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# Professional well-being pathways: examining how social structures and workplace fulfillment influence stress-related outcomes among healthcare practitioners

Guanying Yang<sup>1</sup> and Muhammad Shahid Khan<sup>2\*</sup>

## Abstract

**Background** Healthcare practitioners regularly encounter elevated levels of workplace demands and challenging personal circumstances that can profoundly impact their overall well-being, measured by the EQ-5D Index (0–1). This investigation employed a cross-sectional survey ( $N=624$ ) and semi-structured interviews ( $n=20$ ) in 2024 across six healthcare institutions in Dali, China, using PLS-SEM to test sequential mediation pathways.

**Methodology** We examined the sequential mediation model: ‘occupational/life stressors → social resources → professional engagement → well-being’. Data collection used validated instruments measuring workplace stressors (ERI), challenging life circumstances, professional networks (SCQ), work engagement (MSQ), and well-being indicators (EQ-5D-5 L).

**Findings** Occupational demands negatively correlated with well-being ( $\beta = -0.339, p < 0.001$ ) and professional social networks ( $\beta = -0.375, p < 0.001$ ). Challenging personal circumstances showed negative associations with wellness indicators ( $\beta = -0.567, p < 0.001$ ) and professional connections ( $\beta = -0.500, p < 0.001$ ). Workplace social resources positively influenced professional engagement ( $\beta = 0.753, p < 0.001$ ), which subsequently enhanced well-being ( $\beta = 0.227, p < 0.001$ ). Sequential mediation pathways were significant: occupational demands → workplace networks → professional engagement → well-being ( $\beta = -0.064, 95\% \text{ CI } [-0.094, -0.038]$ ) and challenging circumstances → workplace networks → professional engagement → well-being ( $\beta = -0.085, 95\% \text{ CI } [-0.121, -0.052]$ ).

**Implications** Workplace social connections and professional fulfillment may be associated with improved well-being among healthcare practitioners. Interventions focusing on workplace community development and professional engagement could potentially buffer against stressor effects, contributing to enhanced practitioner wellness and service quality.

**Keywords** Professional stressors, Adverse experiences, Workplace social networks, Professional engagement, Well-being indicators, Sequential mediation, Healthcare practitioners

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## Introduction

Healthcare practitioners worldwide face substantial professional demands characterized by workloads, emotional challenges, and patient care responsibilities. Recent evidence indicates stress prevalence among healthcare workers reaches 25–40%, substantially exceeding comparable professions [1]. In China's evolving healthcare landscape, practitioners navigate changing expectations while managing responsibilities amid resource constraints [2]. These workplace pressures compromise psychological and physical wellness, diminish professional engagement, increase burnout, and heighten clinical error likelihood [3]. Recent research from China demonstrates that occupational stress correlates negatively with innovative approaches and positively with turnover intentions, accelerating workforce attrition [4].

Beyond professional challenges, healthcare practitioners navigate challenging personal circumstances. Research demonstrates that difficult life situations significantly impact mental wellness and subjective well-being [5]. The combined burden of professional demands and personal difficulties severely compromises practitioners' quality of life, potentially affecting patient care outcomes [6]. Recent evidence from Chinese healthcare settings confirms that the interaction between workplace stress and personal challenges creates compounded effects on practitioner well-being [7].

Three conceptual frameworks underpin this investigation. The biopsychosocial approach acknowledges the interplay of physiological, psychological, and social elements in health outcomes [8]. Applied to healthcare practice, this model suggests well-being depends on physical health, psychological wellness, and social connections [9]. The cognitive appraisal framework emphasizes that stressor impact depends on individuals' interpretations and available coping resources, with workplace social networks serving as critical resources [10]. The multidimensional quality of life framework conceptualizes well-being as encompassing health functioning, socioeconomic factors, psychological elements, and relational domains [11].

Despite extensive research, significant knowledge gaps persist. First, previous investigations have not comprehensively integrated the biopsychosocial approach, cognitive appraisal framework, and multidimensional well-being model. Second, connections between factors affecting well-being remain unclear. Third, mechanistic understanding of how workplace social resources and professional engagement regulate stress-well-being relationships remains limited. Finally, research specifically examining Dali City healthcare practitioners' well-being is lacking.

Recent evidence supports the buffering role of social capital in healthcare settings. A 2024 study of 995 newly

graduated nurses in southwest China demonstrated that perceived organizational support reduces burnout through psychological capital and work engagement (chain effect  $\beta = -0.056$ ) [12]. Similarly, a 2025 longitudinal study confirmed that inclusive leadership buffers nurse burnout via professional identity and workplace social capital pathways [13]. These findings align with our proposed 'network → engagement → well-being' sequential mediation model.

