Lasalvia et al. (33) (April 21th–May 6th, 2020)	Italy Single center	Medical	1,200 R 4,740 O 5,940 T	335 (27.9%) R 1,626 (34.3%) O 1,961 (33.01%) T	<36: 633 (32.4%) T 36–55: 980 (50.1%) T >55: 343 (17.5%) T	1,471 (75%) T	NA	492 (25.5%) (D)¥	MBI-GS	7

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TABLE 1 (Continued)

References/ period survey	Country/ setting	Specialty	Total eligible sample *N*	Responders *N* (%)	Age mean (SD)/median (IQR)	Women *N* (%)	Year R *N* (%)	Direct-care C19(D)/Non-D C19 (ND) *N* (%)	Burnout tool	Newcastle Ottawa score
Appiani et al. (43) (May, 2020)	Argentina Single center	All specialties	440 T	103 (34.1%) R 199 (65.9%) P** 305 (69.38%) T	43.25 (12.0) T	48.7% T	NA	138 (45.7%) T	MBI	4
Elghazally et al. (38) (June–July, 2020)	Egypt Single center	All specialties	600 T	67 R 134 P 201 T (35.5%)	20–29: 89 (44.3%) T 30–39: 73 (36.3%) T >40: 39 (19.4%) T	131 (65.2%) T	NA	63 (31.3%) T	MBI	5
Bahadirli and Sagaltici (40) (July, 2020)	Turkey Istanbul University hospitals	All specialties in first line	629 emergency physicians	153 R 95 S 83 P 331 T (52.6%)	29 (27–35) T	142 (42.9%) T	NA	100%	MBI	5
Before/during pandemic										
Aziz et al. (29) (before July, 2020)	USA National study	General surgery	7,378 R approx. >year before	1,102 (14.6%)	NA	NA	R1: 20% R2–3: 41% R4–5: 38.1%	776 (70.4%) (D) 326 (29.6%) (ND)	Single question (MBI)	4
Degraeve et al. (34) (April 29th–May 3th, 2020)	Belgium National study	Urology	126 R Before/during	62 (49.2%)	25–27: 15 (24%) 29–30: 37 (60%) 31–35: 10 (16%) 29 (25–35) T	NA	R2: 15 (24.2%) R3: 15 (24.2%) R4: 16 (25.8%) R5: 5 (8.1%) R6: 6 (17.7%)	14 (22.5%) (D)	CBI, CBIPro, and CBIP subscales.	7
Osama et al. (41) (before July, 2020)	Pakistan Single center	Surgery	112 R Before/during	97 (86.6%)	30.50 (3.58)	45 (40.2%)	R1: 17 (15.2%) R2: 21 (18.8%) R3: 25 (22.3%) R4: 25 (22.3%) R5: 24 (21.4%)	NA	*d*MBI	6
Poelmann et al. (35) (December 30th–January 31th 2019; April 19th–May 5th, 2020)	Netherland National study	Surgery	317 R Before/during	317 B (81%) 313 D (72%)	32 (26–40) 32 (26–39)	47% 45%	R1–R6 R4: 68%	48.6% (D)	UBS	6
Σ residents	USA = 8 (35%) Nationals = 12 (52%)	All = 8 (35%) Surgery = 5 (22%)	*N* = ≥35,230***	*N* = 4,998 (34%)	51.4% (≤30 years)	53.2% women	51% (R1 + R2)	71% (D)	*N* = 15 MBI	6

W, Women; M, Men; EE, Emotional exhaustion; DP, Depersonalization; PA, Personal accomplishment; D, direct contact/COVID-19 patients; NDC, No direct contact; B, Burnout; O, Other health care professionals; F, Fellows; P, Physicians; P*, Early career physicians; P**, Emergency Physicians; R, Residents; S, Medical students; TR, Trainees (residents and fellows); T, Total participants; MBI, Maslash Burnout Inventory; aMBI, adapted MBI; aaMBI, Two single ítems from aMBI; dMBI, Dicotomizated MBI (yes/non); MBI-GS, MBI-General Survey; MBI-HSS, MBI-Health Survey; Mini-Z Burnout assessment; CBI, The Copenhagen Burnout Inventory; CBIP, CBI Personal dimension; CBIPro, CBI Professional dimension; CBIR, CBI Inventory personal dimension; OQB, One-question of Burnout; PFI, Stanford Professional Fulfillment Index; ProQOL, The Professional Quality of Life measure; SMDM, Shirom-Melamet Burnout Measure; UBS, Utrecht Burnout Scale.

[a]In the year before they were asked for burnout (aMBI).

***Three studies did not give the total number of residents.

¥ All total sample, including residents and other healthcare.

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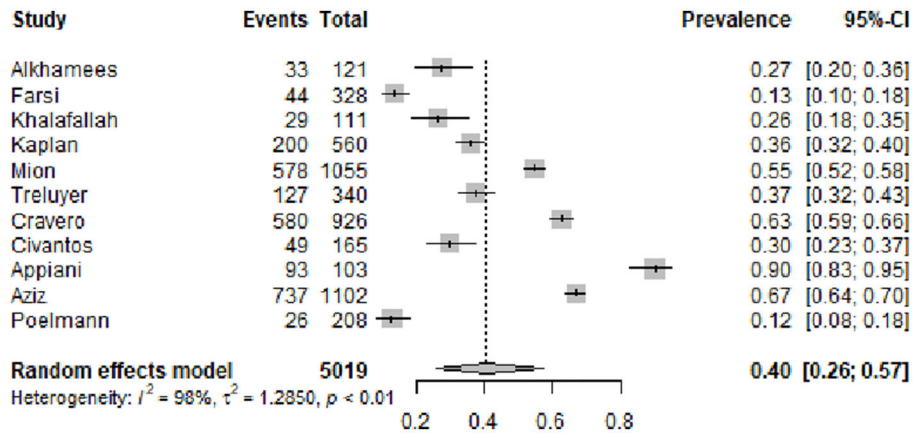

FIGURE 2
Estimated overall prevalence of burnout syndrome in residents during first wave of COVID-19 pandemic.

children in-charge were very similar results between groups. In the included studies, the age of the residents was given in very different ways (interval, mean, median, and range), and it was difficult to synthesize quantitatively the results. We were able to analyze the residents by comparing young (R1-2) vs. old (R3-5) residents in some studies. However, although it seems that the younger residents were more likely to suffer burnout during the pandemic, the result of the meta-analysis was not statistically significant.

Occupational factors (daily exposure to COVID-19 patients, or >60 h per week working with COVID-19 patients) were studied in two (24, 37) and three (26, 30, 31) articles, respectively. None of the two meta-analyses revealed a PR that would have been statistically significantly different from others. Although 71% of residents were exposed to COVID-19 patients, most of the studies did not specify the frequency (days a week, hours a day, and first line) or the prevalence of burnout in those with or without direct contact with COVID-19 patients. Then, we could only use the data of a few studies in this analysis. Those residents who were highly exposed to COVID-19 patients seemed to be more likely to have burnout, but the results were not statistically significant.

Figure 7 presents the funnel plot of the studies with data on psychiatric history ($N = 3$) (26, 30, 36). Using a random-effects model, the estimated PR was 4.60 (95% CI: 1.06–20.06). The prevalence of burnout during the COVID-19 pandemic was highly increased in those residents with a psychiatry history.

Supplementary Table 2 provides a description of the results of all articles included in the systematic review that analyzed risk factors associated with burnout in residents during a pandemic, some of which were not included in the meta-analysis for different reasons (different factors, burnout tools, design, or statistics).

3.4.5 Publications bias results

Supplementary Figure 2 shows the funnel plot corresponding to the meta-analysis of the overall burnout prevalence. It does not show clear evidence of asymmetry and, hence, does not suggest publication bias. No funnel plot was drawn for the other meta-analyses because the number of studies included in these analyses was <10 in all cases.

4 Discussion

The purpose of this systematic review was to synthesize and integrate the existing information related to the prevalence of burnout in residents and risk factors associated with the first wave of the COVID-19 pandemic. The systematic review included 23 observational studies involving 4,998 (34%) responders from 14 different countries, 71% of which were in direct contact with COVID-19 patients. A total of 87% of studies showed low-to-moderate risk of bias. We did not find publication bias. We could include 11 articles to study the pooled overall prevalence of burnout in residents during the first wave of the pandemic. The results of the funnel plot showed a pooled prevalence of 40% during a pandemic, with it being higher in North America (39%) than Europe (14%) or Asia (19%). In terms of specialties, residents of medical specialties (31%) were higher than surgical (27%) or other specialties (18%). Burnout in residents was more likely in those with a psychiatric history. We did not find any other sociodemographic or occupational risk factors associated with burnout in residents in this period.

4.1 Overall point prevalence

Surprisingly, *the overall point prevalence* of burnout during the COVID-19 pandemic found in the present review was similar to those figures reported in the systematic reviews before the pandemic (13, 14). Rodrigues et al.'s (13) systematic review with meta-analysis that included 26 cross-sectional studies from different countries, with ~5,000 residents of medical and surgical specialties evaluated with the MBI (10)[1], found a global prevalence of 35.7% (95% CI: 26.8–43.5%). Low et al.'s (14) systematic review and meta-analysis included 61 cross-sectional and cohort observational studies, with more than 22,000 residents from different specialties and countries from Europe, Asia, and America, showing a global prevalence of burnout of 51.0% with the same tool (10)[1] (95% CI: 45.0–57.0%). The results of our study were above the lower 95% CI of Lou's study and below the upper 95% CI of Rodrigues's study. Concerning the overall prevalence of MBI

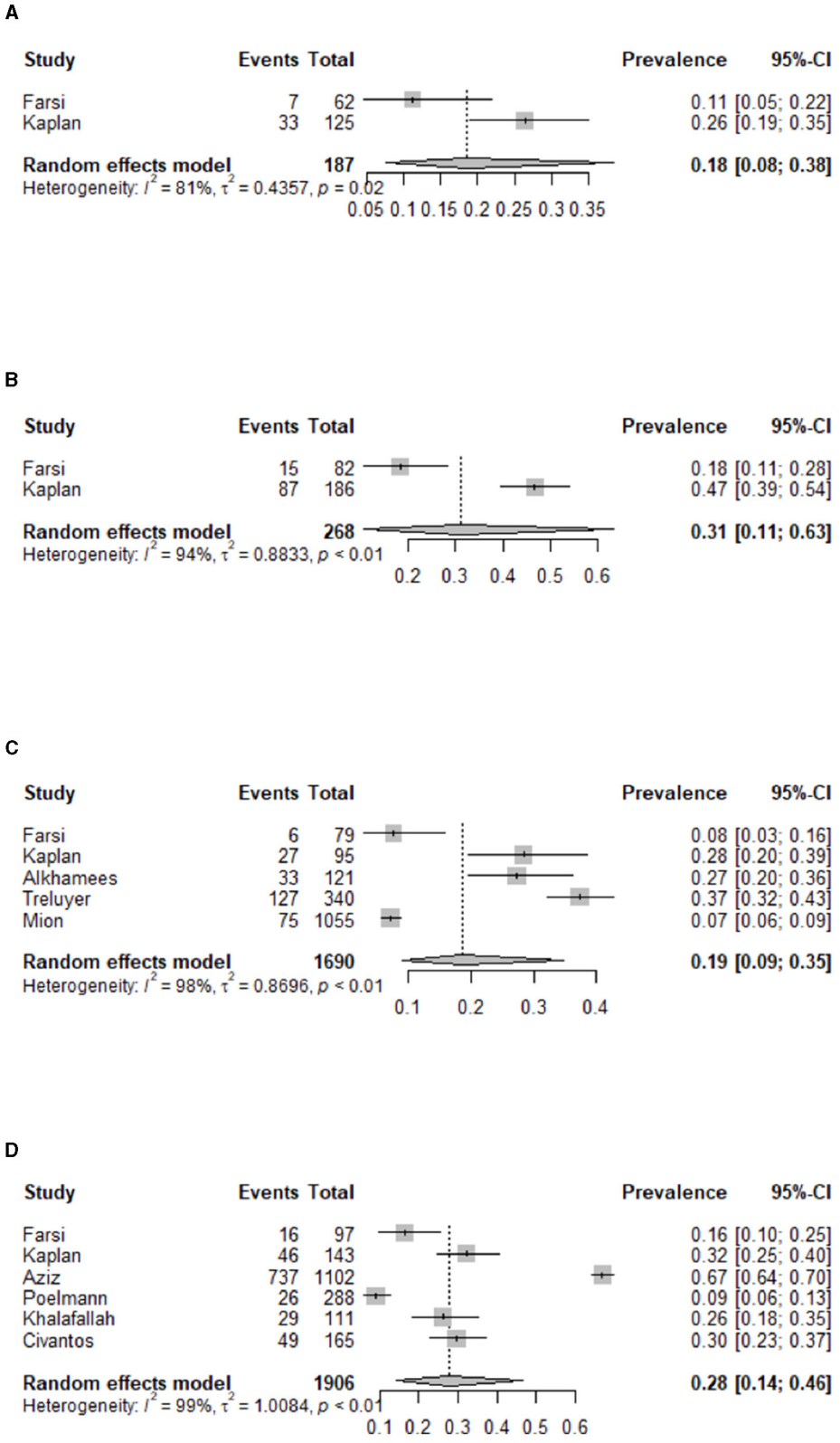

FIGURE 3
Estimated overall prevalence of burnout related to type of specialty **(A)** surgery, **(B)** internal medicine, **(C)** hospital based, and **(D)** others.

