Ye et al. BMC Women's Health (2025) 25:116
https://doi.org/10.1186/s12905-025-03620-7

BMC Women's Health

RESEARCH Open Access

"High-stress, conscientiousness and positive coping": correlation analysis of personality traits, coping style and stress load among obstetrics and gynecology female nurses and midwives in twenty-one public hospitals in Southern China

Qiqi Ye[1], Kefu Zhong[2], Li Yuan[3], Qihua Huang[4*] and Xiangdan Hu[5*]

Abstract

Background The long-term occupational stress experienced by nurses and midwives in obstetrics and gynecology department not only impacts their mental well-being, but also poses a threat to nursing safety and sleep quality of nursing staff. Personality traits and stress coping strategies are believed to play a crucial and distinctive role in regulating stress. It is of great importance to discover effective methods for managing the occupational stress faced by nurses and midwives in obstetrics and gynecology. The study aims to identify the characteristic of stress load, personality and coping style among obstetrics and gynecology nurses and midwives, explore variations in stress levels based on their individual personality traits, and compare different levels of event load and individual vulnerability across various personality domains.

Methods A cross-section study was conducted from February 2023 to March 2023, and a stratified sampling method was used to select 424 obstetric and gynecological nurses. The survey was conducted using the General Information Questionnaire, the Chinese Big Five Personality Questionnaire, the Trait Coping Style Questionnaire, and the Chinese version of the Stress Overload Scale.

Results High stress of stress risk, conscientiousness and positive coping were the main characteristics of obstetrics and gynecology nurses and midwives. The stress-load was at a medium level, with an average score of (65.30 ± 17.27) points. There were statistically significant differences in stress-load among nurses with different marital status, hospital level, family occupational support and work motivation ($p < 0.05$). There was a significant positive correlation

*Correspondence:
Qihua Huang
13710680174@126.com
Xiangdan Hu
doctordan@163.com

Full list of author information is available at the end of the article

among neuroticism, negative coping, and event load. ($p < 0.01$). While conscientiousness, agreeableness, openness, extroversion and positive coping showed positive correlations ($p < 0.05$).

Discussion Based on our findings and the existing literature, we have so suggestions to relieve the stress-load of obstetrics and gynecology nurses and midwives: (1) improve social support and family support; (2) increase the application of intelligent technology appropriately; (3) improve midwifery models; (4) provide positive psychology training; (5) take advantage of the positive interaction between individual and situations.

Conclusion and implications for nursing and midwife policy Nursing and midwife managers should strengthen care for nurses and midwives with significant neurotic personality, adopt flexible or magnetic management, improve midwifery models and elevate the dominant role of midwives in childbirth processes. Importantly, they should enhance group or individual psychological intervention to encourage a positive attitude towards stressors and foster the development of positive personalities.

Keywords Nurse, Midwives, Stress, Personality, Coping skills, Correlation analysis

Introduction

The health status of women and children serves as significant reflection of the nation's economic robustness and societal advancement, including the healthcare oversight of pregnant women and newborns. Obstetrics and gynecology nurses and midwives, as the primary professionals entrusted with infant care and the holistic health safeguarding of women throughout their life cycles, are instrumental in delivering top-tier maternal and child healthcare services and nursing. They play a pivotal role in enhancing the management of nursing quality.

Chronic long-term occupational stress is identified as one of the principal factors influencing negative emotions among nurses and midwives [1–3]. Recent reports indicate a persistent elevation in the levels of occupational stress and negative emotion experiences among obstetrics and gynecology nurses and midwives in China [4–6]. On one front, the combination of high-intensity workloads, exposure to high-risk occupational environments, and potential for high-risk medical disputes tends to excessively deplete psychological resources, hindering the adoption of effective coping strategies for self-regulation [7, 8]. On the other hand, the scarcity of human resources leads to an indistinct delineation of roles among midwives, obstetric nurses and gynecological nurses, resulting in increased workloads and a sharp rise in the psychological burden on obstetrical and gynecological nurses and midwives [9, 10].

Stress load delineates an individual's psychological stress level in response to stress events [11]. Elevated stress load often proves detrimental to the cultivation of individual occupational mental health [12], hindering both individual career advancement and the alignment between individual and organization fit [13–15]. The concept of stress load involves the psychological pressure experienced by an individual during stress events, with a specific emphasis on the individual's subjective perception of pressure and stress events [16]. This pressure manifests behaviorally as a response to particular stimuli affecting both physiology and psychology, resulting in a cascade of stressful reactions [17]. The elicitation of a stress response by an individual in response to a stressor is intricately ties to the individual's perception of the stress events [18]. Lazarus and Folkman introduced the *stress-appraisal-coping* theory [19], which explores the interaction among "stress," "evaluation," and "coping." This theory suggests that the impact of stress on individuals varies depending on their assessments of the relationship between stressors and their personal needs [20].

Psychological or behavioral changes, whether positive or negative, can significantly influence the outcomes of stressful events [21, 22]. Individuals exhibit diverse emotional experiences and coping responses based on their unique personality traits when faced with the same stressor stimuli [23, 24]. Studies have shown that the complex multi-stressor environment compels obstetrics and gynecology nurses and midwives to remain sensitive to stress stimuli, leading to heightened mental tension and limited capacity to regulate negative emotional experiences [25, 26]. Furthermore, it has been evidenced by numerous scholarly investigations that nurses endure workplace violence or social pression, predominantly shaped by their intrinsic attributes [27–29]. These critical incidents are posited to potentially undermine nurses' interpersonal dynamics [30–32], with personality traits being identified as a crucial determinant in these outcomes.

Nevertheless, strong evidence is lacking regarding whether female nurses with varying personality traits exhibit levels of stress load, positive coping and negative coping. While numerous studies have addressed the mental health risks encountered by nurses worldwide [2, 33, 34] and in China [1, 7, 35], none have specifically investigated the correlation of stress with personality traits and coping styles among nurses of obstetrics and gynecology and stress risk levels of them. Therefore, this study intends to analyze the personality traits, coping strategies, and stress load characteristics of obstetrics and

gynecology female nurses through the lens of stress and assessment dimensions in the theory of stress-appraisal-coping [20]. Additionally, to examine the interaction and correlation between stress load and personality, this study will explore the differences in stress load, negative coping, and positive coping among obstetrics and gynecology nurses and midwives with diverse personality traits from the aforementioned perspectives. By providing empirical evidence, this research seeks to enhance the management practices for obstetrics and gynecology nurses and midwives, thereby fostering the high-quality development of this specialized nursing sector.

The following research question were addressed:

1. What are the levels of stress risk, stress load, personality traits, coping styles, and characteristics among obstetrics and gynecology nurses and midwives?
2. Are the stress load level and coping strategies of obstetrics and gynecology nurses and midwives impacted by their personality characteristics?
3. Is there a correlation between personality traits, coping style and stress load of obstetrics and gynecology nurses and midwives?