Additional support comes from a 2025 study of 309 nursing interns showing social support → self-efficacy → learning engagement mediation (45.7% of total effect), suggesting the 'workplace resources → capability perception' pathway extends to practicing healthcare professionals [14]. A recent meta-analysis ( $n = 6,061$ ) quantified the negative correlation between psychological capital and burnout ( $r = -0.53$ ), supporting psychological capital as a crucial moderating variable [15].

Building on this evidence and addressing identified gaps, this study makes three key contributions: (1) Integration of three theoretical frameworks to examine stress-well-being pathways; (2) Testing of sequential mediation model examining how workplace social resources and professional engagement jointly mediate stressor effects; (3) Context-specific insights from Dali City, Yunnan Province, contributing regional understanding of healthcare practitioner well-being.

Based on the theoretical frameworks and empirical evidence, we propose the following hypotheses:

- H1: Occupational demands negatively influence well-being indicators.
- H2: Occupational demands negatively influence workplace social resources.
- H3: Challenging personal circumstances negatively influence well-being indicators.
- H4: Challenging personal circumstances negatively influence workplace social resources.
- H5: Workplace social resources positively influence professional engagement.
- H6: Workplace social resources positively influence well-being indicators.
- H7: Professional engagement positively influence well-being indicators.
- H8: Workplace social resources mediate the relationship between occupational demands and well-being indicators.
- H9: Workplace social resources mediate the relationship between challenging personal circumstances and well-being indicators.
- H10: Workplace social resources and professional engagement sequentially mediate the relationship between occupational demands and well-being indicators.

H11: Workplace social resources and professional engagement sequentially mediate the relationship between challenging personal circumstances and well-being indicators.

## Methodology

### Research design

This investigation employed an Explanatory Sequential Mixed Methods Approach to comprehensively examine relationships among study variables. Figure 1 illustrates the research process timeline, showing the QUAN → qual sequence and integration points. The quantitative phase (January-March 2024) utilized structural equation modeling to evaluate hypotheses. The subsequent qualitative phase (April-May 2024) involved semi-structured interviews to explain and deepen understanding of quantitative findings. Integration occurred at the interpretation stage, with qualitative themes used to contextualize weaker  $\beta$  coefficients in the SEM model.

### Participants and procedures

#### Quantitative phase

The study population comprised registered healthcare practitioners in Dali City, Yunnan Province, China ( $N=3,161$  as of 2022) [16, 17]. Sample size determination followed established sampling formula (95% confidence, 5% margin of error) yielding minimum requirement of

355, and SEM recommendation of 10 participants per observed variable (630 for 63 variables) [18, 19].

Proportional sampling ensured representation across six institutions: The First Affiliated Hospital of Dali University ( $n=167$ ), Dali People’s Hospital ( $n=143$ ), Dali Second People’s Hospital ( $n=105$ ), Dali Traditional Chinese Medicine Hospital ( $n=75$ ), Dali Maternal and Child Health Care Hospital ( $n=96$ ), and community primary health organizations ( $n=44$ ).

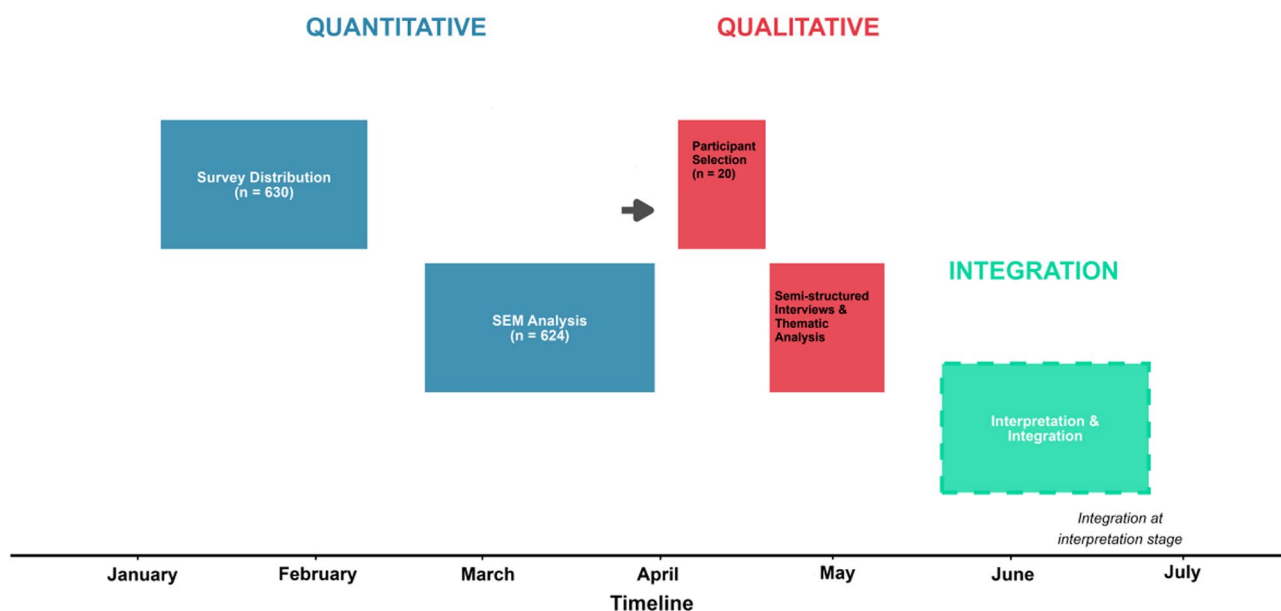
Questionnaires were distributed via institutional internal communication channels without monetary incentives, using only book voucher lottery (5 prizes) to enhance response rates. From 630 questionnaires, 624 were complete (99.1% completion rate).

