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The chain mediating role of negative emotions at work and meaning in life between interpersonal conflict at work and depressive symptoms among nurses: a multicenter cross-sectional study

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Abstract

Background Depressive symptoms among nurses have been a significant public health concern. Although many studies have demonstrated the potential relationship between interpersonal conflict at work and depressive symptoms, the mechanisms underlying this relationship among nurses remain unclear. Based on the theoretical and empirical research, this study aimed to investigate the multiple mediating effects of negative emotion at work and meaning in life on the relationship between interpersonal conflict at work and depressive symptoms among nurses.

Methods An online multicenter cross-sectional study was conducted in 15 hospitals from different geographical areas of Hunan Province, China, from December 2021 to February 2022. A total of 1754 nurses completed validated self-reported questionnaires, including their sociodemographic information, interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms. Descriptive statistics analysis, Spearman's correlation analysis, multiple linear regression analysis, and chain mediation analysis were performed using IBM SPSS software (version 29) and Mplus software (version 8).

Results There were significant correlations between interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms ($r = -0.206 \sim 0.518$, all $p < 0.01$). Interpersonal conflict at work had a statistically significantly direct effect on depressive symptoms ($\beta = 0.061$; 95% confidence interval, CI: 0.011 ~ 0.126, $p = 0.039$). Analysis of mediating effects revealed that interpersonal conflict at work also influenced depressive symptoms through two statistically significantly indirect pathways: (a) the mediating effect of negative emotions at work ($\beta = 0.167$; 95% CI: 0.138 ~ 0.195, $p < 0.001$) and (b) the chain mediating effect between negative emotions at work and meaning in life ($\beta = 0.008$; 95% CI: 0.003 ~ 0.013, $p = 0.005$).

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Conclusion Interpersonal conflict at work has a direct positive effect on depressive symptoms among nurses. Meanwhile, interpersonal conflict at work can influence depressive symptoms among nurses through the mediating effect of negative emotions at work and the chain mediating effect between negative emotions at work and meaning in life.

Keywords Nurses, Depressive symptoms, Interpersonal conflict at work, Negative emotions at work, Meaning in life, Medication effect

Background

As the largest occupational group in the healthcare professions [1], nurses disproportionately suffer from depressive symptoms due to special working conditions, such as unhealthy working environments, over-loaded clinical work, shiftwork disorder, occupational stress, and workplace violence and discrimination [2–6]. Evidence suggested that depressive symptoms have been a significant public health concern for nurses, with prevalence rates ranging from 18.8–64.8% [7–10], which generally predicts increased burnout [11, 12], decreased quality of patient care [13–15], higher turnover intention [16, 17], and increased risk of suicide [5, 18].

Interpersonal conflict at work has been recognized as one of the stressors within the global healthcare settings, i.e., ‘a dynamic process that occurs between interdependent parties as they experience negative emotional reactions to perceived disagreements and interference with the attainment of their goals’ [19]. In today’s complex healthcare environments, nurses are often required to achieve gold standard with limited resources and to coordinate—to a greater extent—with coworkers (e.g., other nurses and physicians) and supervisors, which process may lead to inevitable interpersonal conflicts due to the poor work environment, role ambiguity, lack of support, and poor communication [20, 21]. Unfortunately, interpersonal conflict at work may have a negative impact on mental health conditions among nurses. A wealth of empirical research has shown a positive correlation between interpersonal conflict at work and depressive symptoms; in other words, individuals who perceived higher levels of interpersonal conflict at work may have more depressive symptoms [22–24]. Therefore, we hypothesized that interpersonal conflict at work positively predicts depressive symptoms among nurses.

Negative emotions at work refer to an unpleasant engagement and a subjective feeling of distress, including anger, contempt, disgust, guilt, fear, and nervousness [25]. According to the ‘need to belong’ theory [26], ‘human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships,’ whereas interpersonal conflict at work, as a threat to this drive, may sharp a variety of negative emotions at work among nurses and even subsequent mental health problem, such as depressive symptoms. Previous research has also shown that

interpersonal conflicts at work were associated with higher levels of negative emotions at work [27], which, in turn, were associated with depressive symptoms [28, 29]. Therefore, we hypothesized that negative emotions at work mediate the relationship between interpersonal conflict at work and depressive symptoms among nurses.