Methods

Aim and design

This study aimed to analyze the current situation and characteristics of stress-load, negative coping, positive coping, event load and individual vulnerability of obstetrics and gynecology female nurses, including midwives, and determine the correlation between personality, coping and stress, and on this basis, to explore the difference of positive coping, negative coping and stress-load of obstetrics and gynecology nurses and midwives from the perspective of personality traits. This was a cross-sectional study that followed the STROBE checklist.

Sample and setting

Stratified sampling methods was used in this study. From February 2023 to March 2023, twenty-two public hospitals were selected using a random ball method from a pool of 82 hospitals affiliated with the Obstetrics and Gynecology Nursing Professional Committee of the Guangdong Association of Integrated Traditional Chinese and Western Medicine, comprising 11 Western medicine hospitals and 11 Traditional Chinese medicine hospitals. It was ensured that the selected hospitals included obstetrics and gynecology department (including separate gynecology, obstetrics departments, and combined departments). Subsequently, female nurses and midwives in the obstetrics and gynecology departments of each hospital were chosen through cluster sampling. The number of nurses and midwives in these hospitals ranged from 15 to 28. A total of 585 nurses and midwives were initially included, with 45 nurses or midwives excluded due to hospital refusal or incomplete questionnaires. Consequently, 21 hospitals and 540 nurses and midwives ultimately agreed to participate.

The inclusion criteria of this study include: (1) female nurses and midwives have obtained a nurse qualification certificate; (2) engaged in clinical nursing work in obstetrics and gynecology for at least 1 year; (3) currently employed within the past month; (4) voluntary participation in this study. Exclusion criteria: (1) rehired, retired personnel, and trainees; (2) individuals clinically diagnosed with mental illness; (3) volunteers concurrently participating in multiple psychological investigations at the same time.

Based on the formulate of $n = \left(\frac{Z_{\alpha/2*\sigma}}{\delta}\right)^2$, we used PASS 15.0 V15.0.5 software [36] to calculate the accurate sample size, referencing the highest score in the Big Five Personality Study of pediatric nurses for conscientiousness (34.00 ± 4.72) [37], with an allowable error $\delta = 2\%$ and a significance level $\alpha = 0.05$. The minimum sample size was calculated to be 296 cases. Accounting for potential sample loss, an increase of 20% was applied, resulting in an expected minimum sample size of 370 cases required for this study.

The survey was conducted using the "Questionnaire Star" (https://www.wjx.cn/) online questionnaire applet. The researcher provided unified guidance to the nursing department director or head nurse of each unit, detailing the research purpose and content. After obtaining their informed consent, respondents were invited to fill out the research questionnaire anonymously, with each IP address restricted to a single submission. A total of 540 questionnaires were distributed, and 426 valid questionnaires were recovered after excluding those with a response time of less than 5 min (n=111) or with a single or erratic pattern of answers (n=3), achieving an overall effective rate of 78.52%.

Data collection tools

Four tools were used to collect data in this study. The sociodemographic data of the nurses were collected using a personal information form; The Chinese Big Five Personality Inventory Brief (CBF-PI-B), Trait Coping Style Questionnaire (TCSQ), and Chinese version of Stress Overload Scale (SOS) were used to collect additional data.

Personal information form

Designed by the members of the research team, including age, marital status, education level, hospital level, department, professional title, length of service, employment

type, family occupational support, work motivation, etc. (Supplementary file)

In this study, family occupational support refers to the extent to which family members support or recognize the respondent's career as a nurse or midwife. It is categorized into four levels: (1) not supported but approval, (2) not supported and not recognized, (3) supported but not approval, and (4) supported and endorse. Here, support is defined as family members' desire or respect for the participant's choice to pursue a nursing or midwifery career, while approval refers to acknowledging the social value of the profession and the participant's contributions. Work motivation is defined as the driving forces or purposes that lead respondents to pursue a career in nursing or midwifery. It includes: (1) career mission, such as a sense of professional identity, achievement, and happiness; (2) economic pressure, where respondents are motivated by the higher income associated with nursing or midwifery; and (3) employment contract requirements, where respondents may wish to leave but continue due to contractual obligations.

The Chinese big five personality inventory brief (CBF-PI-B)

Wang Mengcheng and others revised and formed the CBF-PI in 2010, which evaluates neuroticism, agreeableness, extraversion, conscientiousness and openness [38]. On this basis, a brief version of the questionnaire (CBF-PI-B) was formed. Likert scoring method is utilized to indicate levels from "very inconsistent" to "very consistent" on a scale of 1 to 6. Each dimension is scored between 6 and 48 points. The higher the score in each dimension, the more prominent the represented personality characteristics. Cronbach's α coefficients were 0.81, 0.69, 0.73, 0.81, 0.67, with an average of 0.74 [39]. In this study, the Cronbach's α coefficient for various dimensions are 0.882, 0.798, 0.430, 0.885 and 0.610, while the coefficient for the total score is 0.800.

Trait coping style questionnaire (TCSQ)

Chinese scholars Jiang Ganjin and Zhu Yihong developed it in 1999 to evaluate coping strategies [40]. Likert scoring method is used to express "very inconsistent" to "very consistent" from 1 to 5. The scale assessed 20 items in two dimensions of positive coping and negative coping, and the total score range is 20 to 100 points. The Cronbach's α coefficients of negative coping and positive coping were 0.69 and 0.70 respectively [41]. In this study, the Cronbach's α coefficient for negative coping and positive coping are 0.886 and 0.914, while the coefficient for the total score is 0.771.

Chinese version of stress overload scale (SOS)

The Stress Overload Scale (SOS), developed by Amirkhan in 2012 [16], is a self-assessment tool that integrates the language and cultural differences across carious regions, making it for a broad population. Su Xi introduced and localized the SOS scale, incorporating event load and individual vulnerability dimensions [42]. Likert scoring method is used, ranging "strongly disagree" to "strongly agree" on a scale of 1 to 5 points. The 22 items are bifurcated by odd and even numbers, with odd items constituting the individual vulnerability score (10 to 50 points), and the even items forming the event load score (10 to 60 points). The higher the total score, the greater the pressure load. The total scores of the two dimensions are mapped onto the appropriate assessment quadrants in the Stress Risk Assessment Form, delineating four quadrants (low pressure, susceptibility, impact and high pressure) and three risk degrees (lowest risk, low risk and high risk). The Chinese version of SOS exhibits a total reliability of 0.936, with Cronbach's α coefficients of each dimension being 0.902 and 0.896, respectively [11]. In this study, the Cronbach's α coefficient for event load and individual vulnerability are 0.939 and 0.962, respectively, while the coefficient for the total score is 0.965.

