



Original article

Nurses' Colleague Solidarity and Job Performance: Mediating Effect of Positive Emotion and Turnover Intention

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ABSTRACT

Background: Job performance is known as an essential reflection of nursing quality. Colleague solidarity, positive emotion, and turnover intention play effective roles in a clinical working environment, but their impacts on job performance are unclear. Investigating the association between nurses' colleague solidarity and job performance may be valuable, both directly and through the mediating roles of positive emotion and turnover intention.

Methods: In this cross-sectional study, a total of 324 Chinese nurses were recruited by convenience sampling method from July 2016 to January 2017. Descriptive analysis, Spearman's correlation analysis, and the structural equation model were applied for analysis by SPSS 26.0 and AMOS 24.0.

Results: A total of 49.69% of participants were under 30 years old, and 90.12% of participants were female. Colleague solidarity and positive emotion were positively connected with job performance. The results indicated the mediating effects of positive emotion and turnover intention in this relationship, respectively, as well as the chain mediating effect of positive emotion and turnover intention.

Conclusions: In conclusion, dynamic and multiple supportive strategies are needed for nurse managers to ameliorate nursing job performance by improving colleague solidarity and positive emotion and decreasing turnover intention based on the job demand-resource model.

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1. Introduction

With increasing healthcare demands and a nursing shortage, better nursing job performance is required [1]. It is a reflection of nurses' job satisfaction and well-being [2], and it is an integral component of evaluating caring quality and organizational operation [3]. Healthcare is one of the fastest-growing industries worldwide, and nurses play an essential role in the development process. China is facing two major challenges: the childbirth peak and population aging [4,5], which require a great demand of nurses. The World Health Organization (WHO) projects a global shortfall of 18 million

healthcare workers by 2030, and it suggests that there must be not less than 8 nurses per 1,000 people in the aging society [6]. There is a deficiency of nurses that needs to be covered [7]. It is worthwhile to concentrate on Chinese nurses' job performance and its related variables to guide nurse managers in developing management strategies to achieve better job performance with limited nurses.

Since the 20th century, nurses' job performance has been of interest to nursing researchers and clinical managers. It contains two aspects: task performance and contextual performance [8]. Task performance means the direct contribution of nurses' work activities to healthcare work, which reflects their ability to utilize professional

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knowledge and deal with problems. Contextual performance refers to nurses' contributions to the performance of the department and even the hospital. Better job performance among nurses can be obtained by providing adequate caring knowledge and technical support, a clean and orderly working environment, harmonious interpersonal relationships, and so on [9,10]. Studies have suggested that socio-demographic, somatic, and psychological variables (e.g. age, sleep quality, burnout, thriving, and mindfulness) have impacts on nurses' job performance [11–14]. Since job performance also reflects environmental impacts caused by nurses' working behavior, researchers focus on its organizational influencing factors, such as working environment, wage, management, and career advancement [10,11]. Not only are there financial and material supports, but colleagues are also the main individuals in their working environment who play important roles in the performance of nursing work.

Nurses will seek support from colleagues when they have problems, feel worried, or encounter other negative events in the clinical environment. Because they think that colleagues understand their feelings better than other acquaintances, especially for professional problems. Colleague solidarity is defined as obtaining supports from colleagues and sharing professional knowledge, technology, and skills with others to achieve a common goal [15]. Nurses with strong colleague solidarity feel supported and communicate well with managers and patients to deal with difficulties originating from work [16]. They usually have gentle psychology status, which promotes satisfactory job outcomes. Colleague solidarity also inspires nurses in working environment establishment and professional development [17]. Evidence has suggested that colleague solidarity promotes organizational commitment and teamwork, which are beneficial to improving job performance [16,18]. In a word, nurses' colleague solidarity may have a potential association with job performance. However, the specific relationship between colleague solidarity and job performance is unclear among nurses.