Meaning in life has become an increasingly popular concept. Meaning in life refers to ‘the sense made of, and significance felt regarding, the nature of one’s being and existence’ [30]. According to the conceptual model of meaning in life [31], people find their meaning in life when they connect to others and receive help, support, strength, encouragement, love, and caring from others; therefore, interpersonal conflict at work, as an interpersonal stressful event, may have a negative impact on meaning in life among nurses. In addition, Viktor Frankl, a Viennese psychiatrist, recognized that the will to find meaning in life is a fundamental motivation for human beings, and failure to find meaning in life can lead to depression and even suicide [32]. Numerous studies have also demonstrated that meaning in life was associated with psychopathology, depressive symptoms, and suicidal ideation [33–36]. Therefore, we hypothesized that meaning in life mediates the relationship between interpersonal conflict at work and depressive symptoms among nurses.

As we hypothesized above, negative emotions at work and meaning in life may play a single mediating role between interpersonal conflict at work and depressive symptoms among nurses, respectively. However, when both negative emotions at work and meaning in life are considered mediators, the relationship between them remains to be clarified. Previous research has demonstrated that negative emotions were significant predictors of meaning in life [37, 38], and this means the relationship between interpersonal conflict at work and depressive symptoms may be influenced first by negative emotions at work and second by meaning in life. Therefore, we hypothesized that negative emotions at work and meaning in life play a chain mediation role between interpersonal conflict at work and depressive symptoms among nurses.

After an extensive literature review, there is a lack of research on the relationship between interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms among nurses. However,

it is essential to understand the mechanisms underlying the impact of interpersonal conflict at work on depressive symptoms among nurses, which can inform future research and interventions for depressive symptoms among nurses. Therefore, to fill these knowledge gaps, this study aimed to investigate the multiple mediating effects of negative emotion at work and meaning in life on the relationship between interpersonal conflict at work and depressive symptoms among nurses, in order to provide a theoretical basis for the prevention and intervention of depressive symptoms among nurses. Four hypotheses were proposed to construct the hypothetical conceptual model for this study (Fig. 1):

Hypothesis 1 Interpersonal conflict at work positively predicts depressive symptoms among nurses.

Hypothesis 2 Negative emotions at work mediate the relationship between interpersonal conflict at work and depressive symptoms among nurses.

Hypothesis 3 Meaning in life mediates the relationship between interpersonal conflict at work and depressive symptoms among nurses.

Hypothesis 4 Negative emotions at work and meaning in life play a chain mediation role between interpersonal conflict at work and depressive symptoms among nurses.

Methods

Study design, setting and participants

A multicenter cross-sectional study was conducted in the Hunan Province, China, from December 2021 to February 2022. We used a convenience sampling method to recruit participants online from 15 public hospitals in different geographical areas of Hunan Province, including Northern Hunan, Western Hunan, Southern Hunan, Central Hunan, and Eastern Hunan. The 15 public hospitals comprise 12 well-known tertiary hospitals (with

over 1000 fixed beds) and three secondary hospitals (with over 450 fixed beds). All 15 public hospitals are comprehensive or general hospitals except one children’s hospital. Each hospital has more than 200 registered nurses to provide a high level of specialized care, with a cumulative total of more than 10,000 registered nurses in the 15 hospitals. The inclusion criteria were: (1) registered nurses at the hospital; (2) willing to participate in the survey after informed consent. The exclusion criteria were registered nurses with major physical illnesses (e.g., malignant tumors) or acute disease conditions.

The present research was reported in line with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for cross-sectional studies (see Supplementary Material).

Sample size

The sample size was calculated using the procedure of the confidence intervals (CIs) for one mean in the Power Analysis & Sample Size (PASS) software (version 2021, <https://www.ncss.com/software/pass/>). Based on a previous study in China [39], the standard deviation (SD) of depressive symptoms among nurses was estimated to be 7.41. Assuming a 95% confidence level ($\alpha = 0.05$, two-sided), a 5.0% marginal error, and a rate of 15.0% for incomplete or invalid cases, the minimal sample size required was 1,808 participants.