Statistical analysis

IBM SPSS V24.0 software was used for data analysis. Qualitative data are expressed by frequen*cy* n and composition ratio (%). Quantitative data of normal or approximate normal distribution were expressed by ($\bar{X}\pm s$), and those of skewed distribution were expressed by median *M* and quartile interval *Q*. Normal distribution of data was confirmed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. For the comparison of quantitative variables by the paired group method, an independent two-sample *t* test was used for normally distributed data, and Mann–Whitney *U* test was used for nonnormally distributed data. When comparing quantitative variables according to groups of three or more, one-way analysis of variance (ANOVA) was used for normally distributed data, and the Kruskal–Wallis test was used for nonnormally distributed data. Correlations among various variables were assessed using *Spearman* correlation tests to detect collinearity. Significance level $\alpha = 0.05$.

Ethical approval

This research has received ethical approval from the Ethics Committee of Guangdong Provincial Hospital of Traditional Chinese Medicine (Project No.: ZE2023-031). The study was conducted subsequent to obtaining written approval documents and institutional permission from the nurses' hospital. Upon reviewing the questionnaire introduction, participants voluntarily consented to participate in the study and proceeded to formally complete the questionnaire.

Results

Participant's sociodemographic characteristics

All of the participants in this study were women, 58.1% of the women were over 30 years old, 66.30% were married, 87.70% worked in high-level hospital, 13.20% of the participants worked in integrated departments of gynecology and obstetrics, 73.80% had completed the education from university and obtained bachelor degree, 76.40% received adequate family support, 59.00% took career mission as their motivation.

Participant's characteristics concerning stress-load, personality traits, and coping styles

In this study, the stress-load values of obstetrics and gynecology nurses and midwives are mainly distributed in the quadrants of impact (45.54%), high stress (38.73%) and low stress (15.26%) in the stress risk assessment chart, which were judged as high risk, low risk and lowest risk degree respectively. The score of event load was higher than individual vulnerability. Compared with the other four personality traits, nurses and midwives with prominent conscientiousness (48.36%) were observed to have higher stress load scores (35.30 ± 8.50) ($p < 0.05$). Additionally, participants who primarily adopted active coping strategies (78.40%) were also observed to have higher stress load scores (37.33 ± 6.54) compared with those who used passive coping strategies ($p < 0.05$) (Table 1).

Difference of stress-load among obstetrics and gynecology nurses and midwives with different demographic characteristics

The total score of stress-load was (65.30 ± 17.31) among all gynecological and obstetrical nurses and midwives. There were significant differences in stress-load among the patients with different marital status, working hospital level, family occupational support and work motivation. Among them, the nurses with divorced, "Second-class and Grade B" hospitals, economic pressure as the main work motivation and insufficient family support had higher stress-load than others ($p < 0.05$). Although hospital level does not significantly affect the event load ($p > 0.05$), it did influence the variation in stress load and individual vulnerability, respectively. Educational background and professional titles solely impact event load ($p < 0.05$), whereas departments exclusively affect individual vulnerability ($p < 0.05$) (Table 2).

Further post-analysis showed that there was significant difference in stress load between divorced people and married people ($p = 0.009$) and unmarried people ($p = 0.027$); There was statistically significant difference in the pressure load between the nurses of obstetrics and gynecology department in the second grade hospital and those of the Third-class and Grade A hospital ($p = 0.005$) and the Second-class and Grade A hospital ($p = 0.016$); There was significant difference in the stress load between those with "support and approval" and those with "support but not approval" ($p = 0.003$) and those with "no support but approval" ($p < 0.001$); There was significant difference in the stress load between career mission and "economic stress" ($p = 0.002$).

Table 1 Assessment of stress load, personality and coping style among nurses of obstetrics and gynecology department

Dimensions	Score
Stress load	
Event load	33.25 ± 8.17
Individual vulnerability	32.05 ± 10.54
Personality traits	
Agreeableness	31.84 ± 4.28
Extraversion	28.41 ± 5.63
Conscientiousness	35.31 ± 5.79
Neuroticism	22.91 ± 9.14
Openness	32.28 ± 7.30
Coping styles	
Positive coping	37.33 ± 6.44
Negative coping	30.43 ± 7.34

Correlation between personality traits, coping style and stress load

In this study, we found that neuroticism, negative coping, event load, and individuality positively correlated ($p < 0.01$). Similarly, conscientiousness, agreeableness, openness, extroversion and positive coping showed positive correlations ($p < 0.05$). Conversely, conscientiousness, openness and individuality exhibited negative correlation ($p < 0.01$). No significant correlation was found between conscientiousness, openness, extroversion and event load ($p > 0.05$), nor between agreeableness, extroversion and individual vulnerability ($p > 0.05$). Notably, extroversion exhibited no correlation with either dimension of stress load ($p > 0.05$) (Table 3).

Variations in stress load and coping tendencies among obstetrics and gynecology nurses and midwives with different personality traits

In this study, the personality traits that were most prominent among nurses, ranked from highest to lowest stress load levels, were neuroticism, extraversion, agreeableness, conscientiousness and openness (Fig. 1). Nurses with significant traits of openness exhibited the highest positive coping score. Conversely, a strong tendency toward negative coping was observed in nurses with prominent neuroticism trait. (Figure 2a and b). Statistically significant differences were observed in the scores of negative ($Z = 41.871$, $p < 0.001$) and positive coping ($F = 15.398$, $p < 0.001$) among individuals with different personality traits.

Table 2 Stress-load scores of obstetrics and gynecology nurses with different demographic characteristics