Turnover intention is the conscious intention that employees will voluntarily leave the position within a certain period, which reflects their attitudes toward the work and organization [19]. It is a negative thought that usually occurs among nurses due to the aggravating workload, excessive non-nursing work, effort-reward imbalance, and emotional exhaustion [20,21]. A study conducted among 51,406 nurses from 1,858 Chinese hospitals has indicated that 49.58% of nurses have intentions to leave the profession [22]. Once nurses have turnover intentions, they lose concentration on the job, resulting in lower caring quality, which is an indicator of job performance [23]. Colleague solidarity is an important predictor in the generation of nurses' turnover intentions [24,25]. Compared with turnover intention, positive emotion is a motivated psychological status, which is needed due to the great pressure during nursing process. Positive emotion includes pleasant, fulfillment, pride, love and other positive status, which persistently promote psychological growth and well-being [26]. As a dynamic internal power, positive emotion mobilizes psychophysiological resources to take adaptive coping measures in the face of stress and to realize expected goals [26,27]. Health providers with positive emotions are skilled at acquiring colleagues' support and avoiding medical errors [28]. Positive emotion buffers organizational conflicts and makes individuals have a better ability to adapt to their current environment [29], which may be necessary for nurses to maintain ideal job performance. Moreover, studies have confirmed that emotional exhaustion is associated with turnover intention [30,31]. It means that emotional status has an impact on turnover intention, but less study concentrates on positive emotion. Even fewer researchers focus on the influencing mechanisms of positive emotion and turnover intention in the relationship between colleague solidarity and job performance.

The job demand-resource (JD-R) model is a framework for interpreting organizational factors and their effects on working outcomes, such as turnover and performance [32]. The JD-R model contains two elements: job resources and job demands. Job resources include physical, mental, and organizational characteristics, which are motivational factors for employees in their working lives. Job demands refer to the sustained physical and/or psychological effort that is required to realize personal and organizational growth. In the present study, colleague solidarity and positive emotion are considered job resources, while turnover intention and job performance are reflections of whether nurses can make reasonable use of job resources to meet job demands. The JD-R model describes two distinct processes: a motivational process and a health-impairing process. In the motivational process, ideal job resources promote individuals' stable emotional status and interpersonal cooperation, resulting in better job performance [33]. Positive emotion, as an internal psychological resource, may play an essential role in the motivational process. However, in the health-impairing process, job demands may consume employees' mental and physical energy, resulting in tension, anxiety, health problems, and even turnover intentions. Turnover intention may be not only an outcome of a health-impairing process but also be considered a negative psychological resource. It may interact with colleague solidarity and positive emotion and have an influence on the balance between job resources and job demands.

Based on the results of the previous studies and the views of the JD-R model, the present study aimed to explore the relationship between Chinese nurses' colleague solidarity, turnover intention, positive emotion, and job performance, and the hypotheses are stated as follows.

Hypothesis 1. Colleague solidarity and positive emotion positively relate to nurses' job performance.

Hypothesis 2. Turnover intention negatively associates with nurses' job performance.

Hypothesis 3. Positive emotion and turnover intention mediates the relationship between colleague solidarity and job performance, respectively.

Hypothesis 4. There is a chain mediating effect from turnover intention to positive emotion in the relationship between colleague solidarity and job performance.

2. Materials and methods

2.1. Design

This is a quantitative and descriptive cross-sectional study. The direct and indirect effects of nurses' colleague solidarity on job performance would be explored by constructing a mediating model and confirming the standard fit indexes. The results would be reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Checklist.

2.2. Sample and setting

From July 2016 to January 2017, the convenience sampling method was applied to recruit nurses from various departments of three comprehensive Chinese hospitals in Shandong province, located in the eastern region of China. Nurses were qualified if they (1) obtained a registered nurse license in Mainland China, (2) worked for more than half a year, and (3) participated voluntarily. Exclusion criteria included nurses who (1) came to the current hospital for further study as temporary employees, (2) asked for

leave due to business, maternity, or sickness. Kendall's sample size calculation principle suggests that the sample size is 5 to 10 times the number of variables [34]. There are 11 variables in the present study: 7 sociodemographic variables, colleague solidarity, positive emotion, turnover intention, and job performance. Considering the invalid questionnaire, another 20% of the sample size was added. Thus, the ideal sample size should be 69 to 138 at least. Nevertheless, a larger sample was needed to obtain more ideal results. According to the inclusion and exclusion criteria, we distributed 387 questionnaires and collected 360 of them, the corresponding rate was 93.02%. After eliminating 36 questionnaires due to missing items, the final sample contained 324 nurses.

2.3. Measures

2.3.1. Colleague solidarity

Colleague solidarity was measured by the 21-item Colleague Solidarity Scale for Nurses (CSSN) [15], which was adapted by Gao et al. (2014). It includes three subscales: emotional solidarity (ES), academic solidarity (AS) and negative opinions about solidarity (NOS). Items of ES and AS are answered on a 5-point Likert scale from 1 (*never*) to 5 (*always*), while items of NOS are reversely scored. Total scores range from 21 to 105, and a higher score indicates a higher colleague solidarity level. The total Cronbach's α value is 0.892, the test-retest reliability coefficient is 0.865, and the content validity index is 0.957 [35]. The correlation between the score of each subscale and the total scale is 0.625 to 0.841, which indicates good construct validity [35].