dimensions (EE, DP, and PA), in the review of Rodrigues et al. (13), 23 studies reported an overall prevalence rate of high EE of 38.9% (95% CI: 31.8–46.0%) and high DP of 43.6% (95% CI: 38.4–48.9%). The overall prevalence of low PA, studied in 20 articles, was 34.3% (95% CI: 21.3–47.2%). These figures would also be similar to those found in our study. Related to the overall prevalence of burnout in

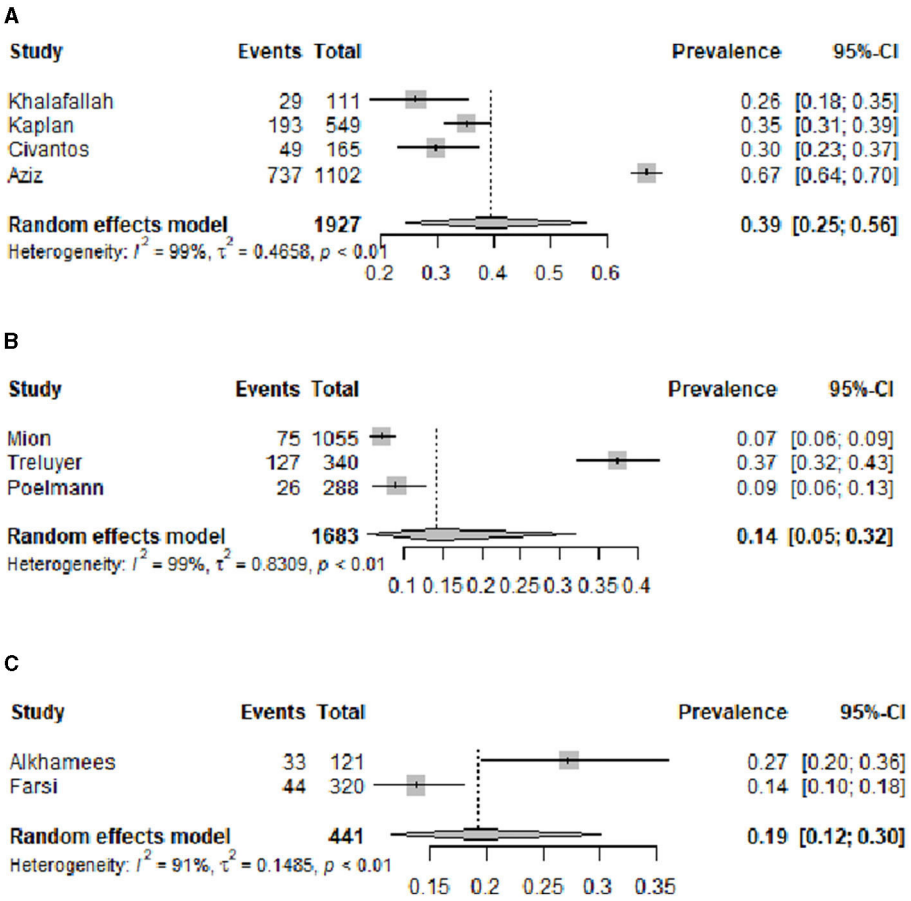

FIGURE 4
Estimated overall prevalence of burnout related geographical origin: **(A)** North-America, **(B)** Europe, and **(C)** Asia.

our study, medical specialties showed a little higher prevalence than surgical and other specialties, which is contrary to the results of Lou et al.'s (13) and Rodrigues et al.'s (12) studies before the pandemic period. During the COVID-19 pandemic, medical specialties were more on the frontline attending to COVID-19 patients. The overall prevalence in the North America continent was higher than in several European countries, which is in line with Low et al.'s study (13). However, we found less prevalence of burnout in Asian countries, opposite to Low et al.'s study, who found the highest overall prevalence in this continent. Our results may be explained due to the small number of Asian studies included.

From our review, the only study using the Copenhagen Burnout Inventory (CBI) (46) not included in the meta-analysis found a lower burnout prevalence during the pandemic than a previous assessment with the same tool and sample before the pandemic (34). Especially in personal exhaustion and professional exhaustion dimensions, associated to direct contact with COVID-19 patients.

Different factors could explain the similar burnout figures in residents found in our study during the first wave of the pandemic compared to pre-pandemic studies. The first factor may be indicative of a high level of resilience among residents during times of increased stress (34). But it can also be the effect of protective factors such as having more time to spend on reading/didactics, hobbies, or family/significant others due the reduction in usual clinical work or taking advantage of this period to carry out scientific work (28, 34). Either way, the pandemic situation has highlighted the importance of implementing wellness programs in institutions and their maintenance during times of health crisis (47, 48).

In our review, residents were more likely to burnout during the pandemic than other healthcare workers. However, we have to consider these data with great caution. We were able to make the comparison based only on the results of two studies. The studies included in the meta-analysis compared residents in training with other physicians (27, 43). Nevertheless, data from the literature show that other healthcare workers such as nursing professionals were one of the healthcare groups with the highest rates of burnout during the SARS-CoV-2 pandemic (49–51).

4.2 Potential risk factors

4.2.1 Sociodemographic factors

4.2.1.1 Gender

The number of physician women has increased in the last decades. Physician gender is a factor that has been proposed as a source of burnout, and some previous data suggested that women scored higher in the EE dimension than men, and men scored higher in DP and lower in PA dimensions (52). A recent systematic review of burnout and physician gender by Hoff and Lee (53)

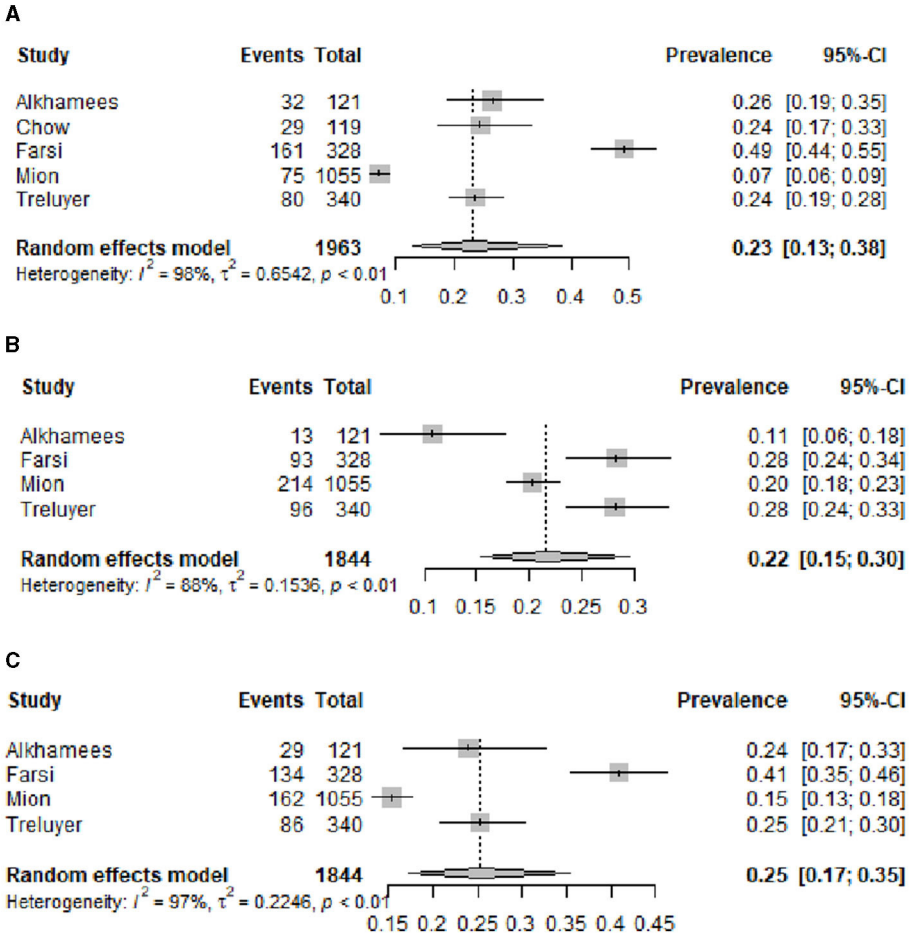

FIGURE 5
Estimated overall prevalence of burnout dimensions in residents during COVID-19 pandemic: **(A)** High emotional exhaustion, **(B)** high depersonalization, and **(C)** low personal accomplishment.

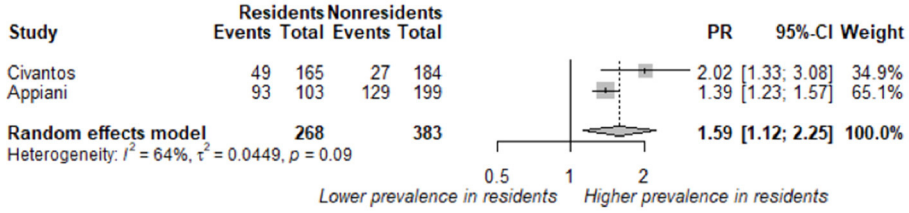

FIGURE 6
Estimated prevalence ratio (PR) of burnout comparing residents vs. others health care personal during COVID-19 pandemic.

that included data from 45 studies from 2010 to 2019 showed that burnout is important both for female and male physicians, although women may experience it to a greater degree. Women had higher levels of EE dimension than men but authors did not find any evidence for gender differences in DP and PA dimensions (53). Some pieces of evidence suggest that the association between gender and burnout may vary among countries (54–56). In our review, 53.2% of the total residents were women and the differences were not statistically significant, which would imply that the pandemic affected the mental health of residents regardless of their gender.

4.2.1.2 Age

It was not possible to analyze the association between age and burnout due to the lack of included studies reporting both variables in the same way. However, as the range of age of the included studies varied between 24 and 35 years old, the analyses of young (R1-2) and older (R3-5) residents could include age variables plus occupational factors. The early years of the residency period (R1-2) seem to be highly associated with burnout during the pandemic but again differences were not statistically significant. Both groups young (R1-2) and older (R3-5) have different patterns of needs and different associated stress factors. In the youngest residents,

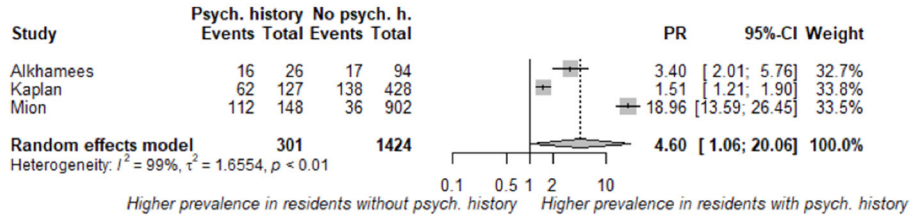

FIGURE 7
Estimated prevalence ratio (PR) of burnout associated with psychiatry history in residents during COVID-19 pandemic.

inexperience and the sudden change from student life to working life, and in the oldest, the feeling of having the skills of a specialist, mentoring the younger ones, and having to face the job search soon may be relevant (57). During the pandemic, it appears that all years of residence were similarly affected by the additional stress associated with it.

Prior to the pandemic, in addition to the year of residence, a review by Low et al. found that the older age of residents was significantly associated with a higher prevalence of burnout (14). On the opposite, Rodrigues et al. found that being young was a risk factor for burnout in residents (13). At present, it is not known whether the age of residents or other factors associated with age predispose them to burnout syndrome (58), so further research may be needed in this area.

4.2.1.3 Civil status and care of children

Neither marital status nor having to care for children was a risk factor for resident physicians to present burnout during the pandemic in our study. Prior to the pandemic, being married or with a partner seemed to be a protective factor as well as the responsibility of caring for children against what could indicate an added stress factor (59). Parenting has a possible humanizing effect on residents, resulting in less detachment and depersonalization (60). In any case, these sociodemographic factors, as in our review, are not associated with the presence of burnout in most previous studies (61, 62).

4.2.2 Psychiatric history

A 30-year seminar longitudinal study in the community showed that workers with a lifetime mood disorder, mainly of mood and anxiety disorders, have a higher risk for subsequent burnout (63). Although many studies indicate that psychiatric history and anxious-depressive disorders are high in medical residents, they have not always been found to be the risk factors for developing burnout during the residency (57, 64). The two pre-pandemic meta-analyses in residents did not study this risk factor (13, 14).

Residents with psychiatry history had a four-time higher risk of burnout during the pandemic peak stress in our meta-analysis. This increase in risk suggests that the subgroup of residents with a psychiatry history should be monitored closely during residency to prevent burnout development (9, 24).