The gender distribution (97.8% female) aligns with National Health Commission 2024 statistics showing 96.2% female nurses nationally [20]. This study received approval from the Institutional Review Board of The First Affiliated Hospital of Dali University (Approval number: OFY20240702003). All participants provided written informed consent in accordance with the Declaration of Helsinki.

#### Qualitative phase

Twenty healthcare practitioners were purposively selected based on: (1) professional experience  $\geq 5$  years; (2) EQ-5D score distribution (upper/lower 10%); (3) willingness to participate in 60-minute interviews. Data

*Explanatory Sequential Mixed Methods Design (QUAN → qual)*



**Fig. 1** Research process timeline showing explanatory sequential mixed methods design. This figure illustrates the QUAN → qual sequence with data collection phases (January-May 2024) and integration points. The quantitative phase involved survey distribution and SEM analysis, followed by qualitative interviews to explain quantitative findings. Integration occurred at the interpretation stage

saturation was assessed following Guest et al. [21] threshold of 16–24 interviews. Semi-structured interviews explored factors affecting well-being and relationships among variables. Interview guide is provided in Appendix C. All interviews were audio-recorded with permission and transcribed verbatim.

### Assessment instruments

#### Occupational demands

Occupational demands were assessed using the Effort-Reward Imbalance (ERI) Questionnaire comprising 23 items: effort (6 items), reward (11 items), and overcommitment (6 items) [22, 23]. The effort-reward ratio was calculated with adjustment factor 11/6. The overcommitment subscale ( $\alpha = 0.79$ ) was included as a control variable in the structural model to adjust for individual work motivation differences. Internal consistency:  $\alpha = 0.877$ , CR = 0.903, AVE = 0.538.

#### Challenging personal circumstances

Challenging personal circumstances were evaluated using a formative checklist from the China Chronic Disease Prospective Research Project [24, 25]. This 10-item binary scale assesses major life events. As a formative measure, traditional reliability metrics are less applicable (Diamantopoulos & Siguaw, 2006) [26]. CR = 0.769, AVE = 0.625.

#### Workplace social resources

The Social Capital Questionnaire (SCQ) measured workplace social resources with 16 items assessing trust, networks, participation, and support [27]. Internal consistency:  $\alpha = 0.931$ , CR = 0.942, AVE = 0.621.

#### Professional engagement

Professional engagement was assessed using the short Minnesota Satisfaction Questionnaire (MSQ) with 20 items measuring intrinsic, extrinsic, and overall satisfaction [28]. Internal consistency:  $\alpha = 0.944$ , CR = 0.951, AVE = 0.582.

#### Well-being indicators

Well-being was measured using the Chinese EQ-5D-5 L comprising five dimensions and visual analog scale [29, 30]. Internal consistency:  $\alpha = 0.714$ , CR = 0.840, AVE = 0.637.

Full instrument items in English and Chinese are provided in Supplementary Table S1.

### Analytical approach

#### Quantitative analysis

Analysis utilized SPSS 29.0 and SmartPLS 4.0. Before primary analysis, data underwent screening for missing values, outliers, and distribution characteristics.

Multicollinearity assessment via Variance Inflation Factor examination showed all values below 5, indicating no serious collinearity concerns (Supplementary Table S2). Common method bias was assessed using Harman's single-factor test (27.4% variance < 40% threshold) and common method VIF (all < 3.3), indicating no serious bias [31]. Model fit indices: SRMR = 0.053, NFI = 0.91, RMS\_theta = 0.09, confirming adequate fit.