Measures

Data was collected using the questionnaire that included sociodemographic variables, interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms. Sociodemographic variables included age (years), gender (male=0, female=1), educational level (junior college or less=0, bachelor’s degree or higher=1), single status (no=0, yes=1), clinical working experience (<5 years=0, ≥ 5 years=1), position (clinical nurse=0, nurse manager=1), and technical title (primary=0, intermediate or senior=1).

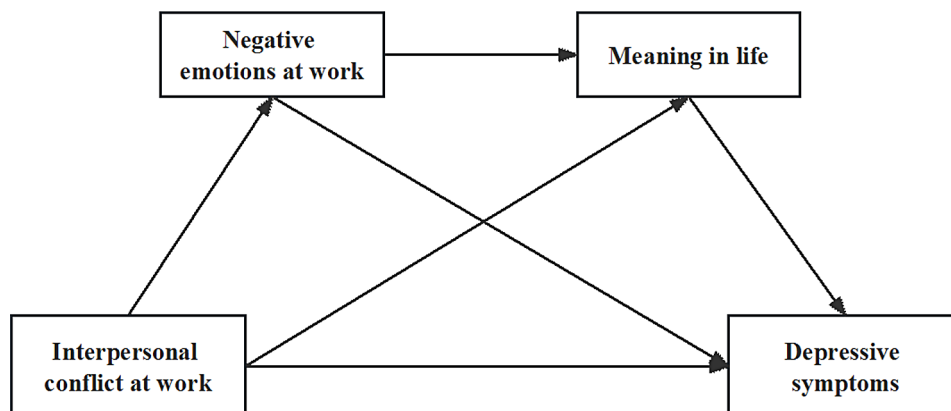


Fig. 1 Hypothesized conceptual model of the chain mediation

Interpersonal conflict at work was assessed by the adapted version of the Interpersonal Conflict at Work Scale [40]. The scale consisted of eight items: four items on interpersonal conflict with the supervisor (e.g., “How often do you get into arguments with your supervisor?”) and four items on interpersonal conflict with coworkers (e.g., “How often do you get into arguments with your coworkers?”). All items were scored on a 5-point Likert scale from 1 (never) to 5 (very often), with a total score ranging from 8 to 40. A higher score reflected a higher level of interpersonal conflict at work. The Cronbach's α was 0.925 in this study.

Negative emotions at work were assessed with a five-item subscale from the Job-Related Affective Well-Being Scale [41]. Each item was scored on a 5-point Likert scale ranging from 1 (never) to 5 (extremely often or always), with a range of total scores from 5 to 25. Higher scores indicated a higher level of negative emotions at work. A sample item of the scale is “My job made me feel angry.” The Cronbach's α was 0.945 in this study.

Meaning in life was assessed by the modified version of the Meaning in Life Questionnaire (MLQ) [42]. The nine-item scale had two dimensions: the presence of meaning (e.g., “I have a good sense of what makes my life meaningful”) and the search for meaning (e.g., “I am looking for something that makes my life feel meaningful”). Each item was scored on a 7-point Likert scale ranging from 1 (absolutely untrue) to 7 (absolutely true). The total score ranged from 9 to 63. A higher score reflected a higher level of meaning in life. The Cronbach's α was 0.847 in this study.

Depressive symptoms were assessed by the Patient Health Questionnaire-2 (PHQ-2) [43], which consisted of two items: “little interest or pleasure in doing things” and “feeling down, depressed, or hopeless.” On a 4-point scale, response options were 0 (not at all), 1 (several days), 2 (more than half the days), and 3 (nearly every day), with a total score ranging from 0 to 6. Higher scores indicated more severe depressive symptoms. A cut-off value (≥ 3 points) indicated signs of depression. The Cronbach's α was 0.847 in this study.