4.2.3 Occupational factors

The potential occupational risk factors measured in the different studies were very different from each other and difficult to synthesize the results (see Supplementary Figure 1).

Direct caring for COVID-19 patients was not a risk factor in our study for burnout in residents. In any case, the heterogeneity in the studies regarding the way this variable was assessed made it difficult to draw conclusions (direct contact vs. no-direct contact, number of hours/week, or COVID-19 patients attended…). In studies on other healthcare workers apart from residents (nurses, physicians,...), direct exposure to COVID-19 patients was a common risk factor for burnout (65–67).

The existence of clear protocols, the practical training regarding the protection measures, and the access and adequate use of PPE are all measures that ensure confidence and control, decreasing stress levels. Especially adequate PPE was demonstrated to protect against burnout in healthcare professionals during the pandemic (68). This review also points out these data (28, 44). However, each study assessed the topic in a different way.

Related to other occupational risk factors included in a single article, such as camaderie/support, increased work hours, interpersonal conflicts, or job satisfaction (26, 30, 33, 40), the data were not possible to be included in the meta-analysis.

4.3 Strengths and limitations

The strengths of this study were the inclusion of large samples of residents from national surveys, with a low-to-moderate risk of bias during the worldwide peak of the pandemic. However, our systematic review is not free of limitations. First, the most prevalent bias was the parameter of recruitment. Although most of the studies were nationals (including all possible candidates to participate), and none of the samples were random, some of the surveys used an opportunist sample or snowball recruitment. Second, there was a high variability between the response rates. Only five of the 23 included surveys had a satisfactory response rate (>60%). Web-based surveys have generally lower response rates than face-to-face or telephone interviews or mail surveys (69). Physicians as a professional group tend to present lower response rates than other collectives, and participation rates of 20% or less are not uncommon in web-based studies for physicians (70). Third, although the survey was anonymous in all cases, the participation was voluntary, meaning that it is possible that people more vulnerable were more likely to complete the survey,

resulting in selection bias. Moreover, the cross-sectional design of studies made a causal relationship impossible, and as with all meta-analyses, there is always potential for publication bias as well as uncontrolled confounding variables. Finally, the results of the study cannot be generalized to all pandemic period as it refers only to the first wave frame. It would be very interesting to study the evolution of the overall prevalence and risk factors of burnout in residents during the complete COVID-19 pandemic period.

4.4 Conclusion

The prevalence of burnout in residents found in this systematic review and meta-analysis was similar to those obtained in the previous meta-analysis of burnout before the pandemic. Psychiatry history was associated with a higher risk of burnout in residents during the first wave of the COVID-19 pandemic, suggesting a high vulnerability of this subgroup of residents during the peak of the stress period.

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

RM-S: Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft. RN: Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing. VO: Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing. DH-M: Methodology, Validation, Writing – original draft, Writing – review & editing. KL: Formal analysis, Methodology, Supervision, Writing – review & editing. EV: Supervision, Writing – review & editing.

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Conflict of interest

EV has received grants and served as consultant, advisor, or CME speaker for the following entities: AN.Biotics, AbbVie, Adamed, Angelini, Biogen, Biohaven, Boehringer-Ingelheim, Celon Pharma, Compass, Dainippon Sumitomo Pharma, Ethypharm, Ferrer, Gedeon, Ritcher, GH Research, Glaxo-Smith Kline, HMNC, Idorsia, Janssen, Lundbeck, Medincell, Merch, Novartis, Orion Corporation, Organon, Otsuka, Roche, Rovi, Sage, Sanofi-Avenis, Sunovion, Takeda, and Viatris, outside the present submitted study. DH-M has received CME-related honoraria and served as a consultant for Abbott, Angelini, Ethypharm Digital Therapy, and Jansen-Cilag, with no financial or other relationships related to the subject of this paper.

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Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1286101/full#supplementary-material

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Nurses' perspectives on workplace environment needs associated to resilience: a qualitative descriptive study

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Objective: The purpose of this study was to explore the demands of nurses on the workplace environment related to psychological resilience.

Methods: A qualitative descriptive design was employed for this study. Purposeful sampling was chosen from a tertiary hospital in Henan Province, China. Semi-structured in-depth interviews were conducted with 20 nurses. The interview data was analyzed using the Colaizzi's method and results were reported following the COREQ standards.

Results: Analysis of the interview data revealed three main themes: (1) Career Support and Development, (2) Practical Support & Development, and (3) Personal Support and Development.

Conclusion: The perspectives of nurses for a workplace environment demands needs to be appreciated, and in addition, it is worth noting that the key role of building a good workplace environment in strengthening the resilience of nurses emphasizes the need for careful consideration. Nursing administrators should formulate policies and measures from multiple perspectives based on the real needs of nurses in terms of professional, practical, and personal dimensions.

KEYWORDS

nurses, psychological resilience, workplace wellbeing, cognition, experience nurses, experience

1 Introduction

Issues such as immediate patient care complexity, administrative mandates, the need to constantly improve professional skills, and dealing with occupational hazards and potential errors in high-stress settings are numerous (1). Such intrinsic challenges, while integral to the nursing profession, can negatively impact their psychological state, leading to outcomes such as emotional fatigue, eroded self-esteem, heightened stress, and the looming threat of burnout (2). Such repercussions contribute to the burgeoning issue of nurse attrition, further accentuating the global nursing shortage dilemma, potentially compromising the quality of patient care and obstructing the broader advancement of the nursing field (3).

Psychological resilience (4), characterized as an individual's adaptive prowess in the face of adversities and setbacks, plays a pivotal role in how professionals, especially nurses, cope in their demanding roles. An enhanced psychological resilience framework could act as a bulwark against the detrimental effects of emotional labor in healthcare settings (5).

Nurse workplace environment is an important subsystem of hospital environment system, which is the product of hospital nursing management, nursing human resource allocation, work design and organizational culture. Nurse workplace environment is related to the physical and psychological well-being, and quality of work life (QWL) for nurses (6). Another survey study of nurse directors indicated that the workplace environment had an impact on nurses' job burnout (7).

At the same time, psychological resilience has a complex relationship with nurses' workplace environment. One survey (8) study found that improvements in the workplace environment can have a positive impact on mental health outcomes. The Health Service Workplace Environmental Resilience Model (HSWERM), which introduced by Cusack (9) et al. in 2016, emphasizes the components of the nursing workplace environment that interplay with psychological resilience. Although too much qualitative research has focused on nurses' adverse experiences, emotional states, life narratives and challenges, there is still a lack of research on the impact of workplace environment on resilience (10). Limited research has ventured into capturing the authentic sentiments and lived experiences of nurses concerning their support necessities in a resilience-conducive practice setting.

The Health Service Workplace Environmental Resilience Model (HSWERM), introduced by Cusack (9) et al. in 2016, emphasizes the components of the nursing workplace environment that interplay with psychological resilience. This intricate model threads through dual dimensions — namely, support and development — and operates on three planes: professional, practical, and personal. Based on this conceptual framework, we conducted an in-depth dialogue with nurses in the survey, aiming to reveal their internal needs for the workplace environment related to psychological resilience. The results of this study provide a reference guide and fundamental impetus to provide new intervention ideas for the improvement of psychological resilience of nurses, and guide related research to an unparalleled refinement.

2 Research subjects and methods

2.1 Participants

We employed a face-to-face interview approach,; each interview was conducted individually. The participants were selected via convenience and purposive sampling and were drawn from a tertiary care hospital in Henan Province. The inclusion criteria for nurses were: 1) Currently employed; 2) Engaged in clinical nursing work; 3)Having more than 1 year of work experience; 4) Informed and voluntarily agreed to participate. We excluded participants who were: 1) Trainees or interns; 2) Not working in the hospital during the survey period, including those out for further study, on sick leave, personal leave, or maternity leave. The sample size was determined by data saturation. Finally, a total of 20 subjects participated in this study.

2.2 Methods

2.2.1 Interview outline confirmation

According to the purpose of the research, through literature search and discussion of the research group, the initial outline of the interview was formulated. An initial round with three nurses helped refine the interview structure, ensuring adaptability until data saturation was reached. The revised interview matrix is detailed in Table 1. All participants were informed of the study's nature and provided their written consent. The study adhered to the Consolidated Criteria for Reporting Qualitative Research and credibility metrics (11, 12): (1) Credibility: Inclusion of field notes and audio captures from the interviews, which underwent team analysis to derive themes. Subsequently, participants authenticated the collated data. (2) Transferability: An exhaustive delineation of the research milieu encompassing participant demographics, sampling logic, and procedural specifics. (3) Reliability: External academic scrutiny ensured the study's protocol adhered to qualitative research tenets. (4) Confirmability: Triangulation was employed to

TABLE 1 Theme and sub-themes.

Theme	Subthemes
Career Support & Development	- Institutional & Emotional Management
	- Transparent Communication & Feedback
	- Ways to Realize Self-value
Practical Support & Development	- Stable Resource Allocation
	- Streamlined and Standardized Workflow
	- Training & Assessment Strategies
Personal Support & Development	- Salary Appraisal
	- Nursing Adverse Event Management
	- Adaptive Scheduling
	- Pressure Relief Channels & Organizations

diminish researcher bias. Self-reflection ensured the recognition of potential limitations, guaranteeing the research's integrity.

We used a descriptive qualitative research design with a semi-structured approach to interviewing based on purposive sampling, it is an effective strategy to acquire data for qualitative research. It helps to explain, understand, and explore research subjects' opinions, behavior, and experiences to narrow down the area of research that researcher is interested to discover while listening to them being involved through dialogue.

The research team members were registered nurses who had participated in training related to qualitative research. The finalized interview outline consisted of the following questions: 1) What kind of hospital workplace environment do you expect or desire? 2) Are there any current aspects of your workplace environment that you would like to change? 3) What kind of support do you hope the hospital would provide to help you work better? 4) When faced with adversity, setbacks, trauma, or other negative events at work, what attitude and actions do you expect the hospital to maintain or take? 5) What kind of assistance or support do you expect from the hospital in terms of your personal development? The interview outline was used as a reference, and the interview questions were adjusted according to the actual situation in the interview process to ensure in-depth understanding of the experience of nurses and perspectives on workplace environment needs associated to resilience.

2.2.2 Data collection

A Face-to-face, one-to-one and semi-structured interviews were used to collect data. Semi-structured interview is a research method of in-depth communication that aims to understand the experiences, attitudes and perspectives of research subjects through open-ended questions and flexible feedback mechanisms (13). This research method has also been used in the past to understand the perceptions and perspectives of nurses (14, 15). The researcher acted as interviewer, and arranged time and place for the interview with the participants. The interview took place on the 7th floor of the inpatient Department of the Third People's Hospital of Henan Province From November 10th to 20th. Each participant was interviewed for 30 minutes after work. Firstly,the researcher introduced herself to the participants before the interview and recorded the location and time of the interview. Secondly, before the interview, the interviewer introduced the informed consent to the participants and asked them to sign their names and dates on the informed consent form. Then, the interviewer asked questions according to the interview outline, and adjusts the questioning strategy flexibly according to the feedback of the participants. Finally, after the interview, the interviewer expressed her gratitude to the participants.

2.3 Data analysis

Used the Colaizzi qualitative analysis procedure in this study (16). The interview data were analyzed according to the previously reported steps (17) in Table 2.

TABLE 2 Steps in Colaizzi's qualitative analysis.

Steps	Procedure
1	Assigned an initial code to each nurse. Deeply reviewed each nurse's interview notes to understand their experiences related to sobriety and their needs concerning psychological resilience.
2	Enhanced dialogue comprehension by refining, identifying, and extracting pivotal statements from interviews, then deducing their meanings.
3	Synthesized and categorized the meaning of pivotal statements into themes, subthemes, and detailed datasets through team collaboration and analysis.
4	Continued interviews until data saturation was achieved, concluding when no fresh topics surfaced.
5	Engaged in discussions to outline the core structure of the nurses' perceptions and experiences about psychological resilience management.
6	Forwarded the refined text data to participating nurses for validation.

2.4 Ethics approval and consent to participate

This study followed the Declaration of Helsinki (18) and was approved by Medical Ethics Committee of The Third People's Hospital of Henan Province, ethics number: 2023-SZSYKY-023. All participants were informed of the purpose of the study, and all patients participated voluntarily.

3 Result

3.1 Demographic characteristics of participants

All participants were female, with an average age of 34.55 years (standard deviation of 7.67 years, ranging from 25 to 55 years old). We collected demographic characteristics and baseline data of the nurses, including age, gender, educational level, marital status, monthly income, and number of children. We conducted 25 semi-structured interviews. Interviews and recordings were carried out with the informed consent of the subjects, and the content was transcribed verbatim within 24 hours after each interview. The detailed demographic characteristics of all participants are presented in Table 3.

3.2 Theme 1: Career support and development

3.2.1 Institutional and emotional management

During the interviews, 80.00% of the nurses mentioned their demands with humanized leadership and management styles. These nurses stated that it was important for them to have genuine care and understanding from the head nurse, and to be able to provide them with help and guidance whenever they encountered difficult

TABLE 3 Demographic characteristics ($n = 20$).