Structural equation modeling using partial least squares examined hypothesized relationships. Control variables (age, tenure, department type, overcommitment) were included in the structural model. Multi-group analysis based on age groups and department types showed no significant path differences ( $p > 0.05$ ), supporting model stability. Gender-based analysis was not conducted due to sample imbalance (97.8% female).

Bootstrapping with 5,000 samples generated bias-corrected confidence intervals for direct and indirect effects [32, 33].

#### Qualitative analysis

Thematic analysis followed Braun & Clarke's (2022) six-step procedure using NVivo software [34]. Two coders independently analyzed transcripts ( $\kappa = 0.83$ ). Member checking with 7 participants and audit trails ensured trustworthiness. Coding combined deductive (theory-driven) and inductive approaches.

## Results

### Participant characteristics

Table 1 presents demographic profiles. The sample predominantly comprised female practitioners (97.8%), aged 30–39 years (50.2%), with bachelor's degrees (76.9%) and > 10 years experience (50.6%).

### Measurement properties

All indicator loadings exceeded 0.7. Internal consistency ranged from  $\alpha = 0.714$ –0.944, with composite reliability 0.769–0.951. Average variance extracted (0.538–0.637) exceeded 0.5 threshold. Discriminant validity was established (Table 2).

### Structural relationships

Figure 2 presents the structural model with path coefficients. Table 3 summarizes effects with confidence intervals.

Occupational demands negatively influenced workplace social resources ( $\beta = -0.375$ ,  $p < 0.001$ ) and well-being indicators ( $\beta = -0.339$ ,  $p < 0.001$ ), supporting H1 and H2. Challenging personal circumstances negatively impacted workplace social resources ( $\beta = -0.500$ ,  $p < 0.001$ ) and well-being indicators ( $\beta = -0.567$ ,  $p < 0.001$ ), supporting H3 and H4.

**Table 1** Demographic profile of participants (N=624)

Characteristic	n	%
Gender		
Female	610	97.8
Male	14	2.2
Age (years)		
20–29	196	31.4
30–39	313	50.2
40–49	101	16.2
≥ 50	14	2.2
Education		
Technical Secondary	14	2.2
College degree	128	20.5
Bachelor	480	76.9
Master	2	0.3
Professional experience (years)		
< 5	96	15.4
5–10	212	34.0
> 10	316	50.6
Professional designation		
Junior	382	61.2
Senior	190	30.4
Associate Professor	29	4.6
Professor	4	0.6
No designation	19	3.0
Monthly income (yuan)		
< 3000	118	18.9
3000–5000	323	51.8
5000–10,000	173	27.7
> 10,000	10	1.6
Relationship status		
Married	499	80.0
Single	112	17.9
Divorced	11	1.8
Widowed	2	0.3

Workplace social resources positively influenced professional engagement ( $\beta = 0.753, p < 0.001$ ) and well-being indicators ( $\beta = 0.127, p < 0.05$ ), supporting H5 and H6. Professional engagement positively affected well-being indicators ( $\beta = 0.227, p < 0.001$ ), supporting H7.

Sequential mediation pathways demonstrated significance, supporting H10 and H11. Control variables showed minimal effects (age:  $\beta = 0.042, ns$ ; tenure:  $\beta =$

$-0.038, ns$ ; department type:  $\beta = 0.051, p < 0.05$ ; overcommitment:  $\beta = -0.089, p < 0.05$ ).

Model explained 56.8% variance in professional engagement, 34.6% in well-being indicators, and 20.6% in workplace social resources. Predictive relevance indicators ( $Q^2 = 0.188-0.284$ ) confirmed good predictive capability (Table 4).

**Qualitative insights**

Thematic analysis revealed three primary themes explaining quantitative findings.

**Sources of occupational demands**

Participants identified workloads, emotional challenges, and administrative responsibilities as major stressors:

“The constant pressure to balance patient care with documentation is overwhelming. We’re chronically understaffed, which means longer shifts and less recovery time. It’s not just physical exhaustion; the emotional toll of caring for critically ill patients day after day affects our personal lives and overall well-being.”

**Protective function of social support**

The qualitative theme ‘peer camaraderie’ illuminates the pathway Workplace Social Resources → Engagement mechanism, enhancing the quantitative model’s explanatory power for the Dali context:

“Having colleagues who understand what you’re going through makes all the difference. We support each other through difficult shifts, share coping strategies, and sometimes just listen. This sense of community at work helps balance the stress and makes me feel more satisfied with my career choice despite the challenges.”