Data collection

The online survey was distributed via the *Wenjuanxing* platform (a free and open online survey website, <https://www.wjx.cn/>) as an electronic questionnaire with a unique Quick Response Code (QR code), including 32 items distributed over four pages. Before the formal survey, we piloted the electronic questionnaire with a convenience sample of registered nurses from various healthcare settings, and we adjusted its wording based on their feedback to ensure comprehensibility and readability. We sent the QR code to the head nurse in each department via e-mail, WeChat, or in-person, and then

they sent the QR code to eligible nurses in their department via the WeChat group platform. Interested nurses scanned the QR code to complete the survey. The survey was anonymous and voluntary, with no personally identifiable information involved. We provided an introduction to this survey and informed consent on the first page of the survey. If participants were willing to participate in the survey, they would click the “I agree to participate in this research of my own volition” button on the first page. We limited the survey to be completed only once for each IP address and set all items as mandatory to avoid omission. Respondents were allowed to review and change their responses by scrolling up and down the screen or clicking the “Back” button at the bottom of each page. Respondents could end the survey at any time by closing the link or not submitting the survey, and their data would not be retained. It took approximately 15 to 20 min to complete the survey. If the time to complete the survey was too short (<150 s), we considered the data invalid. All available data were downloaded from the *Wenjuanxing* platform and stored on the corresponding author's computer; only authorized researchers were entitled to access them.

A total of 1827 questionnaires were submitted by nurses, 73 of which were deemed poor quality due to inadequate completion time. After double-checking and verifying, 1754 valid questionnaires were included in the final analysis, with a valid response rate of 96.0%.

Statistical analysis

Statistical analysis consisted of four parts. Firstly, we used descriptive statistics to describe the participants' sociodemographic variables and the main study variables (interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms). Specifically, we used frequency and percentage to describe categorical variables and used mean (standard deviation, SD) or median (interquartile range) to describe continuous variables according to the normality. Values of skewness and kurtosis $< |2|$ were typically deemed acceptable indicators of a normal distribution [44]. The missing data analysis uncovered less than 1% of missing data, so missing data were treated by a complete case deletion. Secondly, the main study variables were regressed on the sociodemographic variables in multiple linear regressions. Statistically significant sociodemographic variables were defined as covariates. Thirdly, we used Spearman's correlation analysis to examine the bivariate correlation between interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms.

Finally, adjusting for covariates, we examined the hypothesized chain mediation model, following the Mplus code based on the original PROCESS diagrams by Andrew Hayes [45]. We selected the Mplus code for

Table 1 Sociodemographic characteristics of the sample (N = 1754)

Variables	N (%)
Total ^a	1754 (100)
Gender	
Male	97 (5.53)
Female	1657 (94.47)
Educational level	
Junior college or less	447 (25.48)
Bachelor's degree or higher	1307 (74.52)
Single status	
No	1343 (76.57)
Yes	411 (23.43)
Clinical working experience (years)	
< 5	453 (25.83)
≥ 5	1301 (74.17)
Position	
Clinical nurse	1626 (92.70)
Nurse manager	128 (7.30)
Technical title	
Primary	993 (56.61)
Intermediate or senior	761 (43.39)

Note ^a There are two missing values in age

model number 6, which showed an example of 2 mediators, in series, with the maximum likelihood estimation method. Following Hayes' recommendation [46], we calculated the 95% confidence intervals (CIs) for mediation analyses using the bootstrapping procedure with 10,000 repeated sampling, and the mediation effect was statistically significant if the 95% CIs did not contain zero. An acceptable model fit was indicated by a combination of indexes, including a non-significant Chi-Square value, root mean square error of approximation (RMSEA) smaller than 0.07, standardized root mean square residual (SRMR) smaller than 0.05, comparative fit index (CFI), and Tucker-Lewis index (TLI) greater than 0.95 [47]. All statistical analyses were performed using IBM SPSS software (version 29) and Mplus software (version 8), and $p < 0.05$ was considered statistically significant.

Ethics considerations

The study followed the Declaration of Helsinki and obtained ethical approval from the Institutional Review Board of the Third Xiangya Hospital of Central South University (Number: 22297).