Classification	Frequency (*n*,%)	SOS	Event load	Individual vulnerability
Age				
18 ~ 25	59 (13.80)	64.92 ± 16.76	32.41 ± 6.96	32.51 ± 11.10
26 ~ 30	119 (27.90)	64.75 ± 17.99	32.55 ± 8.43	32.20 ± 11.05
31 ~ 40	169 (39.70)	66.33 ± 17.42	34.17 ± 8.32	32.16 ± 10.60
41 ~ 50	71 (16.70)	65.32 ± 16.50	33.52 ± 8.23	31.80 ± 9.39
51 ~ 60	8 (1.90)	65.25 ± 12.41	28.13 ± 7.16	26.12 ± 6.15
		F = 1.007	*F* = 1.734	*F* = 0.679
		p = 0.404	*p* = 0.142	*p* = 0.607
Marita status				
Unmarried	136 (31.90)	66.65 ± 17.25	33.24 ± 7.73	33.41 ± 10.72
Married	283 (66.40)	64.25 ± 17.21	33.13 ± 8.42	31.12 ± 10.33
Divorce	7 (1.60)	81.43 ± 10.88	38.43 ± 4.79	43.00 ± 6.43
		***F* = 4.044***	*F* = 1.439	***F* = 6.165****
		***p* = 0.018**	*p* = 0.238	***p* = 0.002**
Hospital level				
Third-class and Grade A	373 (87.60)	64.87 ± 17.24	33.07 ± 8.29	31.80 ± 10.40
Second-class and Grade A	43 (10.10)	65.74 ± 17.54	33.49 ± 7.08	32.26 ± 11.68
Second-class and Grade B	10 (2.30)	79.40 ± 11.87	39.00 ± 6.13	40.40 ± 7.11
		***Z* = 7.739***	*Z* = 5.186	***Z* = 6.890***
		***p* = 0.021**	*p* = 0.075	***p* = 0.032**
Department				
Gynecology	167 (39.20)	63.55 ± 17.49	32.63 ± 8.44	30.92 ± 10.63
Obstetrics	202 (47.40)	65.67 ± 17.46	33.51 ± 8.20	32.16 ± 10.62
Obstetrics and Gynecology	57 (13.40)	69.11 ± 15.43	34.16 ± 7.18	34.95 ± 9.53
		F = 2.386	*F* = 0.923	***F* = 3.166***
		p = 0.093	*p* = 0.398	***p* = 0.043**
Educational background				
Associate degree and below	112 (26.30)	63.45 ± 17.10	31.58 ± 7.83	31.87 ± 10.75
Bachelor degree and above	314 (73.70)	65.96 ± 17.37	33.83 ± 8.23	32.13 ± 10.50
		t=-1.314	***t*=-2.510***	*t*=-0.220
		p = 0.189	***p* = 0.012**	*p* = 0.826
Professional title				
Junior title	257 (60.30)	64.34 ± 17.80	32.23 ± 8.26	32.11 ± 10.89
Intermediate title	127 (29.80)	68.12 ± 16.68	35.19 ± 7.79	32.93 ± 10.42
Senior title	42 (9.90)	62.62 ± 14.89	33.62 ± 7.80	29.00 ± 8.07
		F = 2.611	***F* = 5.733****	*F* = 2.219
		p = 0.075	***p* = 0.003**	*p* = 0.110
Specialty work experience				
< 3 years	79 (18.60)	61.85 ± 17.59	31.39 ± 8.09	30.46 ± 11.08
3–5 years	57 (13.40)	68.12 ± 18.22	33.98 ± 8.49	34.14 ± 10.78
6–10 years	105 (24.80)	66.19 ± 18.27	33.17 ± 8.55	33.02 ± 11.20
> 10 years	183 (43.20)	65.38 ± 16.12	33.86 ± 7.81	31.52 ± 9.73
		F = 1.670	*F* = 1.878	*F* = 1.826
		p = 0.173	*p* = 0.133	*p* = 0.142
Employment form				
Hospital contract	271 (63.60)	64.50 ± 18.23	32.84 ± 8.62	31.65 ± 11.11
Career establishment	155 (36.40)	66.71 ± 15.41	33.97 ± 7.29	32.74 ± 9.45
		t=-1.277	*t*=-1.383	*t*=-1.020
		p = 0.202	*p* = 0.167	*p* = 0.308
Family occupational support				
Not supported, but approval	33 (7.70)	74.18 ± 14.41	37.12 ± 6.94	37.06 ± 9.64
Not supported and not recognized	4 (0.90)	66.75 ± 11.32	30.50 ± 6.61	36.25 ± 5.74
Supported but not approval	63 (14.80)	69.87 ± 15.70	35.30 ± 7.40	34.57 ± 9.72
Supported and endorse	326 (76.50)	63.50 ± 17.50	32.50 ± 8.29	31.00 ± 10.61

Table 2 (continued)

Classification	Frequency (*n*,%)	SOS	Event load	Individual vulnerability
		$Z=18.727^{**}$ $p<0.001$	$Z=16.644^{**}$ $p=0.001$	$Z=15.471^{**}$ $p=0.001$
Work motivation				
Career mission	251 (58.90)	63.72 ± 18.09	32.32 ± 8.62	31.40 ± 10.84
Economic pressure	118 (27.70)	69.54 ± 15.73	35.40 ± 7.50	34.14 ± 9.83
Employment contract requirements	57 (13.40)	63.47 ± 15.30	32.91 ± 6.59	30.56 ± 10.12
		$F=5.025^{**}$ $p=0.007$	$F=5.891^{**}$ $p=0.003$	$F=3.418^{*}$ $p=0.034$

Note: SOS, Stress overload scale; *, $p<0.05$; **, $p<0.01$

Table 3 Correlation analysis of personality characteristics, coping style and stress-load of nurses of obstetrics and gynecology ($n=426$, *rs*)

Project	*N*	C	A	O	E	PC	NC	Events	Individuality
N	1	-	-	-	-	-	-	-	-
C	**-0.225****	1	-	-	-	-	-	-	-
A	0.004	**0.269****	1	-	-	-	-	-	-
O	**-0.161****	**0.390****	**0.116***	1	-	-	-	-	-
E	-0.003	**0.350****	**0.156****	**0.509****	1	-	-	-	-
PC	**-0.431****	**0.410****	**0.209****	**0.420****	**0.345****	1	-	-	-
NC	**0.528****	**-0.181****	**0.110***	**-0.160****	-0.093	**-0.270****	1	-	-
Events	**0.515****	0.002	**0.102***	-0.029	0.071	**-0.198****	**0.560****	1	-
Individuality	**0.568****	**-0.181****	0.004	**-0.157****	-0.030	**-0.326****	**0.640****	**0.674****	1

Note: * represents $p<0.05$, ** represents $p<0.01$. N represents Neuroticism, C represents Conscientiousness, A represents agreeableness, O represents openness, E represents extroversion, "event" represents event load, and "individuality" represents individual vulnerability

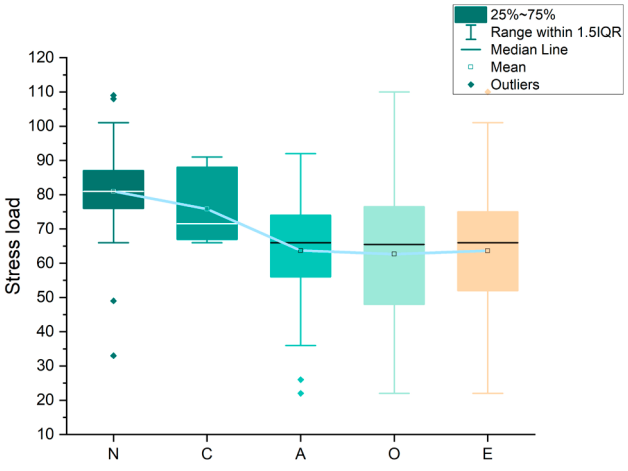

Fig. 1 Levels of stress load across different personality traits among obstetrics and gynecology nurses. *Abbreviations* A, Agreeableness; E, Extraversion; C, Conscientiousness; N, Neuroticism; O, Openness

Discussion

This study was a correlational study using the CBF-PI-B, TCSQ, and SOS to investigate stress load, personality traits, and coping strategy attributes among Chinese obstetrics and gynecology nurses and midwives, as well as the interrelations among them. Identifying pivotal personality traits prevalent among obstetrics and gynecology nurses and midwives, such as neuroticism, conscientiousness, and openness, serves as a foundational step toward elucidating their predictive impacts on nurses' coping strategies and levels of psychological stress. This exploration contributes to advancing future research and applications in this field.