2.3.2. Positive emotion

The Positive and Negative Affect Scale (PANAS) includes Positive Affect Subscale (PAS) Watson, 1988, which was adopted by Huang et al. (2003) [36]. The 10-item PAS describes positive emotion. It is answered on a 5-point Likert scale from 1 (*barely*) to 5 (*mostly*), with total scores ranging from 10 to 50. A higher score indicates a higher level of positive emotion. The Cronbach's α values for PANAS and PAS are 0.820 and 0.850, and PAS has appropriate construct validity and discriminant validity [36].

2.3.3. Turnover intention

The turnover intention was measured by the 6-item Turnover Intention Scale (TIS), which was developed by Michaels and Spector (1982) and adapted by Lee and Lee (2000) [37,38]. The scale comprises three subscales containing two items each: Turnover Intention Scale I (TISI), Turnover Intention Scale II (TISII) and Turnover Intention Scale III (TISIII). Each item is answered on a 5-point Likert scale from 1 (*never*) to 5 (*always*), with total scores ranging from 6 to 30. A higher score indicates a higher turnover intention level. The Cronbach's α value of TIS is 0.773, and it has good construct validity [38].

2.3.4. Job performance

Job performance was measured by the 23-item Chinese version of the Job Performance Scale (JPS) [39], which comprises two subscales: the Task Performance Scale (TPS) and the Contextual Performance Scale (CPS). Each item is answered on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), with total scores ranging from 23 to 115. A higher score indicates a higher job performance level. The Cronbach's α values for the total scale and subscales are 0.918, 0.862, and 0.882, respectively, and the total scale has good construct validity [39].

2.3.5. Sociodemographic information

Sociodemographic variables include gender (male and female), age (≤ 30 , 30–40, and >40 years), educational level (junior degree

or below, undergraduate degree, and graduate degree or above), working years (≤ 5 , 6–10, 11–15, ≥ 16 years), working unit (medical ward, surgical ward, obstetrics and gynecology ward, paediatrics ward, operating theatre, intensive care unit, and emergency care unit), levels of clinical nurse (general nurse, senior nurse, and supervisor nurse), and marital status (unmarried, and married).

2.4. Data collection

Two graduate students collected quantitative data who were uniformly trained by their tutor and mastered the skills for recruiting participants and instructing them to complete questionnaires. They were familiar with the research objectives and procedures, mastered communication skills, and promised to protect participants' privacy. With the assistance of their tutor, they obtained the convenience of issuing questionnaires by contacting the nursing department managers. Researchers explained the study purpose to nurses, and then nurses signed the informed consents. Participants completed pen-and-paper questionnaires during their lunch break or after getting off work. Researchers were by the side of the participants while they were completing the items to address their questions about how to answer the items according to different answering principles, but they never provided participants with content about item interpretation. Questionnaires were distributed and recalled on the spot within 20 minutes. Researchers checked the questionnaires, and if a missing item was found, they would ask participants to finish it. Questionnaires with missing items that were not found on the spot or could not be finished by nurses due to the short resting time would be eliminated as invalid questionnaires.

2.5. Ethical consideration

This study was conducted according to the Declaration of Helsinki and was approved by the Ethical Committee of the hospitals where the research was conducted (Approval number: 2022-LSZ-No.063). All the participants signed the informed consent form, and they were promised that their privacy would not be divulged.

2.6. Data analysis

Numbers and percentages were used to describe sociodemographic characteristics. Medians (M), lower quartiles (P_{25}), and upper quartiles (P_{75}) were used to describe the scores of colleague solidarity and turnover intention because the data failed to pass the normality and homogeneity of variance tests. Means (\bar{X}) and standard deviations (SD) were used to describe the job performance and positive emotion score since the data passed the normality and homogeneity of variance tests. Spearman's correlation analysis was used to examine the bivariate correlation. The above-mentioned tests were conducted by SPSS 26.0 (IBM Corp., NY, USA). All statistical tests were two-tailed, and statistical significance was set at 0.05. The structural equation model (SEM) was applied to evaluate the mediating effect [40]. The analysis of SEM was conducted by AMOS 24.0 (IBM Corp., NY, USA). The bootstrap resampling method was applied with a number of 10000 bootstrap samples and 95% confidence intervals (CIs). The 95% CI excluding zero indicated a significant mediating effect. The standard fit indexes were considered good: $\chi^2/\text{degree of freedom}$ (χ^2/df) ≤ 2 , goodness of fit index (GFI) ≥ 0.95 , adjusted goodness of fit index (AGFI) ≥ 0.90 , comparative fit index (CFI) ≥ 0.97 , normed fit index (NFI) ≥ 0.95 , and root mean square error of approximation (RMSEA) ≤ 0.05 [41].