Demographic characteristics	n (%)	Demographic characteristics	n (%)
Age		Children	
<30	8 (40.0%)	There are	16 (80.0%)
31~40	8 (40.0%)	None	4 (20.0%)
41 ~ 50	3 (15.0%)	Working Department	
51 ~ 60	1 (5.0%)	Physical examination center	1 (5.0%)
Sex		Intensive Care Unit	2 (10.0%)
Women	20 (100%)	Department of gerontology	1 (5.0%)
Men	0 (0)	Department of orthopaedics	1 (5.0%)
Education level		Gynecology and obstetrics	1 (5.0%)
Junior college	9 (45.0%)	Radiology department	1 (5.0%)
Bachelor degree	10 (50.0%)	Disinfection supply center	1 (5.0%)
Master degree or above	1 (5.0%)	Blood purification department	1 (5.0%)
Marital status		Emergency department	2 (10.0%)
Married	14 (70.0%)	Department of pediatrics	1 (5.0%)
Unmarried	3 (15.0%)	Pneumology department	2 (10.0%)
Divorce	2 (10.0%)	Department of neurology	1 (5.0%)
bereaved spouse	1 (5.0%)	Gastroenterology department	1 (5.0%)
Monthly income		Rehabilitation department	1 (5.0%)
1,000 ~ 4,999	14 (70.0%)	Cardiac surgery	1 (5.0%)
5,000 ~ 9,999	5 (25.0%)	Operating room	1 (5.0%)
>10,000	1 (5.0%)	Traditional Chinese medicine department	1 (5.0%)

or uncertain situations in their work, which became a great source of psychological support and provided them with happiness.

"The head nurse always pays attention to our emotional changes and confusions after a day's work, then takes the time to chat with us like a friend and helps us resolve our doubts." (N5)

"The nursing department and each ward formulate three measures every year based on nurses' needs to enhance nurse satisfaction, truly balancing the sleep and training needs of night shift nurses." (N7)

"Whenever there's a challenging situation in the ward, our head nurse takes the initiative to bring the team together, not just to find solutions but also to check in on how we're coping emotionally. It feels like a community where our feelings and well-being matter." (N18)

Additionally, 30.00% of the nurses mentioned in the interview expressed their need for humanized system management. More humane rules and regulations cannot only increase work efficiency, but also improve the willingness of nurses to abide by the rules. The needs of nurses should be considered in the introduction of relevant management policies to meet the needs of multiple roles and identities of nurses.

"It's crucial for leadership to remember that behind every nurse, there's a person with feelings, hopes, and challenges. Systems and processes designed with empathy can truly make a difference in our daily work lives." (N1)

"I believe that rules and regulations can be both efficient and compassionate. When our human needs are taken into account, we not only follow them more willingly but also take pride in our work and the organization." (N4)

"If leaders could consider our needs when formulating certain rules, regulations, or requirements and integrate these rules with our needs, I think everyone would implement the relevant rules and regulations more effectively." (N20)

3.2.2 Transparent communication & feedback

It is important for primary clinical nurses to provide a channel for nurses to feedback and communicate with leaders in time.

In the past, providing feedback was a hassle. Now, the nursing department has established a feedback email for us, and they also hold an annual Nurses' Representative Conference, giving us opportunities to speak our minds freely." (N11)

In addition, the establishment of effective and equal communication channels is conducive to the more forceful execution of nursing tasks.

"When the head nurse communicates with me on an equal footing, it motivates me more than simply giving direct orders." (N9)

"When there are issues with the information system, the bedside Pad is broken, or there are communication problems with delivery or logistics personnel, nurses can contact the relevant department to solve the issue immediately. It's quite convenient and greatly facilitates our work." (N20)

Therefore, effective, two-way, and equal communication can also enhance nurses' sense of ownership and security in their work, allowing them to face emergencies in their work more proactively.

3.2.3 Ways to realize self-value

Realizing one's self-worth is a reflection of a nurse's professional career success. It can help nurses obtain positive psychological experiences and a sense of accomplishment, thereby enhancing their psychological resilience. In the interviews, 90% of the nurses mentioned that a true magnet hospital should provide means and

methods for nurses to realize their self-worth. Their demands included professional title promotion, becoming a professional nurse and improving their ability. Specific measures could be a clear promotion system, providing practical research capability training, reasonable training and utilization of specialized nurses, and opening nursing clinics for self-realization.

Clinical nurses face difficulties in conducting research and cannot write research papers. They have not received systematic training in school. On the other hand, research papers are still one of the indicators for promotion, so this puts most nurses in a dilemma.

"Research is quite challenging for clinical nurses. Publishing articles is difficult. I hope that in addition to theoretical courses, they can provide some genuine research practice training sessions." (N6)

"Providing research and training opportunities shows that the management values our contribution and sees the potential in us. This recognition is crucial for our morale." (N14)

Nurses generally have the demand for continuing education, which involves career planning, nursing education, specialist nurse training and so on. Nurses believed that the special courses arranged by the hospital could make them feel valued, which also made them see the hope of nursing professional development, which could greatly motivate them and make them more active in work.

"Having clear guidelines for promotions, specialized training programs, and opportunities for specialized roles not only make me feel valued but also push me to do my best every day." (N16)

"In our hospital's 258 Nursing Plan, I saw the future prospects of the nursing profession. I am fond of nursing education, and I am determined to become a qualified health education nurse." (N18)

The establishment of nursing clinic can make nurses feel the importance of their specialty, improve their professional identity, and realize that the knowledge they learn has practical value.

"Operating a nursing outpatient clinic enhances our professional identity as nurses. When a patient says 'thank you' to me, I feel that my profession is valuable and recognized." (N19)

"In our hospital, they have opened clinics managed by nurses. This not only allows us to apply our knowledge practically but also provides a sense of achievement." (N20)

This theme emphasizes the importance of institutional support that values and recognizes the contributions of nurses. By providing them with avenues to grow professionally and realize their full potential, the hospital not only retains its staff but also ensures that they remain motivated and committed.

3.3 Theme 2: Practical support and development

3.3.1 Stable resource allocation

The allocation of human and material resources is closely related to the workload and stress levels of nurses. This directly influences the quality and efficiency of nursing services. An irrational structural arrangement can lead to unexpected incidents or accidents in nursing, further reducing the mental resilience of nurses. The interviewed nurses all mentioned the real problems faced in terms of nursing human resources.

There is insufficient staffing in clinical nursing work, which increases the work pressure of nurses and the contradiction between nurses and patients.

"Clinical work is quite busy, with a high intensity and fast pace. The pressure is relatively significant. I hope more nurses can be allocated." (N3)

"When there are fewer nurses, the time allocated for each patient becomes very limited. It's easy for patients to have complaints about the nursing work." (N5)

The application of new technology, the refinement of division of labor, reasonable layout and optimization of resource allocation can reduce the excessive workload of nurses to a certain extent, so as to reduce the work pressure of nurses.

"The reasonable allocation of material resources, such as the emergence of the Internet of Things and informatization, has to some extent made up for the shortage of clinical nursing human resources, alleviating the work pressure of nurses." (N8)

"Nurses have a large workload and need to juggle multiple tasks simultaneously. The pressure feels immense. Thankfully, the hospital has arranged delivery personnel and implemented pneumatic logistics, so nurses no longer need to run errands outside." (N9)

"Optimize the shift scheduling system to give our colleagues adequate rest time. When there's a shortage of staff, we need replacements. We are humans, not machines. Overtime shouldn't become the norm. Increasing shift personnel is essential, as having eight night shifts in a month is too frequent." (N12)

This theme highlights the importance of a supportive workplace environment in the nursing profession. By addressing the actual needs and challenges faced by nurses, healthcare institutions can enhance patient care quality and improve nurses' job satisfaction and overall well-being.

3.3.2 Streamlined and standardized workflow

The demanding nature of nursing roles necessitates a coherent and streamlined workflow. A significant 55.00% of nurses emphasized the need to refine and standardize operations. By doing so, nurses can dedicate more attention to patient care, elevate service standards, and minimize the inherent stresses of their profession.

"We should push toward integrating technology and emphasizing specialized tasks in our workflow. Such an approach not only lightens our workload but also underscores the expertise inherent in nursing." (N8)

"I hope clinical handover procedures and checklists can be standardized across departments, rather than each department creating their own, to simplify the workflow." (N9)

"Current workflows have been optimized significantly compared to when I started working; they're much more detailed. Every shift has its workflow and tasks, and our processes should evolve with the times." (N11)

"The workflow should lean toward informatization and specialization. This can both alleviate nurses' workload and showcase the professionalism of nursing." (N18)

3.3.3 Training and assessment strategies

While training and evaluation play pivotal roles in sharpening the skills of nurses, it's crucial to strike a balance in their frequency and approach. Every nurse interviewed highlighted the burden of excessive training and evaluations, especially when these overlap with demanding shifts or are masked as 'relaxing activities' but end up adding to their workload.

"Following a night shift, many of us nurses are exhausted. Being subjected to intensive training right afterward can be counterproductive, as its advantages are often overshadowed by fatigue. The hospital's policy that allows nurses finishing night shifts to forgo training is a considerate move." (N8)

"Why not exempt those who've completed night shifts from training sessions? Recovery sleep post such shifts should be prioritized." (N9)

"Activities pitched as relaxation can feel burdensome if mandated. Forced participation usually diminishes enthusiasm and genuine engagement." (N13)

"It's advisable to give a respite from meetings or training for those coming off night shifts. Allocating a dedicated day of rest can significantly boost nurses' overall well-being." (N19)

This theme underscores the significance of crafting a workplace environment that respects nurses' energy and time. By streamlining processes and recognizing the importance of work-life balance, medical institutions can deliver superior patient care while ensuring their nursing staff feels valued and satisfied.

3.4 Theme 3: Personal support and development

3.4.1 Salary appraisal

Salary and benefits were among the primary concerns raised by many nurses in terms of personal support.

"The foundational salary doesn't align with our designated roles; it's insufficient and barely meets our family needs." (N9)

"Compensation is a driving force for our dedication. Nurses' efforts should resonate with their paychecks. It's imperative to maintain a balance where both regular and contract nurses receive equitable compensation for their services." (N14)

"I don't merely have expectations about the amount but also the respect it signifies. I wish society would recognize and value the nursing profession more." (N16)

Therefore, the rationality of salary and benefits is a significant environmental factor influencing nurses' psychological resilience.

3.4.2 Nursing adverse event management

Adverse nursing events can lead to panic, anxiety, and tension among nurses. How nurses respond, and whether they can learn and grow from these experiences, are closely tied to the hospital's approach to managing and handling these incidents. Among the 20 nurses interviewed, 5 had experienced adverse events.

"Actually, no nurse wishes to experience an adverse event. I hope that management can have a standardized and protective procedure for handling these events. It's vital to offer necessary support for nurses, who are often the second victims in such situations. This support can help alleviate their stress, overcome negative emotions, and return to work more swiftly." (N4)

"My primary source of stress in my current job stems from the fear that a slight oversight could lead to an adverse event. If such an incident occurs, it affects me both mentally and physically. The gossip among colleagues can be especially distressing." (N12)

"During my training, they always emphasized accuracy and attention to detail, but no one prepared us for the emotional toll of an adverse event. It's more than just the incident itself; it's the after-effects - the sleepless nights questioning your competence, the glances from colleagues, and the silent whispers. Having a supportive system that helps us through these moments is crucial." (N13)

"I remember the first time I made an error in medication administration. I felt like the weight of the world was on my shoulders. What helped me through it was not only a comprehensive review of the incident but also counseling sessions and the support of my team. We need a safe space to discuss these matters, learn from them, and move on." (N16)

"In a profession where even the smallest mistakes can have grave consequences, the pressure is immense. I believe it's not just about how the hospital handles the event but also about creating an environment where nurses can openly discuss errors without fear of retribution. Continuous training and open forums are essential to break the stigma around these events and to ensure they're minimized in the future." (N18)

This theme highlights the importance of an institutional response that is both supportive and constructive when dealing with adverse nursing events. It recognizes that nurses, while responsible for patient care, are also susceptible to human errors and should be provided with the necessary resources and support to navigate through these challenging experiences. A culture that prioritizes learning and growth from mistakes, rather than punishment, can foster a more resilient and efficient nursing staff.

3.4.3 Adaptive scheduling

The term "flexible and adaptive scheduling" appeared 25 times in the interview content, indicating that the ability to have flexible scheduling and balance work and life can impact nurses' psychological resilience.

"Since my family is from out of town, every time before a holiday, the head nurse would ask if I'm going home. If I am, she would arrange the schedule in advance, allowing me to spend an extra couple of days with my family." (N2)

"Our department is quite considerate when it comes to scheduling. If we have personal matters to attend to and inform the head nurse ahead of time, she tends to be understanding and arranges appropriate shifts." (N10)

"As long as it doesn't disrupt the department's work arrangements, the head nurse seeks input from the nursing staff, and then we can autonomously decide on our annual leave dates." (N15)

Properly scheduling breaks and vacations can also help alleviate nurses' mental stress, enabling them to approach work with a more positive mindset.