In this study, we found that the stress risk of obstetrics and gynecology nurses and midwives was characterized by high stress and impact, with a stress-load score of (65.30 ± 17.27). Although this score aligns with the overall stress levels of Chinese nurses [43], from a department-specific perspective, it is higher than that of nurses in pediatrics (64.53 ± 12.48) [37], oncology (53.22 ± 16.16) [44], and hemodialysis departments (3.00 ± 1.26) [17] in China. A Comparison of stress overload scores among nurses and midwives in South Africa [45] Italy [46] and Jordan [47], suggests that stress levels among nurses in China are currently elevated. Compared to scores in pediatrics and oncology, we speculate that the unique nature of obstetrics and gynecology nursing and midwifery service——which primarily involve women and infants——may contribute to elevated stress levels. The characteristics of a younger patient population, rapid disease progression, and high demand for humanistic care in professional practice make obstetrics and gynecology nurses and midwives more susceptible to occupational stress [6, 48].

Additionally, we found that the average score of event load dimension and items was higher than that of

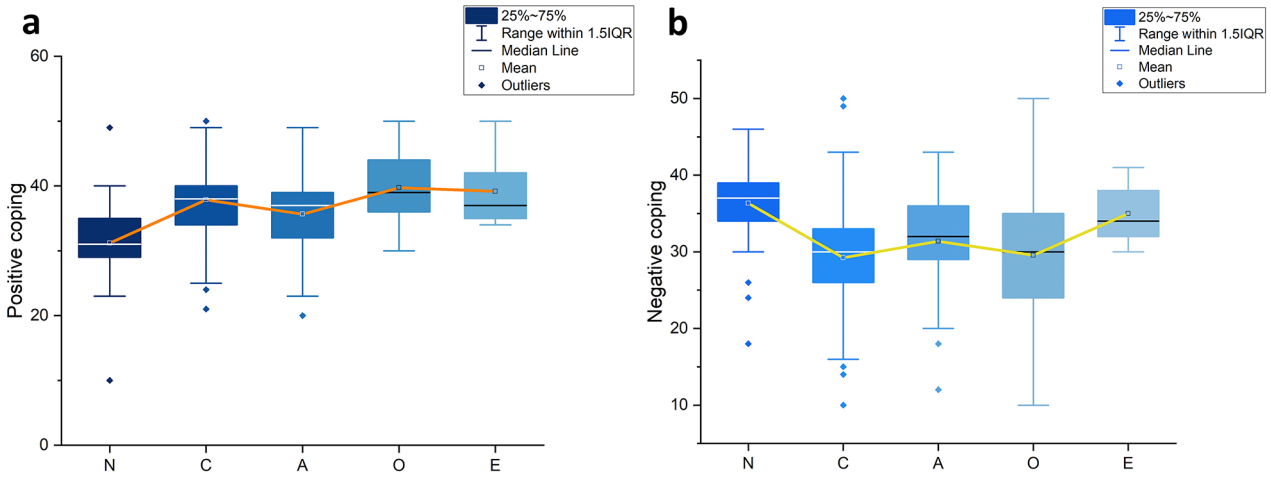

Fig. 2 **a** Levels of positive coping across different personality traits among obstetrics and gynecology nurses. **b** Levels of negative coping across different personality traits among obstetrics and gynecology nurses Abbreviations: A, Agreeableness; E, Extraversion; C, Conscientiousness; N, Neuroticism; O, Openness

individual vulnerability dimension items. This heightened stress may stem from increasing numbers of fetuses and newborns, coupled with a rising proportion of high-risk pregnancies or those with advanced maternal age, under China's revised fertility policy encouraging two or even three children [25, 49]. Obstetrics and gynecology nurses and midwives face greater role expectations, requiring them to comprehensively address the care needs of women, newborns, and their families, as well as associated stress and negative emotions during service delivery.

Event load reflects whether an individual faces excessive external pressure and responsibility, while individual vulnerability assesses ineffective response to stressful events. Event load serves as the primary source of stress load for nurses, potentially linked to the merging of gynecology and obstetrics duties in some departments, resulting in role confusion, heightened sensitivity to time pressure and event load. According to relevant data from the China's National Maternal and Child Health Analysis Report (2018), the cesarean section rate in China is 44.53%, with medical unjustified cesarean deliveries accounting for 24.6% of this rate [50]. This rate exceeds the threshold recommended by the WHO, which recommends cesarean section rate not exceed 15% [51, 52]. This phenomenon is aligns with the China's dominant delivery service model, characterized by a "physician-led" medical care model, rather than a midwife-led "midwifery model" [8, 53]. Additionally, in China, the merger of gynecology and obstetrics departments in some hospitals leads to nurses managing dual responsibilities for both midwifery and postoperative gynecological surgery patients [9], increasing stress during emergency situations and depleting psychological reserves [54]. Consequently, obstetrics and gynecology nurses and midwives may struggle to respond effectively to emergencies, exacerbating feeling of helplessness and defeat [8], thereby jeopardizing their psychological well-being through elevated stress and adverse impact.

In our study, significant variations in stress load were observed among obstetrics and gynecology nurses and midwives based on marital status, hospital level, family occupational support and work motivation ($p < 0.05$), which constituted the primary factors influencing the stress load. Published literature suggests that family stability and adequate financial resources stand out as crucial sources of personal contentment [55]. Specifically, single mother working as obstetrics and gynecology nurses or midwives face complex stressors related to social dynamics and economic stability, amplifying their stress load [54, 56, 57]. Supportive workplace measures act as critical safeguards for the psychological well-being of obstetrics and gynecology nurses and midwives. Effective stress management systems or strategies implemented by managers can help employees reduce perceived stress, disengage from stressors more efficiently, and better regulate their emotional responses.

In the Department of Obstetrics and Gynecology, the prominent personality characteristics among nurses were identified as conscientiousness, openness and agreeableness, reflecting responsibility, tolerance, and interpersonal warmth respectively. This department, characterized by complex conditions and heavy tasks, requires nurses to possess advanced skills, such as bedside floating catheter nursing, advanced life support technology [58], and specialized care for patients with hemorrhagic shock or other bleeding complications. The high complexity and demands necessitate conscientiousness, requiring nurses to address the emotional

and privacy needs of female patients while empathetic, humanistic care [59].

Openness and agreeableness are closely related to coping styles, though the relationship between agreeableness and stress load is bidirectional. This may occur because highly in agreeable individuals, who are often altruists, tend to prioritize others' needs, potentially internalizing negative emotions during stressors and thereby elevating their stress levels [60]. Conversely, sociable and helpful individuals possess robust positive psychological capital, enabling them to manage emotions, rationally interpret events [61], and mitigate the impact of stressors. Openness equips individuals to adapt flexibly, enabling obstetrics and gynecology nurses and midwives to respond effectively to emergencies, leverage psychological resilience, and adopt innovative solutions during challenges [31], thereby reducing individual vulnerability and buffering their perception of event load.