3. Results

3.1. Descriptive statistics

The descriptive statistics are shown in Table 1. A majority of nurses were women (90.12%), aged under 30 years old (49.69%), unmarried (55.25%), and obtained an undergraduate degree (71.30%). Most of them were senior nurses (41.36%), worked in medical (26.23%) or surgical (32.10%) wards, and worked under 5 years (41.36%). The colleague solidarity and turnover intention scores were 3.95 (3.57, 4.43) and 2.67 (2.17, 3.00), which were presented by M (P₂₅, P₇₅). Positive emotion and job performance were shown as ($\bar{X} \pm SD$), and the scores were (2.35 ± 0.60) and (3.63 ± 0.42), respectively.

3.2. Correlations among colleague solidarity, positive emotion, turnover intention and job performance

Spearman's correlation analysis (Table 2) showed that colleague solidarity and its subscales and positive emotion were positively connected with job performance and its subscales ($r = 0.18 - 0.36$, $r = 0.33 - 0.44$; $p < 0.01$), supporting Hypothesis 1. Turnover intention and its subscales were negatively connected with job performance and its subscales ($r = -0.37 - -0.18$, $p < 0.01$), verifying Hypothesis 2. Besides, turnover intention and its subscales were negatively connected with positive emotion ($r = -0.55 - -0.42$, $p < 0.01$).

3.3. Model test

A chain mediation model (Fig. 1, Table 3) showed a good fit ($\chi^2/df = 1.188$, GFI = 0.985, AGFI = 0.964, CFI = 0.996, NFI = 0.978, RMSEA = 0.024). Colleague solidarity directly affected job performance ($\beta = 0.26$, $p < 0.01$, 95% CI = [0.28, 0.37]), and the direct effect was 26%. Verifying Hypothesis 3, positive emotion and turnover

intention mediated the relationship between colleague solidarity and job performance ($\beta = 0.11$, 95% CI = [0.47, 0.80]; $\beta = 0.08$, 95% CI = [0.12, 0.36]). The chain intermediary effect of positive emotion and turnover intention was 0.07 (95% CI = [0.22, 0.25]). In a word, the turnover intention could affect positive emotion. Meanwhile, the chain mediation effect of turnover intention and positive emotion in the relationship between colleague solidarity and job performance was significant, supporting Hypothesis 4. The total mediating effect accounted for 27% of the total effect, that is, 27% of the effect of colleague solidarity on job performance was through the two mediating variables of turnover intention and positive emotion. The conceptual framework was shown in Fig. 2.

4. Discussion

As expected, nurses' colleague solidarity, turnover intention, positive emotion, and job performance had significant relationships with each other in the context of the Chinese healthcare environment. In addition, we found that turnover intention and positive emotion played mediating roles in the relationship between colleague solidarity and job performance, and the chain mediation effect was significant. Furthermore, it supported the application of the JD-R model as a theoretical framework for interpreting nurses' working behavior.

4.1. Colleague solidarity and job performance

In this study, nurses' colleagues' solidarity played an essential role in promoting job performance. China is a collectivistic society in which people tend to cooperate with others to complete work tasks, especially complex nursing work. From nurses' perspectives, colleague solidarity is considered as a motivational element that inspires employees to establish trustworthy relationships and learn from each, other which are keys to improving job performance [42]. From the organizational perspective,

Table 1
Descriptive statistics for sociodemographic and psychosocial characteristics (N = 324)