**Professional identity and meaning**

Participants discussed how meaning and purpose enhanced engagement despite stressors:

“What keeps me going is knowing I’m making a difference in patients’ lives. When I see improvements in their condition or receive gratitude from families, it reminds me why I became a healthcare professional. This sense of purpose compensates for the difficulties and makes the stress worthwhile.”

**Table 2** Reliability and validity of measurement properties

Construct	Cronbach’s $\alpha$	CR	AVE	1	2	3	4	5
1. Professional engagement	0.944	0.951	0.582	0.763				
2. Challenging personal circumstances	0.402*	0.769	0.625	-0.211	0.791			
3. Occupational demands	0.877	0.903	0.538	-0.545	0.219	0.734		
4. Well-being indicators	0.714	0.840	0.637	0.456	-0.333	-0.508	0.798	
5. Workplace social resources	0.931	0.942	0.621	0.753	-0.268	-0.416	0.462	0.788

CR Composite Reliability, AVE Average Variance Extracted, Diagonal elements (in bold) represent the square root of AVE, Off-diagonal elements are correlations among constructs

\*Lower reliability coefficient for challenging personal circumstances is acceptable due to the binary nature of the scale and its formative measurement approach



**Table 3** Direct, indirect, and total effects on well-being indicators

Pathway	Direct Effect	Indirect Effect	Total Effect	95% CI (Indirect)
Occupational demands → Well-being indicators	-0.339***	-0.064***	-0.403***	[-0.094, -0.038]
Challenging personal circumstances → Well-being indicators	-0.567***	-0.085**	-0.652***	[-0.121, -0.052]
Workplace social resources → Well-being indicators	0.127*	0.171***	0.298***	[0.132, 0.215]
Professional engagement → Well-being indicators	0.227***	-	0.227***	-
Occupational demands → Workplace social resources → Well-being indicators	-	-0.048*	-0.048*	[-0.082, -0.019]
Challenging personal circumstances → Workplace social resources → Well-being indicators	-	-0.064*	-0.064*	[-0.095, -0.037]
Occupational demands → Workplace social resources → Professional engagement → Well-being indicators	-	-0.064***	-0.064***	[-0.094, -0.038]
Challenging personal circumstances → Workplace social resources → Professional engagement → Well-being indicators	-	-0.085**	-0.085**	[-0.121, -0.052]

CI Confidence Interval

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

mechanism not previously articulated in the literature. The qualitative theme ‘peer camaraderie’ illuminates how the pathway Workplace Social Resources → Engagement operates in practice, enhancing the quantitative model’s explanatory power for the Dali context.

The exceptionally strong relationship between workplace social resources and professional engagement ( $\beta = 0.753$ ) reflects findings from recent meta-analyses and may be influenced by collectivist cultural values emphasizing interpersonal harmony and group cohesion. A recent meta-analysis of Chinese operating room nurses ( $n = 6,061$ ) quantified the negative correlation between psychological capital and burnout ( $r = -0.53$ ), supporting psychological capital as a crucial protective factor [15]. In Chinese healthcare settings, guanxi (relationship networks) play crucial roles in resource access, emotional

**Table 4** Hypothesis testing summary

Hypothesis	Pathway	Result
H1	Occupational demands → Well-being indicators	Supported***
H2	Occupational demands → Workplace social resources	Supported***
H3	Challenging personal circumstances → Well-being indicators	Supported***
H4	Challenging personal circumstances → Workplace social resources	Supported***
H5	Workplace social resources → Professional engagement	Supported***
H6	Workplace social resources → Well-being indicators	Supported*
H7	Professional engagement → Well-being indicators	Supported***
H8	Occupational demands → WSR → Well-being	Supported*
H9	Challenging circumstances → WSR → Well-being	Supported*
H10	Occupational demands → WSR → PE → Well-being	Supported***
H11	Challenging circumstances → WSR → PE → Well-being	Supported**

WSR Workplace Social Resources, PE Professional Engagement

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

support, and career development, potentially amplifying the protective effects of workplace social capital [39].

Our study makes a novel contribution by successfully integrating three theoretical frameworks to understand healthcare practitioner well-being. While previous studies have applied the biopsychosocial approach, cognitive appraisal framework, and multidimensional quality of life model separately, our integrated approach reveals how they work synergistically [40]. The biopsychosocial model helps explain why both workplace and personal stressors affect well-being through biological stress responses, psychological strain, and social resource depletion. The cognitive appraisal framework illuminates why workplace social resources are crucial—they shape how practitioners interpret and cope with stressors. The multidimensional quality of life framework captures the comprehensive nature of well-being outcomes affected by these processes.