Additionally, neuroticism was found to positively correlate with event load and individual vulnerability ($p < 0.05$), and agreeableness was positively correlated with event load ($p < 0.05$). Nurses and midwives in obstetrics and gynecology with high neuroticism traits exhibited the highest stress load levels among the five personality traits ($p < 0.05$). Consistent with the findings from Dar's study in India [62], neuroticism——a key trait among healthcare professionals——effectively predicted coping strategy preference in this study. Nurses with pronounced neurotic traits often display heightened interpersonal sensitive, rely excessively on emotional responses to stressors, and exhibit overreaction or ineffective coping strategies, increasing their risk of anxiety and depression [7].

Relevant studies indicate that over prolonged working periods, nurses develop greater hardiness and self-improvement traits [6], with hardiness associated with proactive and responsible response to stressors [58]. Weng's research reported that nurses with extroversion demonstrate heightened boldness, courage, and superior social skills in their work [31], aligning with the communication and emergency response demands of obstetrics and gynecology nursing. This trait also fosters psychological resilience, encouraging proactive problem-solving and support-seeking during challenges. However, the relationship was nonsignificant in this study, potentially due to limited sample size. Additionally, obstetrics and gynecology nursing——inherently tied to privacy concerns——may constraint open communication, potentially hindering accurate assessment of nurses' extroversion traits.

In this study, most of the obstetrics and gynecology nurses and midwives adopted positive attitudes to manage professional stressors, with stress load levels among those using positive coping strategies significantly lower than those relying on negative coping strategies. This aligns with a previous longitudinal cohort study in Poland [63], where positive coping strategies were shown to enhance subjective agency, facilitate healthy emotions expression and mitigate psychological stress. Psychological resources generated through person-situation interactions can influence individual psychological states [64]. The obstetrics and gynecology work environment, centered on nurturing new life, fosters positive psychological outcomes for nurses and midwives, including professional accomplishment, fulfillment, and identity [65]. This environment reinforces psychological capital, enabling nurses and midwives to adapt swiftly to stressors. It also prompts constructive evaluation and responses to stress. Similar recommendations appear in the U.S. nursing and midwifery literature [66]. Transitioning nurses and midwives from passive support roles to an active leadership roles can foster a supportive environment for healthcare providers and even perinatal patients. This shift mitigates burnout and reduces occupational stress load [67].

The findings suggest that obstetrics and gynecology nurses and midwives should timely assess their coping strategies and effectiveness, apply positive psychology principles to alleviate negative emotions, and improve stress resilience [68, 69]. Nursing managers should prioritize nurses with pronounced neurotic traits and negative coping tendencies, enhancing two-way communication and providing targeted psychological counseling to this cohort. To foster a supportive department environment and leverage the stress-regulatory benefits of person-situation interactions, institutions should offer robust organizational support to cultivate positive traits (e.g., openness, agreeableness) and modify neurotic traits. Furthermore, nursing managers can adopt magnetic management strategies to build a cohesive team environment, enabling nurses and midwives to balance workload and rewards dynamically while reducing stress load through enhanced professional fulfillment and psychological resilience.

Conlcusion

Currently, the stress load of obstetrics and gynecology nurses and midwives in China is at a moderate level, and the stress risk is characterized by impact and high stress. Factors such as family, organizational, societal, and individual psychology influences significantly affect their stress load. Neuroticism and negative coping strategies exert a significant impact on the stress load of obstetrics and gynecology nurses and midwives. Fortunately, positive coping strategies——including mindfulness-based stress reduction therapy, cognitive behavioral therapy, among others——are widely adopted by most obstetrics and gynecology nurses and midwives to manage stress and bolster psychological resilience.

Implications for nursing practice and policies

The administrators of obstetrics and gynecology nurses and midwives should adopt flexible management or magnetic management means, establish and improve the monitoring mechanism of nurses' mental health in the future, identify nurses with negative emotions and middle and high stress-load level in time, provide positive psychological training through group psychological intervention or case intervention, stimulate prosocial behavior among members, and help nurses of obstetrics and gynecology have correct cognition of their own personality characteristics and actively form positive coping strategies.

Strengthen, limitations and perspectives

This study provides valuable insights into the stress-load and coping strategies among female nurses and midwives. It successfully identifies key factors contributing to stress and highlights the importance of addressing these issues to improve job satisfaction and retention. The research also underscores the need for support systems and interventions tailored to the unique challenges faced by female healthcare professionals. By focusing on a demographically representative sample, the study offers a broad understanding of the experiences of female nurses and midwives in the workplace. Furthermore, it lays the groundwork for future research to explore the impact of stress on professional turnover and the potential benefits of targeted interventions.

Despite its contributions, this study has several limitations. One limitation is the exclusion of male nurses due to their global underrepresentation in the nursing and midwifery professions. Another one is the lack of controlling for other factors that may affect stress-load, such as religion, fertility, experience of workplace violence, and so on. What's more, all the questionnaires are self-assessment scales and lack objective evaluation indicators. Therefore, we suggest that future research in this area should appropriately consider objective indicators such as the number of deliveries and the number of patients cared for (especially critically patients or parturient) within a unit of time, which can, to some extent, objectively reflecting the participants' perceived stress and influencing coping strategies.

Given the potential impact of stress overload on professional turnover, future research may need to design longitudinal studies, selecting nurses and midwives who have left their jobs due to high stress load, to investigate their stress load, personality traits, and coping strategies after re-employment and compare these with their pre-departure status. In addition, research focusing on male nurses and midwives is also necessary and valuable, which gives help to compare the stress load level between different gender and benefit from enhancing and promoting the well-being of women nurses and midwives.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03620-7 .

Supplementary Material 1

Acknowledgements

We are thankful to all the nurses and midwives who participated in this study and grateful to head of the nursing department of these twenty-one hospitals, which have worked closely with the team to ensure the field survey is successfully implemented.

Author contributions

YQQ was responsible for the study design, data analysis, the drafts and the final manuscript. ZKF, YL, YQQ and HQH were responsible for the study design and data collection and analysis. HQH and HXD provided administrative support. All authors read and approved the final manuscript.

Funding

This study was not funded by any institution, college or person.