Results

Preliminary analysis

Since the study data were collected through self-report measures, we conducted Harman's single-factor test in IBM SPSS software (version 29) to detect common method bias using exploratory factor analysis [48]. The results showed that five factors had eigenvalues greater than 1, explaining 75.13% of the total variance. Among

Table 2 Mean, standard deviation, and bivariate correlation analysis (N = 1754)

	M (SD)/ Median (IQR)	1	2	3	4
1. Interpersonal conflict at work	8.00 (3.00)	1			
2. Negative emotions at work	12.44 (4.23)	0.400***	1		
3. Meaning in life	43.26 (8.50)	-0.068**	-0.206***	1	
4. Depressive symptoms	1.97 (1.60)	0.306***	0.518***	-0.184***	1

Note M, mean; SD, standard deviation; IQR, interquartile range

** $p < 0.01$, *** $p < 0.001$

them, the first factor explained 32.10% of the total variance, lower than the critical value of 40.00%, indicating that no significant common method bias was found in this study.

Descriptive statistics

Table 1 shows the sociodemographic characteristics of the participants. In this study, the mean age of participants was 31.03 years (SD=6.44). Most participants were female (94.47%), not single (76.57%), and clinical nurses (92.70%), and had a bachelor's degree or higher (74.52%), ≥ five years of clinical experience (74.17%), and a primary technical title (56.61%). The prevalence of depression among nurses was 27.54%.

Correlation between interpersonal conflict at work, negative emotions at work, meaning in life and depressive symptoms

Table 2 shows the descriptive statistics of the main study variables. The median and interquartile range of interpersonal conflict at work was 8.00 and 3.00. The mean and standard deviation of negative emotions at work, meaning in life, and depressive symptoms were 12.44 ± 4.23 , 43.26 ± 8.50 , and 1.97 ± 1.60 , respectively.

Table 2 also shows the correlation matrix for the main study variables. The results of the correlation analysis were consistent with our expected hypotheses, and all the analysis results were statistically significant at the level of $p < 0.01$ (two-tailed). Firstly, interpersonal conflict at work was positively correlated with negative emotions at work ($r = 0.400$, $p < 0.001$) and depressive symptoms ($r = 0.306$, $p < 0.001$) and negatively correlated with meaning in life ($r = -0.068$, $p < 0.01$). Secondly, negative emotions at work were negatively correlated with meaning in life ($r = -0.206$, $p < 0.001$) and positively correlated with depressive symptoms ($r = 0.518$, $p < 0.001$). Thirdly, meaning in life was negatively correlated with depressive symptoms ($r = -0.184$, $p < 0.001$).

All sociodemographic variables were significantly associated with these four main study variables ($p < 0.05$), except the technical title (see Table 3). Specifically, gender ($B = -1.70, p < 0.001$) was negatively associated with interpersonal conflict at work; age ($B = -0.11, p < 0.001$) and position ($B = -0.95, p = 0.020$) were negatively associated with negative emotions at work; educational level ($B = 0.63, p = 0.009$), single status ($B = 0.84, p = 0.002$), and clinical working experience ($B = 0.95, p = 0.002$) were positively associated with negative emotions at work; clinical working experience ($B = -1.86, p = 0.003$) was negatively associated with meaning in life; age ($B = -0.02, p = 0.012$) and position ($B = -0.36, p = 0.020$) were negatively associated with depressive symptoms; single status ($B = 0.25, p = 0.014$) and clinical working experience ($B = 0.44, p < 0.001$) were positively associated with depressive symptoms.