3.4.4 Pressure relief channels and organizations

Nurses, facing numerous pressures and challenges in their work, need appropriate channels or organizations to release and alleviate stress, establishing a positive emotional approach to deal with challenges or unexpected events.

"While improving patient experience and satisfaction, it's equally crucial to pay attention to the physical and psychological well-being of the nursing staff, ensuring that their rights and safety are protected. I suggest organizing more group activities and entertainment events to relieve nurses' stress." (N7)

"The union's activities, like the spring and autumn outings we had before, make me feel relatively happier because I can leave my work concerns behind during those times." (N13)

"The hospital has a Nursing Humanities Committee. I'm actually quite interested in it, but I'm not sure what I would be doing there, and I worry about whether the things I share would be kept confidential." (N17)

"Conducting regular psychological health assessments and providing nurses with a confidential avenue to express their feelings is essential." (N18)

Thus, when management offers necessary support to nurses, they should also consider establishing a system to protect nurses' privacy, allowing them to share their feelings without reservations.

4 Discussion

Our interviews found that nurses suggested that the hospital leadership need to develop humanized management, pay attention to nurses' emotions and confusion, and get along with employees like friends, nurses also believe that hospitals should respect and recognize their contributions, provide professional training opportunities and clear promotion systems, and help nurses realize their professional value. Nurses suggest avoiding excessive training and provide an appropriate scheduling, especially for nurses who have completed night shifts, advocating a balance between work and rest for reducing nurses' workload. In addition, nurses hope that management can take measures to alleviate their work pressure, such as group building activities, Nursing Humanities Committee, psychological health assessments. Therefore, establishing a humanized management system is an important strategic measure, the new humanizing policy brings a new meaning to the healthcare professional/patient relationship, triggering significant benefits for individuals, groups and organizations (19). Create a positive workplace environment had the power to improve employee performance (20). Similarly, a positive workplace environment also improved the employee commitment level and achievement-striving ability significantly.

During this interview,we found that nurses believe that transparent communication and information feedback are crucial in hospital work, and equal communication and quick feedback help nurses complete their work more effectively, an organization's day-to-day transparent communication practice characterized by information substantiality, accountability and employee participation largely contributes to employees' positive evaluation of the organization (21).

Furthermore, nurses want to change the status quo, their salaries are too low to afford family expenses, and their salaries should match the intensity of their work. Optimize the rational allocation of human, material, and financial information resources (22). The low salary level is an important factor affecting the work pressure and job satisfaction of nurses. Research shows that the salary level of nurses in China is relatively low, resulting in the inability to reflect the work value of nurses.

Also, after most nurses experience nursing adverse events, they will be questioned, criticized, and punished, they hope that they can receive support from management. Many nurses express great fear and anxiety regarding the handling of nursing adverse events. Significant negative correlations were found between adverse events and both family and manager support (23). Hospital managers should provide effective support to nurses, including the provision of information and collegial support after adverse events occur.

Based on nurses' real experiences and the HSWERM model, this study offers a profound understanding of nurses' support needs regarding psychological resilience in their workplace settings. provides a direction for managers to improve the nursing workplace environment from multiple perspectives and levels, and enhance the psychological resilience of nurses.

4.1 Magnetic work policies and structures encourage nurses to provide feedback, promote nurse professional development, and foster lifelong learning

Nursing is unique and complex, and compassion is a moral and spiritual empowerment inherent in nursing. Compassion is applied when the nurse interacts with the patient and shares the pain reflected in their behaviors and attitudes. When nurses perceive and are chronically exposed to nursing stress on the job, it can lead to a state of emotional, physical, and psychological exhaustion. This emotional exhaustion reduces job satisfaction, poorer judgment and discrimination (24). It also reduces the quality of patient care and impairs the nurse-patient relationship. The stressful and high-risk nature of nursing makes the profession more susceptible to symptoms of compassion fatigue than other healthcare professionals (25).On a societal level, it has a negative impact on health care organizations. In addition, in China, the nurse-patient ratio is low. There is a "doctor over care" phenomenon among both patients and health care providers. which creates excessive workloads and emotional stress for caregivers. Under high pressure, it is difficult to provide comprehensive physical and emotional care to every patient. Such adverse feedback can add to the emotional burden of nurses.

Such adverse feedback can add to the emotional burden of nurses. Research has shown that Continuing Professional Development (CPD) in nursing is an important part of the nursing workplace environment. Experienced nurses experience contextual barriers related to lack of support structures and lack of access to CPD resources, lack of support from managers and

other colleagues, Lack of avenues for self-worth. Lack of access to CPD resources and activities affects the quality of care and adversely affects nurse satisfaction, recruitment and retention, and reduces nurses' psychological resilience (26).

This study found that enhancing the support of care managers and care teams was beneficial in increasing caregivers' sense of belonging, decreasing emotional isolation, and alleviating dysphoria. Expanding different career paths for nurses, exploring possibilities for continued professional development, assisting nurses in realizing their self-worth, achieving a reduction in the risk of damage from a single pathway to fulfillment, improving emotional regulation, optimizing the workplace environment, and increasing psychological resilience.

Effective system management and emotional support significantly impact nurses' stress perception and coping mechanisms. Establishing transparent and bidirectional communication channels fosters internal motivation within the organization, promoting nurses' enthusiasm and minimizing negative emotions.

Genetic work policies and structures should focus on two key aspects: encouraging open feedback and nurturing the professional development of nurses. On a broader scale, the implementation of policies centered around human well-being can significantly decrease nurses' perceived stress (27). Such policies not only enhance their resilience to unforeseen challenges but also contribute to the stability of the nursing team, paving the way for a magnetic hospital environment (28). Crucially, fostering robust, bidirectional communication channels—both within nursing and across disciplines—is essential (29). Effective interprofessional communication ensures that nurses not only receive the respect they deserve but can also anticipate and manage emergencies better. Recent studies, like Bender et al.'s, highlight the potential of innovative interventions like healthcare improvisation communication workshops in improving such communication (30). Moreover, supporting nurses' professional growth bolsters their psychological resilience. Managers can achieve this by implementing transparent management competitions, streamlined management structures, advanced training modules, and specialized nursing platforms (31). This not only clarifies nurses' career trajectories but also reinforces their sense of purpose, leading to higher job satisfaction, a positive work cycle, and enhanced psychological resilience (32).

4.2 Refining work procedures and adjusting training intensity boost nurses' care skills

China is a large country with a large population. It has huge medical needs. There are varying degrees of equity in the clustering of the number of RNs in different cities and regions. There is a regional allocation of nursing staff resources, and the overall nurse-patient ratio is substandard. Much evidence suggests that hospital nurse staffing is associated with patient prognosis, and it is also associated with nurses' mental health (33).Frequent shifts and night shifts can fill a nurse's life when the nurse-to-patient ratio is out of balance. Complex workflows can add to the workload and result in significant overtime. Excessive operational training and assessment further compresses nurses' rest time, preventing them from getting timely and quality relaxation. Such a poor workplace environment makes nurses prone to doubt the meaning of life. It makes them suffer from severe anxiety and depression, which damages the mental health of nurses. Reasonable patient-care ratios, adequate supplies, and smoother workflow will optimize the nursing workplace environment. These can reduce unnecessary workloads and enable nurses to focus on patient care, thereby improving the quality of care, reducing nurse burnout, and increasing nurses' psychological resilience. The study concluded that minimum nurse-patient ratio policies are a viable way to improve nurse staffing and patient outcomes with a high return on investment (34).

Interview findings highlight nurses' pronounced desire for equitable human resource distribution (35). Sufficient staffing is crucial in alleviating nurses' workload and stress. In situations with limited staffing, managers are advised to adopt flexible staffing strategies, adjusted for the varying demands throughout different periods and units (36). Embracing streamlined, standardized, and modern work procedures, supplemented by advancements in nursing technology, can further mitigate staffing shortages (37). As delineated in the interviews, innovations like enhanced Personal Digital Assistants (PDAs) and the incorporation of pneumatic logistics significantly diminish nurses' physical demands (38).

While ongoing training fortifies nurses' skillsets, it can inadvertently heighten their educational burden. Hence, management should develop talent nurturing models congruent with nurses' real-world developmental needs (39). By judiciously calibrating training intervals and methodologies, managers can optimize the learning process, ensuring nurses are adeptly prepared for clinical scenarios.

4.3 A just, compassionate, and secure work setting offers nurses personal support and room for self-adaptation

Nurses, as an important part of the health care workforce, are paid far less than physicians. Many nurses find it difficult to cope with the enormous pressure of financial life, resulting in an imbalance in the ratio of health care workers to nurses. Disproportionate ratio of medical to nursing, on the one hand, will lead to part of the medical work due to the lack of nursing staff cannot be carried out normally, affecting the physician's motivation; on the other hand, it will increase the workload of the existing nursing staff, seriously affecting their physical and mental health. A multi-site patient-level longitudinal survey explored the relationship between nurse staffing methods and risk of adverse events (40). Uncoordinated nursing staffing ratios can have an impact on adverse events. Adverse events can have a wide-ranging negative impact on nurse burnout, which in turn affects nurses' psychological resilience. Adverse events are positively associated with nurse burnout. Adverse events have a greater impact on nurse burnout when nurses strongly identify with their work team, while the impact on nurse burnout is diminished when

the safety climate is better. That's why managers need to focus on creating a favorable safety climate (41).

Salary and associated benefits are paramount determinants of a nurse's job satisfaction, their experience of occupational stress, and their overall engagement in their roles (42). Our qualitative interviews revealed a consistent theme: nurses, particularly those on contract terms, emphasized the significance of transparent and equitable compensation systems. Advocating for and implementing such systems, characterized by the principle of equal pay for equivalent work, not only supports individual job satisfaction but also underpins the broader stability of psychological resilience within the nursing community (43).

The optimal scheduling of shifts is an intricate balance of addressing the hospital's operational needs while ensuring nurses have sufficient rest. Beyond just the operational implications, thoughtful scheduling that ensures nurses receive adequate sleep, and has allowances for their personal and family commitments, sets the foundation for sustainable, long-term nursing practices. Such practices translate to reduced burnout and improved patient care (44).

Every medical profession, nursing included, faces the risk of adverse events. Such events can be detrimental, not just from a clinical perspective, but they also carry significant emotional consequences, particularly when amplified by public reactions (45). It's imperative for institutions to develop a two-fold approach: proactive strategies that aim to minimize such events and reactive strategies that provide support and tools for recovery after such events. Additionally, offering specialized courses that focus on emotional and stress management can offer nurses tools and strategies to navigate these challenging situations, bolstering their psychological resilience (46).

By utilizing the HSWERM model, this research offers a unique lens through which to view and analyze the lived experiences of nurses, particularly concerning their psychological resilience within current practice settings. The findings, which meld both practical implications and theoretical contributions, serve as a foundational guide for the development of tailored interventions aimed at enhancing the workplace environment for nurses. However, it's crucial to acknowledge the study's geographical limitation; being concentrated solely on a tertiary general hospital in Zhengzhou might not capture the broader nuances of the nursing community. Therefore, future research endeavors should consider a more expansive, multi-centered approach, incorporating both quantitative and qualitative methodologies, to provide a richer, more comprehensive understanding.

5 Limitations

The limitations of this study are mainly related to the study design and small sample size of the qualitative study. In this study, the nurses we interviewed all came from the same hospital, which limited the universality of these nurses' perspectives among all nurses. Because nurses in other hospitals may hold controversial points because of their different systems and workplace environments.

6 Conclusion

The perspectives of nurses for a workplace environment demands needs to be appreciated, and in addition, it is worth noting that the key role of building a good workplace environment in strengthening the resilience of nurses emphasizes the need for careful consideration. Nursing administrators should formulate policies and measures from multiple perspectives based on the real needs of nurses in terms of professional, practical, and personal dimensions.

7 Recommendations for future research

To enhance the depth and breadth of understanding concerning environmental factors affecting nurses' psychological resilience, future investigations should incorporate diverse research methods across varied clinical settings. Such an approach would not only validate the findings of this study but would also offer a repository of actionable insights for nursing managers, policy-makers, and educational institutions. Future research can start from the research design of quantitative research to explore the extent to which the resilience related factors based on the workplace environment affect the resilience of nurses. Based on this, further intervention research can be carried out to explore effective measures to improve the resilience of nurses and improve the workplace environment of nurses. Longitudinal dynamic changes in nurses' resilience based on relevant workplace environment factors can also be carried out.

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

The studies involving human participants were reviewed and approved by Medical Ethics Committee of The Third People's Hospital of Henan Province. The patients/participants provided their written informed consent to participate in this study.

Author contributions

ML: Conceptualization, Investigation, Methodology, Writing – original draft. RZ: Conceptualization, Investigation, Project administration, Writing – original draft. JW: Data curation, Investigation, Writing – original draft. LZ: Validation, Writing – review & editing. SY: Validation, Writing – review & editing. YT: Visualization, Writing – review & editing. LW: Writing – review & editing. WZ: Resources, Writing – review & editing. XX:

Supervision, Writing – review & editing. CH: Conceptualization, Writing – review & editing. ZP: Methodology, Writing – review & editing. RS: Resources, Writing – review & editing.