Data availability

Due to the principle of scientific research confidentiality, we promised to keep participant's information and data confidential, and the data used for this study will not be public, but available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Participants assured that they were voluntary in the survey. After informing the nurses and midwives about the study and obtaining their informed consent, the researchers invited them to fill out the questionnaires. The study protocol was in accordance with the ethical guidelines of the Declaration of Helsinki and was approved by the Institutional research board of Guangdong Provincial Hospital of Traditional Chinese Medicine (No. ZE2023-031), and no identifying information was included in the questionnaire.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]The Second Clinical College, Guangzhou University of Chinese Medicine, Dade Road 111, Guangzhou, China
[2]Guangdong Second Provincial Traditional Chinese Medicine Hospital, Guangzhou, China
[3]Department of Hepatobiliary Surgery & Vascular Surgery, Chengdu Seventh People's Hospital, Chengdu, China
[4]Department of Nursing, The Second Affiliated Hospital of Guangzhou University of Chinese Medicine, Guangzhou, China
[5]Department of Gynecology, The Second Affiliated Hospital of Guangzhou University of Chinese Medicine, Guangzhou, China

Received: 20 February 2024 / Accepted: 17 February 2025
Published online: 14 March 2025

References

1. Jin Y, Cui F, WANG R, et al. Stress overload, influencing factors, and psychological experiences of nurse managers during early stages of the COVID-19

pandemic: a sequential explanatory mixed method study. Front Psychol. 2023;14:1187433.
2. Cybulska AM, Rachubińska K, Stanisławska M, et al. Analysis of factors related to mental health, suppression of emotions, and personality influencing coping with stress among nurses. Int J Environ Res Public Health. 2022;19(16):9777.
3. Hunter B, Fenwick J, Sidebotham M, et al. Midwives in the united Kingdom: levels of burnout, depression, anxiety and stress and associated predictors. Midwifery. 2019;79:102526.
4. Zeng SX, Liu ZH, Shen P, et al. Current status investigation and correlation analysis of obstetric Nurse's stressor, anxiety and social support. Nurs J Chin PLA. 2014;31(13):17–9.
5. Hu SS, Liu J, Jiang PH, et al. Investigation on current status and analysis on influencing factors of quality of working life among obstetrics nurses in Wuxi City. Occup Health. 2021;37(19):2634–7.
6. Xu J, Duan YX, Liu Y, et al. Relationship between psychological resilience and social support amid job stress and burnout in gynecological nurses of varying tenure. Maternal Child Health Care China. 2022;37(10):1877–80.
7. Shen LX, Bao L, Huang YH. Nurses' experiences of time pressure in clinical work: a qualitative study. Chin Nurs Manage. 2023;23(4):599–603.
8. Dai L, Zeng TY, Zhang K, et al. The experience of midwives' participating in traumatic birth: a meta-synthesis of qualitative research. Chin J Nurse. 2021;56(11):1728–35.
9. Hu L, Jiang M, Xu XF, et al. Investigation on the current situation of midwives human resources in chin. Chin J Nurse. 2020;55(2):192–7.
10. Jiang WW, Pu CS, Zhu Z, et al. The relationship between task load, stress cognition and psychological disengagement among midwives in Jiangsu. Chin J Nurse. 2023;58(17):2142–8.
11. Su Q, Guo LL. Reliability and validity of the stress overload scale in Chinese nurses. Chin J Nurse. 2014;49(10):1264–8.
12. Dong YJ, Wei H, Chen Y, et al. Relationship between emotional exhaustion and work stress, thought suppression, difficulties in emotion regulation in clinical nurses. Chin Occup Med. 2023;50(3):355–60.
13. Darling EK, Grenier LN, Mackenzie RK et al. A mixed-method study exploring barriers and facilitators to midwives' mental health in Ontario. BMC Women's Health. 2023;23(1).
14. Yang JR, Yuan LL, Ju YN, et al. Research progress on individual and organization fit among nurses. J Nurs Sci. 2021;36(15):110–3.
15. Yan N, Yang YJ, Yang XX, et al. Relationship between job stress and turnover intention based of professional identity in nurses. Chin Hosp Manage. 2018;38(7):73–5.
16. Amirkhan JH. Stress overload: a new approach to the assessment of stress. Am J Community Psychol. 2012;49(1–2):55–71.
17. Zeng Y, Yang YJ, Yuan HH, et al. Correlation between the stress load of Hemodialysis specialist nurses and their occupational sense of benefit. Med J West China. 2021;33(8):1245–9.
18. Guo JP, Wang SC, Liu GY. How does university student's academic stress affect their mental health problem? Joint moderating effects of academic self-efficacy and stress coping strategy. China High Educ Res. 2023;39(5):25–31.
19. Lazarus RS, Delongis A, Folkman S, et al. Stress and adaptational outcomes. The problem of confounded measures. Am Psychol. 1985;40(7):770–85.
20. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer Publishing Company; 1984.
21. Guo GJ, Ma H. Relationship between depressive emotion and personality of undergraduates: analysis of coping style as a mediator or moderator. China J Health Psychol. 2022;30(3):426–31.
22. Sui LX, Cheng LP. Correlation among big five personality, empathy and workplace violence among pediatric nurses. Chin Nurs Res. 2019;33(2):241–6.
23. Mollart L, Skinner VM, Newing C, et al. Factors that May influence midwives work-related stress and burnout. Women Birth. 2013;26(1):26–32.
24. Friedman HS. Neuroticism and health as individuals age. Personal Disord. 2019;10(1):25–32.
25. Li DP, Chen ZH, Guo ZD, et al. Relationship between psychological empowerment and professional burnout under tow-child policy among obstetrics nurses. J Nurs Sci. 2019;34(3):97–100.
26. Xie J, Liu M, Zhong Z, et al. Relationships among character strengths, Self-efficacy, social support, depression, and psychological Well-being of hospital nurses. Asian Nurs Res (Korean Soc Nurs Sci). 2020;14(3):150–7.
27. Zhu D, Duan JY, Tian XM. Social undermining in organization: conceptualization, consequences and formation mechanism. Adv Psychol Sci. 2013;21(1):135–43.
28. Hester S, Harrelson C, Mongo T. Workplace violence against nurses: making it safe to care. Creat Nurs. 2016;22(3):204–9.
29. Cai JZ, Wang HF, Hu XY, et al. Analysis on the characteristics of nurses who suffer from workplace violence repeatedly. Chin J Nurs Educ. 2023;20(8):919–24.
30. Zhu B, Ren BL, Gao HL, et al. Alexithymia, social undermining in emergency nurse of teritary hospital and their influences on post-traumatic stress disorder. Occup Health. 2018;34(19):2684–8.
31. Weng QX, Peng CH, Cao WL, et al. The relationship between big-five personality and subjective career success: a meta-analysis of the prior 15-year researches. Manage Rev. 2016;28(1):83–95.
32. Henriksen L, Lukasse M. Burnout among Norwegian midwives and the contribution of personal and work-related factors: A cross-sectional study. Sex Reprod Healthc. 2016;9:42–7.
33. De La Cruz P, Cebrino S, Herruzo J. A multicenter study into burnout, perceived stress, job satisfaction, coping strategies, and general health among emergency department nursing staff. JCM. 2020;9(4):1007.
34. Patricia PC, Jillian C, Timothy B. Workplace violence against nurses in health care and the role of human resource management: A systematic review of the literature. J Adv Nurs. 2020;76(7).
35. Cao W, Hu L, He Y, et al. Work-Related musculoskeletal disorders among hospital midwives in Chenzhou, Hunan Province, China and associations with job stress and working conditions. Risk Manag Healthc Policy. 2021;14:3675–86.
36. PASS 15 Power Analysis and Sample Size Software. (2017). NCSS, LLC. Kaysville, Utah, USA, ncss.com/software/pass.
37. Liu YY, Chen J. Moderating effect of big five personality traits between pressure load and professional quality of life in pediatric nurses. J Nursing(China). 2022;29(20):44–9.
38. Wang MC, Dai XY, Yao SQ. Development of chines big five personality inventory (CBF-PI) I: theoretical framework and reliability analysis. Chin J Clin Psychol. 2010;18(5):545–8.
39. Wang MC, Dai XY, Yao SQ. Development of the Chinese big five personality inventory (CBF-PI) III: psychometric properties of CBF-PI brief version. Chin J Clin Psychol. 2011;19(4):454–7.
40. Wang Y, Wang XJ, Liu LL. Investigation on psychological status and coping style of the nurses at the isolation war of a designated hospital. Chin J Nurs. 2020;55(S1):88–90.
41. Jiang QJ, Zhu YH. Further explorations for a coping style questionnaire. Chin Behav Med Sci. 1999;8(3):9–11.
42. Rouxianguli·M, Zhang MH. The relationship between occupational anchors and pressure load among nursing: the mediating role of humanistic care. J Nurs Adm. 2021;21(5):309–12.
43. Zeng Z, Ye ZJ, Hu Q, et al. The mediating effect of psychological resilience on stress load, mental health and perceived professional benefit in nurse. Guangdong Med J. 2018;39(15):2352–5.
44. Huang FF, Deng MH, Zhu XQ, et al. Correlations between sleep quality, stress overload and social support among oncology nurses in class A hospital of grade III. Med J Chin PAP. 2019;30(3):209–14.
45. Khamisa N, Oldenburg B, Peltzer K, et al. Work related stress, burnout, job satisfaction and general health of nurses. Int J Environ Res Public Health. 2015;12(1):652–66.
46. Fumagalli S, Panzeri M, Borrelli S, et al. Midwives' stress and burnout during the Omicron wave in Italy: an observational survey. J Adv Nurs. 2024;80(11):4510–22.
47. D'emeh WM, Yacoub MI, Shahwan BS. Work-Related stress and anxiety among frontline nurses during the COVID-19 pandemic: A Cross-Sectional study. J PsychoSoc Nurs Ment Health Serv. 2021;59(8):31–42.
48. Chen JY, Zheng LQ. Investigation on the stressors among obstetric nurses and countermeasures. Health Med Res Prac. 2019;16(5):25–9.
49. National Health Commission of the People's Republic of China. Guiding Opinions of the National Health and Family Planning Commission on Strengthening Maternal and Child Health Services in the New Situation. (2014-06-19) http://www.nhc.gov.cn/cms-search/xxgk/getManuscriptXxgk.htm?id=fb7b841983a2460e92b350bef532a6a1.
50. Yan MQ, Wang J, Liu YN, et al. Effects of midwife▪ed health management model on maternal outcomes. Chin Nurs Res. 2020;34(7):1272–4.
51. Signore C, Spong CY. Vaginal birth after Cesarean: new insights manuscripts from an NIH consensus development conference, March 8–10, 2010. Semin Perinatol. 2010;34(5):309–10.
52. Li HT, Luo SS, Leonardo T, et al. Geographic variations and Temporal trends in Cesarean delivery rates in China, 2008–2014. JAMA. 2017;317(1):69–76.