The sequential mediation model represents our most significant theoretical contribution. While previous research has examined workplace social resources or professional engagement as individual mediators, few studies have explored their joint sequential effects. Our findings suggest a cascade process where stressors erode social connections, which reduces engagement, ultimately compromising well-being. This extends the work of Zhang et al., who found psychological capital appreciation fully mediates the resilience-burnout relationship (79% mediation effect) among ICU nurses [41]. Our model adds

complexity by showing how external resources (social capital) influence internal resources (engagement) in a sequential process.

The mechanisms underlying our findings align with Conservation of Resources theory, suggesting that stress depletes psychological resources needed to maintain social connections [42]. Healthcare practitioners facing high occupational demands or personal difficulties may lack the emotional energy to invest in workplace relationships, creating a downward spiral. The qualitative data support this interpretation, with participants describing how overwhelming workloads left little capacity for collegial interaction. Furthermore, the pathway from workplace social resources to professional engagement can be understood through capability theory. Wu et al. demonstrated that social support enhances learning engagement among nursing interns through self-efficacy (45.7% mediation effect) [14]. Our findings extend this to practicing professionals, suggesting workplace social resources enhance practitioners' capabilities to find meaning and satisfaction in their work despite stressors.

Our findings must be interpreted within the specific cultural and institutional context of Chinese healthcare. The Dali City context adds another layer of specificity. As a prefecture-level city in Yunnan Province, Dali's healthcare system faces unique challenges including ethnic diversity (25% ethnic minorities), geographic barriers to healthcare access, and resource constraints typical of western China. These contextual factors may intensify both stressors and the importance of social support networks, making our findings particularly relevant for similar regional healthcare settings [43].

The predominantly female sample (97.8%) reflects national nursing workforce demographics but limits generalizability to male-dominated healthcare specialties. Recent evidence suggests gender differences in stress responses and coping mechanisms among healthcare workers [44]. Female healthcare workers may particularly benefit from social support networks, potentially explaining the strong mediating effects observed. Future research should examine whether these pathways operate similarly in gender-balanced or male-dominated healthcare teams, such as emergency medicine or surgery departments.

Practical implications of our findings suggest healthcare organizations should implement multilevel intervention strategies. At the organizational level, quarterly team-building workshops focusing on interpersonal connection, peer coaching programs pairing experienced and novice practitioners, and incorporation of workplace social capital metrics into organizational KPIs are recommended. Team-level interventions might include structured peer support groups for high-stress units, collaborative care models emphasizing teamwork, and

mentorship programs within departments. Individual-level support should encompass training in social skills and relationship building, counseling services addressing both work and personal stressors, and recognition of collaborative behaviors.

Based on our qualitative findings, organizations should target specific stressor sources including workload management through appropriate staffing ratios, streamlined documentation systems reducing administrative burden, emotional support resources including debriefing sessions after critical incidents, and family support programs addressing challenging personal circumstances. Healthcare organizations should regularly assess workplace social capital using validated instruments like the SCQ, track professional engagement through MSQ scores, and monitor well-being indicators using EQ-5D-5 L to inform continuous improvement efforts.

Despite these contributions, several limitations warrant consideration. The cross-sectional design precludes causal inferences, and longitudinal studies are needed to confirm temporal sequences of the proposed mediation pathways. Self-report measures are subject to common method bias, though our tests (Harman's single factor: 27.4%; VIF < 3.3) suggest this was not severe. The single-region sample limits generalizability to other Chinese provinces or countries. We did not directly assess cognitive appraisal processes or coping strategies, and the binary measurement of challenging personal circumstances may oversimplify complex life stressors. The gender imbalance and convenience sampling through institutional channels may introduce selection bias, and our nursing-dominated sample may not represent physician experiences.

Future research should address these limitations through longitudinal designs examining temporal dynamics of the sequential mediation, randomized trials testing social capital enhancement interventions, and multi-site investigations across different Chinese provinces and healthcare systems. Studies directly measuring appraisal processes and coping mechanisms, examining model applicability across gender and cultural contexts, and incorporating organizational-level variables through multilevel modeling would further advance understanding. While conducted in China, our findings have broader implications for the global healthcare workforce facing similar challenges, suggesting that protecting and enhancing workplace social connections may be crucial for maintaining engaged and healthy healthcare workforces internationally.

## Conclusions

This study demonstrates that workplace social resources and professional engagement sequentially mediate stressor effects on healthcare practitioners' well-being.

Findings highlight the importance of fostering professional networks and enhancing engagement as protective factors. Organizations should create supportive environments, manage workloads, and provide resources helping practitioners navigate professional and personal challenges. Future research directions include longitudinal studies establishing causality and intervention trials testing effectiveness of social capital enhancement programs.

### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-025-13352-x>.

Supplementary Material 1.