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Conflict of interest

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

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A population health approach to workplace mental health: rationale, implementation and engagement

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Objectives: To describe a population health-based program to support employee and dependent mental health and learn from engagement trends.

Methods: Retrospective analysis of a program utilizing an assessment of mental health risk. For scoring "at risk," a Care Concierge is offered to connect users with resources.

Results: Participation was offered to 56,442 employees and dependents. Eight thousand seven hundred thirty-one completed the assessment (15%). Of those, 4,644 (53%) scored moderate or higher. A total of 418 (9%) engaged the Care Concierge. Factors that negatively influenced the decision to engage care included bodily pain, financial concerns. Positive influences were younger age, high stress, anxiety, PTSD and low social support.

Conclusion: Proactive assessment plus access to a Care Concierge facilitates mental healthcare utilization. Several factors influence likelihood to engage in care. A better understanding of these factors may allow for more targeted outreach and improved engagement.

KEYWORDS

employee health, mental wellbeing, mental health risk, proactive outreach, engagement (involvement), assessment

Application of findings

- Shift workplace culture from reactive to proactive by offering regular mental health risk assessments for all.
- Learn how to create an outreach effort on mental health risk through our story.
- Set expectations for your own population's mental health engagement rates by risk type based on these results.

Introduction

The national burden of mental illness is expansive. In 2019, the prevalence of any mental illness in the United States was 20.6%, corresponding to a population of 51.5 million adults, and in 2020, this figure rose to 21%, representing 53 million adults (1). Although caution should be exercised when comparing 2020 prevalence data to years prior, due to the coronavirus disease 2019 (COVID-19) pandemic, an upward trend in mental illness prevalence is noteworthy and plausible (2). On the individual level, one in two adults will meet diagnostic criteria for a mental illness at some point across the lifespan (3). Moreover, common mood disorders often occur comorbidly with substance use disorders and anxiety disorders and other chronic conditions, suggesting that many individuals who struggle with mental illness are hindered by multiple conditions simultaneously. These realities reflect a growing public health crisis that generates significant costs for individuals, businesses, and society at large.

Direct spending on mental and behavioral healthcare in the United States has increased at an average annual rate of 4.6% since 2009 and is projected to surpass $280 billion in 2020 (4, 5). In addition to direct costs, mental illness in working adults generates indirect costs related to productivity loss, absenteeism, and presenteeism (6–13). These costs are estimated at over $1 trillion annually (14).

The economic burden of mental illness is not unique to the United States. Globally, mental illness is a leading cause of disability and contributes to more work loss and work impairment than other chronic medical conditions (15, 16). Beyond the financial consequences, mental illness contributes to personal suffering and diminished quality of life which are far more difficult to quantify.

From a clinical perspective, most mental illnesses are treatable. Multiple lines of evidence also suggest that public investment in mental healthcare has favorable benefit-to-cost ratios and produces cost savings in the long-term (17, 18). Despite the clear benefits of treatment, access to adequate mental healthcare remains profoundly limited for the majority of adults who need it. In multiple national health surveys, millions of adults with mental illness symptoms have reported unmet healthcare needs, leading to socioemotional impairment and reduced functional capacity (4, 19). There is a clear and critical need for concerted public health strategies that promote identification and management of mental and behavioral health conditions. With greater than 60% of the American population participating in the labor force, the workplace represents an opportune environment to trial such initiatives (16, 20).

Many employees have access to an Employee Assistance Program (EAP) as part of their employee benefits. However, utilization of these plans is low (21, 22). Often, they are perceived as crisis support tools rather than a comprehensive mental health initiative for employers. New, more expansive, employer-sponsored mental health programs are emerging. While novel and varied, early data support their use for both employers and employees. Multiple studies suggest that such mental health programs can improve psychological wellbeing and productivity, reduce absenteeism and healthcare costs, and positively shift employer attitudes toward mental health (16, 23–31). While these outcomes are encouraging, the cumulative evidence base for workplace mental health investment remains limited. The programs offered vary widely in approach and offerings. More research is needed on program structure and delivery to inform consensus and best-practice guidelines.

In 2018, Johns Hopkins Healthcare Solutions launched a novel employee mental health engagement program called *Balance*. This program is a proactive, population health-based approach. It delivers a technology-based assessment to all employees and adult dependents that identifies mental health risk factors among users. *Balance* then provides a personal Care Concierge services to bridge users to treatment based on individual needs and preferences using the employee's own benefits. The Care Concierge team was comprised of trained mental health professionals who were provided access to the *Balance* users benefits in order to guide and advise on care options and resources while also providing in the moment support. The purpose of *Balance* is (1) to improve workplace culture on the topic of mental health by recommending that all employees proactively check-in on their emotional wellbeing on a regular basis and (2) to lower barriers to mental healthcare such as limitations on access, convenience, cost and time requirements to find care. Based on data derived from a preliminary cohort study of *Balance* participants (32), we anticipated strong utilization of the program. In this study, we describe the rationale, development, and implementation of *Balance*, and explore how *Balance* users engaged with the program.

Method

Balance is a novel, employer-initiated employee mental health engagement program. It uses a technology-based behavioral health and wellbeing assessment to build individualized mental health risk profiles for employees. For those who reach a scoring threshold, *Balance* offers "Care Concierge" services to connect employees with appropriate treatment and resources. *Balance* was developed in 2018 at Johns Hopkins as a collaboration between psychiatrists and Johns Hopkins Healthcare Solutions, which is an innovation team within Johns Hopkins Medicine that develops and manages partnerships between healthcare researchers and industrial entities. *Balance* was made commercially available in 2019.

Eligibility, recruitment, and consent for outreach

This retrospective cohort study reviews data derived from a large national health service company that purchased *Balance* for internal use in 2019. This company employs approximately 46,000 adults across 49 states. Adults with eligible dependents over age 18, such as spouses or adult children, for whom the employees elected to provide medical coverage, were also eligible for *Balance*.

Balance was promoted to employees through multiple communications. Employees and eligible dependents who opted to enroll were directed to the *Balance* website, where they received additional information about the program and followed prompts to complete the initial enrollment step. The *Balance* website was accessible wherever the internet was available including at work or at home, and on computers, smartphones, and other portable electronic devices. Enrollment was cost-free, voluntary, and confidential. Registrants were matched to an employer provided eligibility file before receiving access to the *Balance* assessment.

Study data collection procedures

Data were collected from employees and eligible adult dependents who enrolled in *Balance* during the 6 months between September 4, 2019 and March 6, 2020. The cut-off date of the study period was selected retrospectively to avoid confounding influences related to the effects of the COVID-19 pandemic on mental health symptoms and healthcare utilization. The close date represents the day before significant workplace changes were announced to employees, including work from home policies and temporary furloughs.

Data were collected and deidentified prior to retrospective review. The Johns Hopkins University Institutional Review Board determined that this research qualified as exempt under Department of Health and Human Services regulations based on its use of deidentified data for secondary research without intention to reidentify or contact study participants (IRB00220549).

Data monitoring and quality control

Demographic and clinical data were collected and stored electronically on a secure web-based platform in accordance with the Health Insurance Portability and Accountability Act (HIPAA). Data quality was optimized by the use of standardized electronic data collection forms. Participant responses were restricted to automated input fields and fixed options to ensure consistency across participants and worksites, and to avoid clerical errors.

Data regarding referral patterns, health care utilization, and time spent coordinating care on the behalf of *Balance* users were collected by the Care Concierge. The eligibility data file, the assessment data, and the Care Concierge data were then concatenated into one file for analysis.

Behavioral health and wellbeing assessment

After enrolling in *Balance,* employees completed a standardized electronic behavioral health and wellbeing assessment offered through a virtual platform. The assessment consisted of 48 questions evaluating mental health symptom burden. Question topics included medical history, depression, anxiety, substance use, sleep, and stress. Employees were able to complete the assessment in one sitting or save their responses for completion at a later point in time.

Assessment questions on medical symptom burden focused on the presence or absence of chronic medical conditions including chronic pain. Assessment questions on mental health symptom burden were compiled from validated, self-administered psychiatric symptom scales, including the Patient Health Questionnaire-9 (PHQ-9), the Generalized Anxiety Disorder-7 (GAD-7), the Perceived Stress Scale-4 (PSS-4), the abbreviated PTSD Checklist-Civilian Version (PCL C-6), the Alcohol Use Disorders Identification Test (AUDIT-C), and The Oslo Social Support Scale.

Feedback report and risk stratification

The assessment scores on all measures were calculated and an overall acuity score was generated. This acuity score served as a gate-keeper to the Care Concierge with those scoring at moderate or above overall risk encouraged to schedule a consult with the Care Concierge immediately upon completing the assessment.

Individualized summary reports for each participant based on his/her assessment responses were provided immediately to the *Balance* user. These reports included feedback on eight specific domains of mental health and wellbeing, as well as an overall mental health risk group assignment. Domains included depression, anxiety, stress, alcohol misuse, substance misuse, sleep, social determinants of health, and life events. A more detailed report was also sent to the Care Concierge for those *Balance* users scoring moderate or above on overall mental health risk.

- *Mental health*: symptom burden was classified categorically from "no risk" to "severe risk" for four domains of mental health including depression, anxiety, traumatic stress, and alcohol use. For each of these domains, participants were given a visual representation of their symptom burden in the form of a color-coded graphic, along with a brief summary comment and/or a recommendation for next steps.
- *Wellbeing*: the wellbeing profile was classified categorically from "low" to "high" for four common measure of overall wellbeing including, perceived stress, financial stress, social support, and sleep disturbance. For each of these factors, participants were given a visual representation of their symptom burden in the form of a color-coded graphic, along with a motivational comment and/or a brief recommendation for stress-reduction.
- *Overall risk group stratification*: in order to focus utilization of Care Concierge services on those with the greatest need, an overall risk group categorization was used. The goal of the overall risk assignment was to capture all *Balance* users who may benefit from a Care Concierge consult with priority going to those with the greatest need. The algorithm to calculate overall risk from the various assessments of specific domains was tested to ensure that any *Balance* user who scored moderate or above for any one of several key inventories such as depression, anxiety, substance use, alcohol misuse, and traumatic stress were captured as moderate or higher on the overall mental health risk score. The overall risk algorithm reflected the risk levels of the validated, standardized measures included in the assessment.

Care Concierge outreach process

After submitting the assessment but before receiving feedback, employees were asked if they would like to receive outreach from a mental healthcare professional if their results indicate a need. After receiving results, a link was provided to self-schedule with the Care Concierge for all those scoring at a moderate or above risk level for overall acuity. For those who did not self-schedule and who elected to receive outreach, the Care Concierge could then reach out via e-mail or phone to schedule an appointment to discuss results and explore options for care. Those who did not consent to outreach but scored moderate or higher in risk were provided the link and encouraged to self-schedule a Care Concierge appointment. This approach allowed all *Balance* users to opt out of outreach for those disinclined to receive it. It also

afforded those comfortable with outreach with multiple touch points to schedule an appointment.

Referrals, resources, and bridging to care

The Care Concierge received full assessment results from all *Balance* users who scored moderate or higher. Appointments were conducted by phone. The initial appointment was approximately 40 min in length and included a review of the assessment results as well as a few additional questions. Answers were recorded in an Electronic Medical Record (EMR) and were later concatenated to the assessment data and eligibility data file for a complete record of the *Balance* user's engagement with the program. The Care Concierge team was comprised of masters degree-level mental health practitioners such as social workers and therapists, trained on all relevant benefits information for the employer, then discussed resources and care options with *Balance* users to determine how best to engage in mental health care. At the completion of each appointment, a care plan was developed and issued to the *Balance* user to guide them to resources. Resources suggested in the care plans included referral to a behavioral health provider through EAP for short term issues, the health insurance provider for long term needs, local emergency resources, and support groups. In addition, tip sheets were offered on ways to connect to a medical provider (e.g., a primary care provider). Also offered were specific financial resources available through the employer and ways to take advantage of work life services (e.g., childcare, eldercare, or financial resources). When behavioral health treatment from an EAP or medical provider was recommended and agreed to by the user, the Care Concierge facilitated access to available providers who were accepting taking new patients and who met the user's criteria (location, personal preferences, insurance, and required skill sets). The time necessary to identify resources was tracked by the Care Concierge for later analysis.

Outreach efforts by the Care Concierge to secure appointments with those scoring moderate or higher were also tracked by channel of outreach (i.e., e-mail, phone call) and frequency.