Mediation analysis

The mediation analysis evaluated a hypothesized chain mediation model where interpersonal conflict at work was chosen as the independent variable, negative emotions at work and meaning in life as mediators, and depressive symptoms as the dependent variable (Fig. 1; Table 4). The chain mediation model showed sufficient goodness of fit value: $\chi^2 = 12.77$ ($p = 0.466$), RMSEA = 0.000, SRMR = 0.015, CFI = 1.000, and TLI = 1.000. The mediation analysis results showed that after being adjusted for covariates, the total effect of interpersonal conflict at work on depressive symptoms was statistically significant ($\beta = 0.229$, 95% CI: 0.185 to 0.285, $p < 0.001$), with a statistically significant direct effect (Hypothesis 1, $\beta = 0.061$, 95% CI: 0.011 to 0.126, $p = 0.039$). Besides, the total indirect effect through both mediators was also statistically significant ($\beta = 0.168$, 95% CI: 0.139 to 0.197, $p < 0.001$), suggesting a significant overall mediation effect. Specifically, interpersonal conflict at work could influence depressive symptoms through two pathways: (a) Interpersonal conflict at work \rightarrow Negative emotions at work \rightarrow Depressive symptoms (Hypothesis 2), and (b) Interpersonal conflict at work \rightarrow Negative emotions at work \rightarrow Meaning in life \rightarrow Depressive symptoms (Hypothesis 4). The mediating effects of the above two are 0.167 (0.331×0.505) and 0.008 ($0.331 \times -0.218 \times -0.107$), respectively. Both of the two indirect effects reached the level of statistical significance because the 95% CI for the above indirect effects did not contain a zero value. However, the indirect effects of Interpersonal conflict at work \rightarrow Meaning in life \rightarrow Depressive symptoms did not reach a significant level (Hypothesis 3). In summary, all hypotheses were confirmed except hypothesis 3.

Discussion

This study aimed to investigate the multiple mediating effects of negative emotion at work and meaning in life on the relationship between interpersonal conflict at work and depressive symptoms among nurses. The results of this study confirmed a direct relationship between interpersonal conflict at work and depressive symptoms among nurses. Meanwhile, this study confirmed that interpersonal conflict at work influences depressive symptoms among nurses through two pathways: (a) Interpersonal conflict at work \rightarrow Negative emotions at work \rightarrow Depressive symptoms, and (b) Interpersonal conflict at work \rightarrow Negative emotions at work \rightarrow Meaning in life \rightarrow Depressive symptoms.

For hypothesis 1, this study confirmed that interpersonal conflict at work has a direct positive effect on depressive symptoms among nurses, and the higher the level of interpersonal conflict at work, the more depressive symptoms among nurses, which is similar to the previous research on general workers [40, 49]. As the largest occupational group in any healthcare setting, nurses are members of the organization and part of this social network by nature. In the collectivist cultural context of Chinese society, people are highly group-oriented and particularly value relationships with their in-group [50]. Therefore, it is not surprising that interpersonal conflict at work has a profound impact on the mental health conditions among nurses, as they tend to pursue relationship harmony and balance within their in-groups [51]. Meanwhile, these cultural values also make Chinese nurses more likely to use compromise/coordination and avoidance styles to deal with interpersonal conflict at work [51–53], thus making them more vulnerable to depressive symptoms [54, 55]. Given the prevalence of interpersonal conflict at work in healthcare settings, this finding highlights the need to focus on interpersonal relationships with coworkers and supervisors at work to improve depressive symptoms among nurses.

For hypothesis 2, this study confirmed that negative emotions at work mediate the relationship between interpersonal conflict at work and depressive symptoms among nurses. In other words, when nurses experience higher levels of interpersonal conflict at work, they may have more negative emotions at work and thus suffer more depressive symptoms. This finding is consistent with the ‘need to belong’ theory [26]. In complex healthcare environments, nurses experience interpersonal conflict at work from multiple sources, such as other nurses coworkers, nurse managers, and physicians [56], and these interpersonal conflict processes may threaten their relationships with their in-groups and, as a result, fail to satisfy their need to belong to their in-groups [26]. Therefore, when these interpersonal relationships are broken, threatened, or refused, negative emotions at work may

Table 3 Multiple regression (N = 1752)