53. Zhu W, Chen Y, Lu T, et al. Application of continuous midwives' service in vaginal delivery of pregnant women with Scar uterus. Nurs J Chin PLA. 2019;36(7):79–82.
54. Wang H, Li N, Zhang W, et al. Correlation analysis of psychological capital, time pressure and occupational stress of 204 obstetric nurses in four grade-A tertiary hospitals in Xi'an City. Occup Health. 2022;38(12):1585–15891595.
55. Li JL, Pan XF, Bi WF, et al. How does household income affect individual social pressure? J Sichuan Normal Univ (Social Sci Edition). 2023;50(2):124–32.
56. Yu GX, Sun ZF, Yao SY, et al. Analysis of occupational stressors and their influencing factors of nursing staff in Beijing City [J]. Chin J Ind Med. 2019;32(4):258–60.
57. Han JW, Kim JH. Moderated mediation effect of Self-esteem on the relationship between parenting stress and depression according to employment status in married women: A longitudinal study utilizing data from panel study on Korean children. Asian Nurs Res (Korean Soc Nurs Sci). 2017;11(2):134–41.
58. Cao QY. Regression analysis of obstetric nurses' tenacious personality and self-concept. J Qilu Nurs. 2013;19(22):41–3.
59. Li JJ, Li ML, Liu Y, et al. Analysis of the mediation effect of nurses' empathy ability on medical narrative and humanistic care abilities. J Nurs (China). 2022;29(24):1–5.
60. Xiao JJ, Wang XH, Liu YW, et al. The anxiety status and its influencing factors of medical staff in Guangdong Province under the situation of normalized epidemic prevention and control. Guangdong Med J. 2022;43(10):1210–7.
61. Thompson C, Bucknall T, Estabrookes CA, et al. Nurses' critical event risk assessments: a judgement analysis. J Clin Nurs. 2009;18(4):601–12.
62. Dar IA, Iqbal N. Beyond linear evidence: the curvilinear relationship between secondary traumatic stress and vicarious posttraumatic growth among healthcare professionals. Stress Health. 2020;36(2):203–12.
63. Farnicka M, Wojciechowska L, Wojiechowski Ł. Positive psychology in Poland between 2001 and 2020: A review of available articles. Front Psychol. 2021;12:659337.
64. Wickrama KAS, Lee S, Klopack ET, et al. Stressful work conditions, positive affect, and physical health of middle-aged couples: A dyadic analysis. Stress Health. 2019;35(4):382–95.
65. Huang SR, Yu YH, Zhou X, et al. The occupation experience of the new-recruited undergraduate midwives. Chin J Nurs Educ. 2017;14(9):692–6.
66. Thumm EB, Smith DC, Squires AP, et al. Burnout of the US midwifery workforce and the role of practice environment. Health Serv Res. 2022;57(2):351–63.
67. LANCET T. The status of nursing and midwifery in the world. Lancet. 2020;395(10231):1167.
68. Alkhawaldeh JMA, Soh KL, Mukhtar FBM, et al. Effectiveness of stress management interventional programme on occupational stress for nurses: A systematic review. J Nurs Adm Manag. 2020;28(2):209–20.
69. Li FQ, Xing LL, Fan L. Effects of positive psychology training in nurses with severe work stress. J Nurs Sci. 2023;38(6):96–100.

Publisher's note