Supplementary Material 2.

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The authors have no acknowledgments to report.

### Authors' contributions

We declare that all the listed authors have participated actively in the study and all meet the requirements of the authorship. Guanying Yang managed the literature searches, data acquisition and prepared the paper, Muhammad Shahid Khan contributed to the correspondence and study concepts. All authors reviewed the manuscript.

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### Data availability

The datasets used or analyzed during the current study are available from the corresponding author on reasonable request.

### Declarations

#### Ethics approval and consent to participate

The study protocol was reviewed and approved by the Institutional Review Board of The First Affiliated Hospital of Dali University (Approval number: OFY20240702003), in accordance with the Declaration of Helsinki. All participants provided written informed consent before participation.

#### Consent for publication

Not Applicable.

#### Competing interests

The authors declare no competing interests.

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### References

- Smith P, Johnson R, Wang H. The impact of occupational stress on nurses' quality of life: a cross-sectional study. *Int J Nurs Stud*. 2020;107: 103587.
- Chen Y, Liu Y, Zhang X. The effect of workplace stress on social capital: evidence from Chinese nurses. *Int J Environ Res Public Health*. 2020;17(5):1730.
- Wang L, Wang X, Liu S, Wang B. Analysis and strategy research on quality of nursing work life. *Medicine*. 2020;99(6): e19172.
- Wu X, Han D, Zhang J. Occupational stress and social capital among Chinese nurses: a cross-sectional study. *BMC Nurs*. 2021;1(20):39.
- Zhou H, Peng J, Wang D. Occupational stress and its related factors among Chinese nurses. *J Nurs Manag*. 2019;27(3):553–63.
- Marum G, Clench-Aas J, Nes RB, Raanaas RK. The relationship between negative life events, psychological distress and life satisfaction: a population-based study. *Qual Life Res*. 2014;23(2):601–11.
- Xiao Y, Dong D, Zhang H, et al. Burnout and well-being among medical professionals in China: a national cross-sectional study. *Front Public Health*. 2022;9:761706.
- Engel GL. The need for a new medical model: a challenge for biomedicine. *Science*. 1977;196(4286):129–36.
- Smith RC, Fortin AH, Dwamena F, Frankel RM. An evidence-based patient-centered method makes the biopsychosocial model scientific. *Patient Educ Couns*. 2013;91(3):265–70.
- Lazarus RS, Folkman S. *Stress, appraisal, and coping*. New York: Springer; 1984.
- Ferrans CE, Powers MJ. Quality of life index: development and psychometric properties. *ANS Adv Nurs Sci*. 1985;8(1):15–24.
- Ren Y, Li G, Pu D, He L, Huang X, Lu Q, Du J, Huang H. The relationship between perceived organizational support and burnout in newly graduated nurses from Southwest China: the chain mediating roles of psychological capital and work engagement. *BMC Nurs*. 2024;23(1):719. <https://doi.org/10.1186/s12912-024-02386-x>.
- Wu Y, Chen W, Zhang R, et al. The chain mediating roles of professional identity and workplace social capital in the relationship between inclusive leadership and burnout of nurses: A longitudinal study. *J Nurs Manag*. 2025;2025:4713030. <https://doi.org/10.1155/jonm/4713030>.
- Wu L, Chen Y, Xue M, Zhu W, Wang W. The effect of social support on learning engagement among Chinese nursing interns: the mediating role of self-efficacy. *BMC Nurs*. 2025;24(1):955. <https://doi.org/10.1186/s12912-025-03615-7>.
- Dai X, Xie C, Wu Y, Chen T, Lu F. Factors associated with burnout among Chinese operating room nurses: a meta-analysis. *BMC Nurs*. 2025;24(1):312. <https://doi.org/10.1186/s12912-025-02914-3>.
- City PsGoD. Dali health statistics report 2022. Dali: People's Government of Dali City; 2023.
- Government DBAPPs. Dali health development report 2022. Dali: Dali Bai Autonomous Prefecture People's Government; 2022.
- Yamane T. *Statistics: an introductory analysis*. 3rd ed. New York: Harper & Row; 1973.
- Mitchell RJ. Path analysis: pollination. In: Schneider SM, Gurevitch J, editors. *Design and analysis of ecological experiments*. New York: Chapman & Hall; 1993. pp. 211–231.
- National Health Commission of China. *China health statistical yearbook 2024*. Beijing: China Statistics; 2024.
- Guest G, Namey E, Chen M. A simple method to assess and report thematic saturation in qualitative research. *PLoS One*. 2020;15(5):e0232076.
- Huang H, Liu L, Yang S, Cui X, Zhang J, Wu H. Effects of job conditions, occupational stress, and emotional intelligence on chronic fatigue among Chinese nurses: A cross-sectional study. *Psychol Res Behav Manag*. 2019;12:351–3600. <https://doi.org/10.2147/PRBM.S207283>. Published 13 May 2019.
- Guan S, Xiaerfuding X, Ning L. Effect of job strain on job burnout, mental fatigue and chronic diseases among civil servants in the Xinjiang Uygur autonomous region of China. *Int J Environ Res Public Health*. 2017;14(8): 872.
- Wu M, Li JC, Yu CQ, Chen YP, Lyu J, Guo Y, Bian Z, Tan YL, Pei P, Chen JS, et al. [Gender differences in stressful life events and depression in Chinese adults aged 30–79 years]. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2017;38(11):1449–1453.
- Kendler KS, Karkowski LM, Prescott CA. Causal relationship between stressful life events and the onset of major depression. *Am J Psychiatry*. 1999;156:837–41.
- Diamantopoulos A, Siguaw JA. Formative versus reflective indicators in organizational measure development: a comparison and empirical illustration. *Br J Manage*. 2006;17(4):263–82.
- Hu F, Niu L, Chen R, Ma Y, Qin X, Hu Z. The association between social capital and quality of life among type 2 diabetes patients in Anhui province, China: a cross-sectional study. *BMC Public Health*. 2015;15:786.
- Weiss DJ, Dawis RV, England GW, Lofquist LH. *Manual for the Minnesota satisfaction questionnaire*. Minneapolis: University of Minnesota, Industrial Relations Center; 1967.
- Herdman M, Gudex C, Lloyd A, Janssen M, Kind P, Parkin D, Bonseil G, Badia X. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). *Qual Life Res*. 2011;20(10):1727–36.
- Luo N, Liu G, Li M, Guan H, Jin X, Rand-Hendriksen K. Estimating an EQ-5D-5L value set for China. *Value Health*. 2017;20(4):662–9.

31. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol*. 2003;88(5):879–903.
32. Hair JF, Hult GTM, Ringle CM, Sarstedt M, Danks NP, Ray S. Partial least squares structural equation modeling (PLS-SEM) using R: A workbook. Cham: Springer; 2021.
33. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: A Regression-Based approach. 2nd ed. New York: Guilford Press; 2018.
34. Braun V, Clarke V. Thematic analysis: A practical guide. London: SAGE Publications; 2022.
35. Khamisa N, Peltzer K, Oldenburg B. Burnout in relation to specific contributing factors and health outcomes among nurses: a systematic review. *Int J Environ Res Public Health*. 2013;10(6):2214–2240.
36. Lee RT, Akhtar S. Job burnout as a mediator of the relationship between stress and health: A behavioral approach. *Stress Health*. 2020;5(30):375–382.
37. Kong X, Zhao M, Li R, et al. The relationship between job burnout and presenteeism among Chinese primary public health physicians: a moderated mediation model. *BMC Med Educ*. 2025;25(1):810. <https://doi.org/10.1186/s12909-025-07391-5>.
38. Ike OO, Chuke NU, Nnamchi OC. Panacea for improving mental health: the influential roles of social capital, resilience and job embeddedness on nurses' mental health. *Discover Mental Health*. 2025;5(1):89. <https://doi.org/10.1007/s44192-025-00222-5>.
39. Chen H, Li G, Li M, Lyu L, Zhang T. A cross-sectional study on nurse turnover intention and influencing factors in Jiangsu province, China. *Int J Nurs Sci*. 2018;5(4):396–402.
40. Farre A, Rapley T. The new old (and old new) medical model: four decades navigating the biomedical and psychosocial understandings of health and illness. *Healthcare*. 2017. <https://doi.org/10.3390/healthcare5040088>.
41. Zhang R, Shan M, Yin Y, et al. Psychological capital appreciation as a mediator between resilience and burnout among ICU nurses. *Front Public Health*. 2025;13: 1551725. <https://doi.org/10.3389/fpubh.2025.1551725>.
42. Hobfoll SE. Conservation of resources: a new attempt at conceptualizing stress. *Am Psychol*. 1989;44(3):513–24.
43. Zhang L, Zhao J, Xiao H, Zheng H, Xiao Y, Chen M, Chen D. Mental health and burnout in primary and secondary school teachers in the remote mountain areas of Guangdong Province in the people's Republic of China. *Neuropsychiatr Dis Treat*. 2014;10:123–30.
44. Liang Y, Wang H, Tao X. Quality of life of young clinical doctors in public hospitals in China's developed cities as measured by the Nottingham health profile (NHP). *Int J Equity Health*. 2015;14:85.

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