Data capture

Participation and utilization data included:

- *Concierge outreach efforts*: as measured by the count of phone calls and/or e-mails to secure initial connection to the Care Concierge;
- *Employee participation patterns*: measured as the percentage of employees and eligible dependents who completed enrollment in *Balance* and submitted the behavioral health and wellbeing assessment;
- *Care Concierge utilization*: measured as the percentage of employees who were eligible for a Care Concierge consultation based on risk stratification, and subsequently completed a Care Concierge consultation;
- *Care Concierge engagement*: measured by time spent working with *Balance* users, categorized by time spent in consultation with the user and time spent engaged in outreach to secure appointments with referred resources; and
- *Completed referrals* recorded in the Care Concierge record when *Balance* users responded to queries from the Care Concierge confirming successful completion of the first appointment with a provider.

Data used to predict use of concierge services included:

- *Baseline demographics*: age and gender;
- *Medical history*: presence or absence of chronic medical conditions including chronic pain;
- *Self-reported mental and behavioral health symptoms*: as measured by the PHQ-9, GAD-7, PSS-4;
- *Social determinants of health*: as measured by the Oslo Social Support Scale, and a series of questions that align with the Center for Disease Control and Prevention's (CDC) social determents of health including: food and shelter insecurity, risk for physical and verbal abuse, caring for a loved one with a mental or physical illness and job loss or insecurity; and
- *An overall risk-stratification score*: as calculated by a proprietary clinical scoring algorithm that incorporated measurements of mental and behavioral health history and social determinants of health as defined above for the purpose of determining need and access of Care Concierge services

Analysis

We describe the number of employees and dependents who completed the behavioral health and wellbeing assessment, what their risk scores were, and whether they used the Care Concierge services. We then describe the characteristics of individuals who scored moderate risk or higher and who used or did not use the concierge services, reporting frequencies with percentages for categorical variables and mean with interquartile ranges for continuous variables. We conducted bi-variate analysis to examine the association between each predictive variable with use of concierge services using chi-square tests or Wilcoxon rank sum tests. To further explore the driving factors for individuals to use the concierge services, we performed logistic regression models using the backward stepwise selection of variables with elimination criteria set at the $p = 0.2$ level. The stepwise approach is a method used to fit regression models by iteratively selecting predictive variables based on predefined criteria. In each step, variables are considered for inclusion or exclusion from the model, with a prespecified criterion, typically set at a significance level of $p = 0.2$ as utilized in this study. This iterative process is particularly useful for exploratory analyses, allowing for the management of a large number of potential predictor variables and the selection of the most appropriate set for model inclusion. The predictive variables included in the model have been described in the data capture section. Moreover, the criterion level of $p = 0.2$ was chosen to balance the need to limit information loss while dealing with a substantial number of predictive variables (>25 in this study) (33–35). This threshold aligns with commonly adopted practices in stepwise regression modeling. It's important to note that the significance level was set at $p = 0.05$.

For employees and dependents who used the concierge services, we described whether an action plan was created, whether the case was closed, overall duration of activities, number of appointments,

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outreach activities, and referrals recommended and used. Several *Balance* users took the *Balance* assessment multiple times throughout the time period. Our analysis focused on initial assessments only. Two employees presented to the Care Concierge based on references without first taking the *Balance* assessment.

Results

Of the 56,442 employees and dependents who were offered to participate in *Balance* during the time period 11,567 registered for *Balance* (21%), and 8,731 completed the assessment (15% of all those eligible). A total of 4,644 employees (53% of those who completed the assessment) scored moderate risk or higher and were proactively offered Care Concierge services after completing the survey.

Of those who completed the assessment, 70% indicated their willingness to be contacted by the Care Concierge if their results indicated they may benefit from a consultation. Among the 418 with moderate or high risk and used concierge services, 215 (51%) self-scheduled their appointment "prior to outreach" while 192 (46%) scheduled in response to outreach.

Among those who had access to the Care Concierge (4,644), several differences in likelihood to follow-up with the service were noted (Table 1). Age group trends were evident. Younger *Balance* users were more likely to schedule and complete a follow-up consultation (ages 19–34 years) compared to other age groups ($p = 0.002$). However, those age 45–64 scored at a similar rate to the youngest age group (28.5% engaging in follow-up compared to 29% in the youngest group). *Balance* users currently seeing a doctor, therapist, or other professional for a mental health concern were more likely to complete a consultation with the Care Concierge ($p = 0.010$) and those who consented to outreach from the Care Concierge were more likely to engage and complete a Care Concierge appointment ($p < 0.0001$).

Eligibility to meet with the Care Concierge was defined by an overall mental health risk score designed to ensure that Care Concierge resources were granted to those most in need. The choice to engage the Care Concierge was associated with certain trends in the screening tool. Individuals who engaged the Care Concierge scored higher on the PSS, GAD2, GAD7, PHQ8, PCL-C-2 AND PCL-C-5 and lower on the Oslo Social Support Scale, generally signifying higher perceived stress, more severe anxiety and depression, greater severity of trauma symptoms, and fewer social connections and support systems (Table 1).

We examined indicators useful in measuring social determinants of health among *Balance* users based on Oslo Social Support Scale and a series of questions that align with the CDC's social determents of health to understand likelihood to engage in services based on lifestyle factors. Responses that were indicators of increased likelihood to access the Care Concierge are listed in Table 2 and these included experiencing verbal abuse ($p = 0.002$), experiencing a financial crisis in the past 6 months ($p = 0.031$), and having financial concerns regarding meeting daily needs ($p = 0.031$) and monthly expenses ($p = 0.014$).

A stepwise regression analysis addressed potential confounding variables such as age and consent for Care Concierge contact (Table 3). Factors that negatively influenced the decision to engage the Care Concierge included: bodily pain in the last month, meeting monthly

TABLE 1 *Balance* users scoring moderate or above in mental health risk who elected to engage (yes) or not engage (no) the Care Concierge follow-up service.

	Follow-up consultation				*p*-value
	No		Yes		
	n = 4,212	%	*n* = 418	%	
Age					
19–34	1,267	30.1	121	29.0	0.002
35–44	1,114	26.5	82	19.6	
45–54	1,062	25.2	119	28.5	
55–64	657	15.6	88	21.1	
65+	112	2.7	8	1.9	
Gender					
Male	936	22.2	80	19.1	0.338
Female	3,253	77.2	336	80.4	
Non-binary or transgender	23	0.6	2	0.5	
Active military member or veteran					
No	4,073	96.7	406	97.1	0.637
Yes	139	3.3	12	2.9	
Screen of drug use					
Negative	3,954	93.9	392	93.8	0.939
Positive	258	6.1	26	6.2	
Currently seeing a doctor, therapist or other professional for a problem					
No	3,200	76.0	298	71.3	0.034
Yes	1,012	24.0	120	28.7	
Asthma					
No	3,545	84.2	353	84.5	0.879
Yes	667	15.8	65	15.6	
Back pain					
No	1991	47.3	190	45.5	0.478
Yes	2,221	52.7	228	54.6	
Cancer					
No	4,057	96.3	402	96.2	0.879
Yes	155	3.7	16	3.8	
COPD					
No	4,128	98.0	406	97.1	0.230
Yes	84	2.0	12	2.9	
Diabetes					
No	3,852	91.5	379	90.7	0.586
Yes	360	8.6	39	9.3	
Heart disease					
No	4,126	98.0	409	97.9	0.878
Yes	86	2.0	9	2.2	

Chi square tests were used to identify demographics and healthcare related factors that were a statistically significant impact in whether or not a follow-up visit was completed. *Balance* users currently seeing a provider for a mental health issue were more likely to complete a follow-up visit. Those between age 19–34 were more likely to engage the Care Concierge as well. Fourteen *Balance* users were excluded due to missing age or gender information.

TABLE 2 Social determinants of health (SDoH) factors between users with vs. without follow-up.

	Follow-up consultation				*p*-value
	No (*n* = 4,212)		Yes (*n* = 418)		
How often does anyone, including family, insult or talk down to you? Mean (SD)	2.24	1.09	2.43	1.16	0.001
How often does anyone, including family, physically hurt you? Mean (SD)	1.08	0.35	1.06	0.33	0.069
How often do you worry about money? Mean (SD)	1.82	1.11	1.87	1.10	0.420
I have had a financial crisis in the last 6 months, n (%)					
Agree	1813	43.0	158	37.8	0.039
Disagree	2,399	57.0	260	62.2	
My greatest financial concern, n (%)					
Meeting daily needs such as food and shelter	1,129	26.8	78	18.7	<0.001
Meeting my monthly expenses such as car payments and insurance	2,276	54.0	201	48.1	0.020
Paying off debt	2,840	67.4	281	67.2	0.933
Saving for retirement	2,436	57.8	256	61.2	0.178

Social determinants of health of *Balance* users were measured by indicators listed in this table. Wilcoxon rank sum tests or chi square tests were used to determine which variables were significant in affecting the likelihood of engagement in follow-up visits. Individuals completing a follow-up visit were more likely to be experiencing verbal abuse and less likely to be in a financial crisis.

TABLE 3 Stepwise regression on factors that contributed to the likelihood to engage in Care Concierge follow up after assessment results.

	Outcome variable: engagement in Care Concierge follow up (*n* = 4,630)		
	Odds ratio	95% CI	*p*-value
Age			
19–34	1		
35–44	0.91	(0.67–1.22)	0.517
45–54	1.47	(1.11–1.94)	0.006
55–64	1.74	(1.28–2.36)	<0.001
65+	0.92	(0.43–1.96)	0.828
Physically hurt	0.78	(0.56–1.10)	0.155
Financial crisis in the last 6 months	0.76	(0.59–0.97)	0.030
Have concerns on meeting daily needs such as food and shelter	0.69	(0.52–0.93)	0.014
Have concerns on meeting my monthly expenses such as car payments and insurance	0.83	(0.65–1.05)	0.125
Perceived stress score (PSS)	1.11	(1.06–1.16)	<0.001
Generalized anxiety disorder (GAD)-2	1.09	(1.01–1.17)	0.022
PCL-C-2 score	1.07	(1.01–1.12)	0.011
Oslo social support scale (OSSS-3)	0.95	(0.91–0.99)	0.026
Tobacco use	0.94	(0.87–1.02)	0.147
Bodily pain in the past month	0.87	(0.80–0.95)	0.002

A stepwise regression on follow-up consultations was done to address confounding variables (consent for Care Concierge contact and visits done after March 6th 2020). This table lists, the demographics, social determinants of health and screening surveys measured in the analysis.

expenses (payments and car insurance), positive drug screen, financial crisis in the last 6 months, tobacco use, and meeting daily needs such as food and shelter. Factors that positively influenced the decision to engage the Care Concierge included: being between the ages of 45–64, higher levels of stress, and reporting symptoms of anxiety and PTSD.

The mean number of outreach activities was 2.43 attempts per *Balance* user (Table 3). On average, a Care Concierge spent 2.5 h per person in a follow-up visit with a standard deviation of 1.28 h. If employees presented to the Care Concierge with high emotional affect or specific requests in care management, visits lasted longer (Table 4).

The Care Concierge created care plans for 393 participants. Those care plans included 281 referrals to other mental health resources and providers. The number of referrals made in the care plans ranged from 0 to 4. A total of 252 participants followed up for multiple conversations with their Care Concierge for in-the-moment support or follow-up on the care plan and referrals. Care Concierges provided at least one recommendation to 94% of *Balance* users they engaged (Table 5). Emotional wellbeing, establishing a short-term provider, and referrals to behavioral health/substance misuse providers were the most common recommendations at 78, 55.3 and 24.6%, respectively.

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TABLE 4 Description of activity hour, appointments, and outreach activities ($n = 418$).

	Mean	SD	Median	IQR	Range	% individuals with at least one appointment or outreach activities
Activity hour	2.53	1.28	2.25	(1.58–3.08)	(0.58–9.58)	
Appointment						
No. of all appointments	1.09	0.30	1	(1–1)	(1–3)	100
No. of telephonic appointments	1.02	0.39	1	(1–1)	(0–3)	94.0
No. of video appointments	0.06	0.26	0	(0–0)	(0–2)	6.2
Outreach activity						
No. of outreach activities	2.43	1.61	2	(1–3)	(0–15)	94.3
No. of emails	1.30	0.68	1	(1–2)	(0–4)	89.0
No. of guide activities	0.01	0.11	0	(0–0)	(0–2)	0.5
No. of independent activities	0.00	0.05	0	(0–0)	(0–1)	0.2
No. of legacy activities	0.36	0.72	0	(0–1)	(0–6)	26.1
No. of phone calls	0.77	0.81	1	(0–1)	(0–5)	59.1

Care Concierges tracked time spent with *Balance* users during follow-up visits as well as the methods and time spent on outreach efforts for those who consented to outreach. The average time spent with employees was 2.53 h with a notably wide range of 0.58–9.58 h, highlighting the ability of balance to deliver individualized care. Approximately 2.4 outreach activities were employed by Care Concierges to engage *Balance* users who consenting to be contacted to complete follow-up visits.

TABLE 5 Description of recommendations/referrals and usage rate ($n = 418$).