	Interpersonal conflict at work			Negative emotions at work			Meaning in life			Depressive symptoms						
	B	SE	t	B	SE	t	B	SE	t	B	SE	t	P			
Age (years)	0.01	0.03	0.23	0.818	-0.11	0.03	-4.51	<0.001	0.06	0.05	1.09	0.275	-0.02	0.01	-2.51	0.012
Gender																
Male	reference				reference				reference				reference			
Female	-1.70	0.44	-3.85	<0.001	-0.54	0.44	-1.22	0.223	0.85	0.90	0.94	0.346	-0.03	0.17	-0.17	0.868
Educational level																
Junior college or less	reference				reference				reference				reference			
Bachelor's degree or higher	0.06	0.24	0.26	0.797	0.63	0.24	2.60	0.009	0.17	0.49	0.35	0.729	0.10	0.09	1.09	0.277
Single status																
No	reference				reference				reference				reference			
Yes	0.09	0.27	0.34	0.732	0.84	0.27	3.14	0.002	0.22	0.55	0.41	0.681	0.25	0.10	2.46	0.014
Clinical working experience																
< 5	reference				reference				reference				reference			
≥ 5	-0.32	0.31	-1.03	0.303	0.95	0.31	3.09	0.002	-1.86	0.63	-2.96	0.003	0.44	0.12	3.77	<0.001
Position																
Clinical nurse	reference				reference				reference				reference			
Nurse manager	-0.67	0.41	-1.63	0.102	-0.95	0.41	-2.33	0.020	1.23	0.83	1.48	0.140	-0.36	0.16	-2.34	0.020
Technical title																
Primary	reference				reference				reference				reference			
Intermediate or senior	0.04	0.30	0.15	0.883	0.45	0.30	1.51	0.132	-0.02	0.60	-0.03	0.977	-0.10	0.11	-0.90	0.369

Note: Due to complete case deletion, multiple regression analyses were conducted with 1752 participants; B, unstandardized regression coefficient; SE, standard error; Data in bold are statistically significant

Table 4 Direct, indirect, and total effects of the chain mediation model (N= 1752)

Model pathway	β	SE	95% CI (Bootstrap test)		p
			Lower	Upper	
Total effect	0.229	0.026	0.185	0.285	< 0.001
Direct effect	0.061	0.029	0.011	0.126	0.039
Total indirect effect	0.168	0.015	0.139	0.197	< 0.001
Interpersonal conflict at work → Negative emotions at work → Depressive symptoms	0.167	0.015	0.138	0.195	< 0.001
Interpersonal conflict at work → Meaning in life → Depressive symptoms	-0.006	0.004	-0.014	0.000	0.073
Interpersonal conflict at work → Negative emotions at work → Meaning in life → Depressive symptoms	0.008	0.003	0.003	0.013	0.005

Note Due to complete case deletion, mediation analyses were conducted with 1752 participants; β , standardized path coefficients; SE standard error; 95% CI, 95% confidence interval for the standardized path coefficients

ensue [26], while nurses with high levels of negative emotions at work tend to put themselves in circumstances with more stressors, leading to more depressive symptoms [57].

For hypothesis 3, we found that meaning in life did not mediate the relationship between interpersonal conflict at work and depressive symptoms among nurses. This finding is unexpected, but some clues can be found in previous research. As a stressful event, interpersonal conflict at work may prompt nurses to make compensatory meaning-making efforts to restore their meaning in life, and such a rebound effect has been found in previous research on meaning making in the context of stressful life experiences [58]. Specifically, nurses may reappraise the meaning of interpersonal conflict at work to make it more consistent with their preexisting beliefs and desires. For example, nurses may consider interpersonal conflict at work as benign compared to what others experience or as relatively fortunate because the event did not worsen. Van and Green also found a similar rebound effect in their experiments on the automatic defense of meaning [59]. However, our single-point assessment may not capture this dynamic process [60], and thus, we may underestimate the actual effect of interpersonal conflict at work on meaning in life. Future research could use the Ecological Momentary Assessment (EMA) method, a repeated collection of real-time data on subjects' experience in their natural environments [61], to capture this dynamic process and further examine the effect of interpersonal conflict at work on meaning in life among nurses.