	Mean	SD	Median	IQR	Range	% individuals with at least one recommendation/ referral	% individuals with referrals using at least one recommendation/ referral
No. of all recommendations/referrals	2.03	1.13	2	(1–3)	(0–6)	94.0	60.3
Behavioral health facility	0.00	0.05	0	(0–0)	(0–1)	0.2	0.0
Behavioral health/substance abuse provider	0.31	0.59	0	(0–0)	(0–3)	24.6	3.9
Career wellbeing	0.00	0.05	0	(0–0)	(0–1)	0.2	0.0
Emotional wellbeing	0.81	0.47	1	(1–1)	(0–2)	78.0	67.8
Financial wellbeing	0.16	0.46	0	(0–0)	(0–2)	11.5	33.3
Physical wellbeing	0.05	0.26	0	(0–0)	(0–3)	3.8	0.0
Short term provider	0.61	0.62	1	(0–1)	(0–3)	55.3	11.7
Substance abuse facility	0.00	0.00	0	(0–0)	(0–0)	0.0	—
Support group	0.04	0.20	0	(0–0)	(0–2)	3.6	13.3
Work life services	0.03	0.19	0	(0–0)	(0–2)	2.4	20.0

Utilization of recommendations by the Care Concierge team by *Balance* users are noted in this table. Ninety-four percent of employees completing a follow-up visit received at least one recommendation from the Care Concierge. The most frequently used recommendations provided to users include those pertaining to addressing emotional wellbeing, establishing a short term provider and seeking behavioral health/substance abuse providers. Sixty percent of users receiving a recommendation were recorded as using at least one of the recommendations provided by the Care Concierge. The most utilized recommendation pertained to addressing emotional wellbeing, financial wellbeing and work life services.

Referrals pertaining to substance abuse facilities, behavioral health facilities, and career wellbeing were among the least utilized during Care Concierge visits at 0, 0.2 and 0.2%, respectively.

Of the recommendations given, the degree to which a type of referral was utilized by a *Balance* participant was measured as the percentage of individuals using the recommendation provided (Table 5). Of the employees who received at least one recommendation, 60.3% were recorded as using at least one of the referrals provided by the Care Concierge. Emotional well-being, financial wellbeing, and work life services were the most utilized recommendations by users at 67.8, 33.3, and 20%, respectively. Of the 418 Care Concierge engagements, 298 individuals (71%) reported that they were seeking mental health services for the issue at hand for the first time while 120 (29%) were seeking support for an issue where a mental health provider was currently engaged.

Discussion

The Johns Hopkins *Balance* program is designed to support employers and employees by raising awareness of mental health risk and facilitating care for those in need. In doing so, the program collects valuable data on the mental health challenges of participants as well as the way in which these individuals choose to engage with

mental healthcare resources. By analyzing data collected from employees and eligible dependents enrolled in *Balance*, this retrospective cohort study investigates the utilization of a novel mental health engagement program. Results demonstrate differences in willingness to engage mental health services by a variety of factors. By understanding who may be inclined or disinclined to engage in care we may be able to tailor strategies to the special needs of each group.

In total, 8,731 employees and eligible dependents completed the *Balance* screening assessment. Of those, 418 *Balance* users scoring moderate or above in overall acuity completed a visit with the Care Concierge service. The Care Concierge is a trained and licensed mental health professional receiving guidance and oversight from Johns Hopkins *Balance* Medical Directors. For the 418 *Balance* participants who engaged the Care Concierge, a phone consultation took place to review *Balance* assessment results and to discuss current mental health needs and available resources.

Balance was designed with the understanding that (1) mental healthcare is valuable and effective and (2) the process of securing mental healthcare is time-consuming and difficult. By proactively encouraging a population to assess their mental health status and by making the connection to care markedly easier for those in need, employers can meaningfully impact the health of employees and their dependents.

Balance was designed to improve workplace culture related to mental health and to lower the barriers to care for those in need. Proactive efforts may prevent expensive acute episodes of care such as emergency room visits or inpatient hospitalizations, as well as improving employee performance via reduced absenteeism and increased presenteeism (36). *Balance* is distinguished from other employee health resources currently offered in the workforce by using a proactive, population health-based approach for all employees at every level of the organization and at every level of mental health risk.

When studying utilization data, several variables were found to be associated with likelihood to engage the Care Concierge for those scoring at moderate or above overall risk. A bimodal distribution was evident by age. Participants whose age fell into the 19–34 range were significantly more likely to complete a meeting with the Care Concierge (29%). This may be an indication of increased openness, willingness, need or availability to engage in mental health. Similarly, rates of Care Concierge use for 45–64 year old age group was high (28.5%) This age range may represent individuals who increased availability to seek out mental healthcare due to changes in personal responsibilities. This age range may also include the accumulation of pressing life events which may explain the increased participation in Care Concierge consultations. Users between 35–44 were less likely to engage in the Care Concierge. There are several possible explanations including increased use of other care options outside of the *Balance* Care Concierge, less time to engage in mental healthcare due to other life responsibilities, or less appetite to engage in mental healthcare services. The multimodal age distribution illustrates *Balance*'s potential to provide resources intrinsic to employees as they move through different stages of life.

In addition to demographic patterns, we saw patterns in the relationship between type of mental health risk and the choice to engage the Care Concierge. Those experiencing heightened levels of perceived stress and increased severity of anxiety and PTSD symptoms were more likely to engage the Care Concierge than others. This may suggest that these conditions motivate the individual to seek care compared to other conditions. The cause for this observation is unknown, but a possible explanation may be that employees with these anxious symptoms may more likely seek help because they believe that these symptoms can be effectively treated with medications and therapies compared to other psychiatric symptoms. Individuals who reported lower social support scores were more likely to engage the Care Concierge. This may suggest that those with stronger social networks are less likely to engage in mental health resources than those who are more isolated.

Variables decreasing the likelihood of employees following up with a Care Concierge include substance use disorder, bodily pain, and presence of financial crisis. Substance use disorders may be substantively different from other mental health conditions in a variety of ways. Stigma may be a major barrier, particularly in the workplace. Moreover, treatment for substance use disorders may present the individual with a different risk/reward consideration compared to other mental health treatments. Treatment success may be perceived as less likely or too costly (37, 38). Given the importance of treating addiction, particularly for employers, an approach to better target and support these *Balance* users should be identified.

Similarly, if those experiencing physical pain are less likely to address their mental health issues, we may be losing the opportunity to make an important impact on providing care for employees' physical and mental needs. Physical pain may cause depression and depression may make one less likely to effectively manage physical pain. Individuals suffering physical pain may attribute their emotional state to their taxing physical pain causing them to overlook the opportunity to address mental health challenges. Identifying those with heterogeneous conditions may allow for targeted outreach and greater engagement in mental health solutions.

A similar phenomenon may be true for those who have undergone a recent financial crisis, as individuals may be less likely to seek mental healthcare because they have prioritized addressing the immediate financial needs rather than investing time and resources into mental health. Offering special programs to support financial stress paired with targeted messaging may help engage these individuals to utilize services addressing the interplay between lifestyle challenges, mental health, and their possible confounding effects.

Balance successfully identified individuals with no past or present healthcare providers and offered guidance in connecting them with appropriate resources. Capturing this subset of individuals highlights the program's accessibility to people who potentially would not receive professional healthcare otherwise. Tailored recommendations addressing the specific needs of each individual user illustrates the breadth and flexibility of *Balance*'s support for employee wellbeing.

While our data did not include *Balance* utilization during the pandemic, preliminary evidence suggests that quarantine and isolation for infection control will be associated with an increased incidence of mental health conditions (2), as mental health sequelae of the coronavirus pandemic will likely only increase the need for employers to encourage and facilitate mental health resources (39). Moreover, the use of technology-based screening tools and telehealth interventions are becoming increasingly relevant as institutions across the country restructure their environments to promote social distancing measures (40).

Limitations

The *Balance* assessment was completed by 8,731 employees and eligible dependents. Of those, 420 continued on to the Care Concierge

service. However, many others may have engaged in mental healthcare on their own without use of the Care Concierge. A future analysis of claims and pharmacy data to track utilization of healthcare services amongst *Balance* users vs. non-users is planned to determine if the assessment alone was useful in driving mental healthcare services.

Once referrals were delivered to the 418 individuals who met with the Care Concierge, confirmation that appointments were kept was not reliably recorded as providing that information was at the discretion of the *Balance* user or service provider. This analysis cannot be used to demonstrate that mental health care services were delivered for all those who accessed the Care Concierge and were referred to care. The outcomes of mental health care services delivered by providers were not captured. Taking the assessment may have encouraged some to seek mental health services from existing providers rather than engaging the Care Concierge offering. Our study did not capture all possible impacts of the assessment process.

Balance was designed to improve workplace culture related to mental health and to lower the barriers to care for those in need. However, our study did not allow for a comparison of pre-post workplace culture nor for use of comparison groups. We were able to quantify utilization of the program but could not compare it to mental healthcare in the absence of *Balance*.

Future offerings

The *Balance* team meets regularly to improve the program based on user feedback and advancements in the field of mental health. The next iteration of *Balance* will include a psychoeducational component that teaches users about mental health etiology and treatment through the lens of the Johns Hopkins perspectives of psychiatry model (41). The *Balance* program is a high-touch model capturing a wide range of personal struggles that influence mental health. Our study demonstrates how a human-centric, scalable program connects its users to resources specific to the needs of each individual. The human touch through the Care Concierge service is central to *Balance*. However, offering additional asynchronous channels of connection and Artificial Intelligence (AI) based tools may allow for improved scale of mental healthcare. These novel approaches recognize that the market for mental healthcare may include preferences for non-traditional tools that are safe and effective to reduce stress and treat common conditions. Further, the first year deploying *Balance* identified the need to support mental health needs of dependent children of employees. The *Balance* assessment was intended for the *Balance* user's use only; however, the employees often needed Care Concierge support to address the mental health needs of a loved one. Future versions of *Balance* allow Care Concierge access for all dependent children and a channel to the Care Concierge for direct work with adolescents in need.

Conclusion

Despite improved awareness of mental healthcare needs during and after the COVID-19 pandemic, barriers to mental healthcare continue to persist in many settings. Even in employer populations with generous employee benefits, robust care networks, and a recent trend to offer added care navigation, challenges remain for many individuals in need of mental healthcare. *Balance*'s approach of encouraging mental health risk assessment, coupled with the Care Concierge service, across a large employer population is novel. Additionally, proactively assessing mental health status may prevent future development of a more severe psychiatric condition, as well as improving awareness of mental health risks so that individuals may monitor for any warning signs and symptoms of mental illnesses. Therefore, improved benefit design that combines assessment with care navigation may offer advantages for employers, employees, and their families. Insights into the factors associated with likelihood to engage in care may aid in more targeted and effective approaches to engagement.

Data availability statement

The datasets presented in this article are not readily available because they are the property of the employer. The data set will not be shared. Requests to access the datasets should be directed to SMCarrMPH@gmail.com.

Ethics statement

The studies involving humans were approved by IRB: Johns Hopkins University School of Medicine Institutional Review Board exempted (IRB00220549). The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements.

Author contributions

KW: Writing – review & editing, Project administration. AB: Writing – original draft. AE: Writing – review & editing. MF: Writing – review & editing. JoH: Writing – review & editing. JeH: Writing – review & editing. Y-JH: Formal analysis, Data curation, Writing – review & editing, Methodology. PK: Writing – review & editing. MP: Writing – review & editing, Methodology, Conceptualization. SC: Writing – review & editing, Resources, Project administration, Methodology, Conceptualization.

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Conflict of interest

MF was employed by Quest Diagnostics. JoH was employed by BHS. JeH was employed by emVitals. SC was employed by Johns Hopkins Healthcare.

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

Publisher's note

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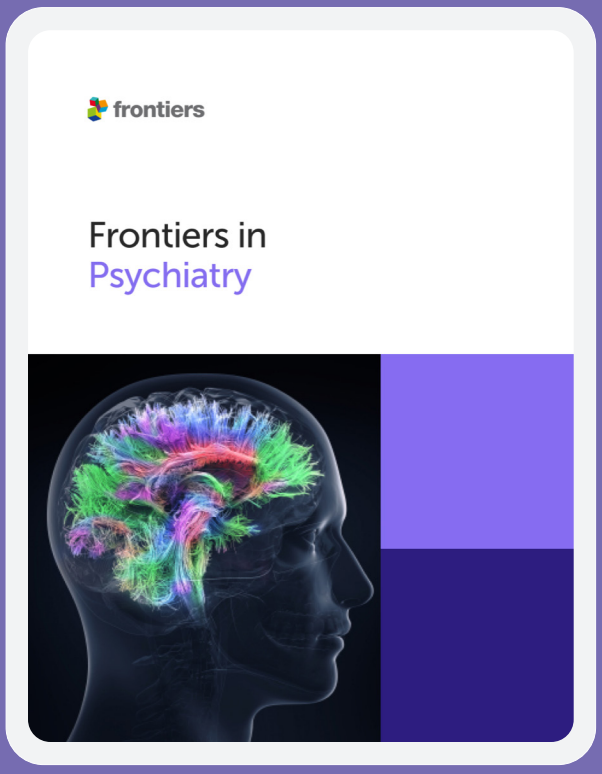

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