For hypothesis 4, this study confirmed the sequential mediating effect of negative emotions at work and

meaning in life on the relationship between interpersonal conflict at work and depressive symptoms among nurses. The sequential mediating effect indicates that nurses with higher levels of interpersonal conflict at work may have more negative emotions at work, which may subsequently decrease their meaning in life and finally increase their depressive symptoms. This finding is similar to previous research. Previous research has shown that negative emotions may mediate the effect of negative events on meaning in life [60] while meaning in life plays a fundamental protective role against a range of mental health problems [33]. The potential explanation for this finding may be that negative emotions at work lead to narrowed attention and analytical focus and amplified negative evaluations among nurses [62–64], which in turn influences their meaning in life and finally triggers their mental health problems [34, 38, 65]. As such, there is a need to focus on the interpersonal conflict at work and its series of knock-on effects, i.e., negative emotions at work and decreased meaning in life, in order to prevent and intervene in depressive symptoms among nurses promptly.

Implications for future practice

Attention to the mental health of nurses is imperative for an efficient, effective, resilient, and sustainable health-care system, especially under unprecedented strain from the pandemic. The Centers for Disease Control and Prevention (CDC) has also served as a wake-up call to the pressing need to support their mental health [66]. Our findings provide practical implications for the prevention and intervention of mental health problems among nurses. Firstly, managers can create a positive, supportive environment for nurses to avoid interpersonal conflict at work as much as possible. For example, managers can hold regular group activities to help nurses develop trusting, reciprocal relationships with coworkers (e.g., other nurses and physicians) and their managers, making nurses feel a more positive and harmonious organizational atmosphere and a sense of belonging. Secondly, managers can build an effective communication platform to encourage nurses to express their voices actively when they experience interpersonal conflicts at work, negative emotions at work, decreased meaning in life, or depressive symptoms. Finally, managers can regularly assess interpersonal conflict at work, negative emotions at work, meaning in life, and depressive symptoms among nurses and develop targeted preventions and interventions for depressive symptoms among nurses.

Limitations and future research directions

This study has several limitations. First, our study used a cross-sectional design, which did not allow for the inference of causal relationships between the variables.

Future longitudinal studies are needed to clarify the potential causal relationships between these variables in this model. Second, due to limited funding and time, all participants in this study were recruited from a specific province in China through convenience sampling, which may not represent all nurses in the survey area, thereby limiting the generalizability of the findings. However, we recruited nurses from various departments in different geographical areas of Hunan Province, China, which is, to some extent, a representation of a diverse group of nurses within the survey area. Therefore, it can still be assumed that our findings reflect a social trend. Further studies should consider a more expansive sampling method to improve the generalizability and representativeness of the findings. Third, although we used a range of strategies for quality control before distributing the electronic questionnaires, some invalid questionnaires were collected due to the limitations of the online survey platform, which may affect the authenticity of the findings. Finally, due to the sensitivity of interpersonal conflict at work, participants may not fully answer their actual answers to gain social approval. Future studies could use more objective measurements, such as behavioral observation, to collect data.

Conclusion

This study showed that interpersonal conflict at work has a direct positive effect on depressive symptoms among nurses. Meanwhile, interpersonal conflict at work can influence depressive symptoms among nurses through the mediating effect of negative emotions at work and the chain mediating effect between negative emotions at work and meaning in life. These findings may help managers better understand the underlying mechanisms between interpersonal conflict at work and depressive symptoms among nurses and develop targeted preventions and interventions for depressive symptoms among nurses in the future.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12912-024-02276-2>.

Supplementary Material 1

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Author contributions

TZ: Conceptualization, Methodology, Investigation, Formal analysis, Writing - Original Draft. HY: Conceptualization, Methodology, Investigation, Formal analysis, Writing - Original Draft. HW: Conceptualization, Supervision, Writing - Review & Editing. MG: Conceptualization, Project administration, Writing - Review & Editing. All authors read and approved the final manuscript.

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None.

Data availability

The data can be obtained by contacting the correspondence author.

Declarations

Ethics approval and consent to participate

All procedures were in accordance with the Declaration of Helsinki. The study obtained ethical approval from the Institutional Review Board of the Third Xiangya Hospital of Central South University (Number: 22297). Informed consent was obtained online from each participant.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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