	N	%		N	%
Gender			Intensive care unit	56	17.28%
Male	32	9.88%	Emergency care unit	11	3.40%
Female	292	90.12%	Levels of clinical nurse		
Age (years)			General nurse	114	35.19%
≤ 30	161	49.69%	Senior nurse	134	41.36%
31 – 40	129	39.82%	Supervisor nurse	76	23.45%
> 40	34	10.49%	Marital status		
Education level			Unmarried	179	55.25%
Junior degree or below	79	24.38%	Married	145	44.75%
Undergraduate degree	231	71.30%	M (P₂₅, P₇₅)		$\bar{X} \pm SD$
Graduate degree or above	14	4.32%	CSNS	3.95 (3.57, 4.43)	
Working years			ES	4.33 (4.00, 4.89)	
≤ 5	134	41.36%	AS	3.57 (3.00, 4.29)	
6 – 10	88	27.16%	NOS	3.80 (3.40, 4.20)	
11 – 15	64	19.75%	TIS	2.67 (2.17, 3.00)	
≥ 16	38	11.73%	TISI	2.50 (2.00, 3.00)	
Working unit			TISII	2.50 (2.00, 3.00)	
Medical ward	85	26.23%	TIS III	3.00 (2.50, 3.00)	
Surgical ward	104	32.10%	PAS		2.35 ± 0.60
Obstetrics and gynaecology ward	10	3.09%	JPS		3.63 ± 0.42
Paediatrics ward	18	5.56%	TPS		3.70 ± 0.48
Operating theatre	40	12.34%	CPS		3.60 ± 0.47

Note: M, medians; P₂₅, lower quartiles; P₇₅, upper quartiles; \bar{X} , mean; SD, standard deviation; CSNS, Colleague Solidarity of Nurses' Scale; ES, emotional solidarity; AS, academic solidarity; NOS, negative opinions about solidarity; PAS, Positive Affect Scale; TIS, Turnover Intention Scale; TISI, turnover intention scale I; TISII, turnover intention scale II; TIS III, turnover intention scale III; JPS, Job Performance Scale; TPS, task performance scale; CPS, contextual performance scale.

Table 2
Correlations (r) between colleague solidarity, positive emotion, turnover intention and job performance (N = 324)

	CSNS	ES	AS	NOS	PAS	TIS	TISI	TISII	TISIII	JPS	TPS	CPS
CSNS	1											
ES	.90**	1										
AS	.87**	.74**	1									
NOS	.63**	.42**	.29**	1								
PAS	.55**	.49**	.51**	.29**	1							
TIS	-.48**	-.49**	-.45**	-.21**	-.55**	1						
TISI	-.44**	-.44**	-.41**	-.19**	-.49**	.87**	1					
TISII	-.35**	-.36**	-.35**	-.11*	-.45**	.86**	.65**	1				
TISIII	-.41**	-.41**	-.36**	-.21**	-.42**	.72**	.47**	.45**	1			
JPS	.33**	.32**	.26**	.21**	.44**	-.31**	-.26**	-.21**	-.33**	1		
TPS	.36**	.35**	.31**	.19**	.38**	-.32**	-.28**	-.20**	-.37**	.72**	1	
CPS	.25**	.23**	.19**	.18**	.33**	-.24**	-.20**	-.18**	-.25**	.92**	.42**	1

Note: **p-value <0.01; *p-value <0.05.

CSNS, Colleague Solidarity of Nurses' Scale; ES, emotional solidarity; AS, academic solidarity; NOS, negative opinions about solidarity; PAS, Positive Emotion Scale; TIS, Turnover Intention Scale; TISI, turnover intention scale I; TISII, turnover intention scale II; TISIII, turnover intention scale III; JPS, Job Performance Scale; TPS, task performance scale; CPS, contextual performance scale.

colleague solidarity is a job resource reported by the JD-R model, which meets job demands by creating an effective work environment and supportive relationship [15]. In this study, both emotional and academic solidarity were positively connected with job performance. Emotional solidarity is described as a trusting, sincere relationship, establishing friendship, and so on; academic solidarity mainly refers to research participation and professional knowledge sharing [15]. In the motivational process stated by the JD-R model, nurses with stronger emotional solidarity are more likely to obtain colleague support, which promotes job performance. A study indicated that nurses with a higher academic solidarity level performed well in paper publication and scientific project application, which promoted career success [43]. In turn, career success encourages nurses to pursue better job performance. Meanwhile, nurses' negative opinions about colleague solidarity are negatively associated with job performance. Nurses with poor colleague solidarity might be indifferent and insensitive, ignore health, and refuse to deal with problems [44]. Undesirable and destructive behaviors are common in their daily work, leading to poor job performance.

4.2. Mediating role of positive emotion and turnover intention

Nurses' positive emotion was proactively associated with job performance, and the mediating role of positive emotion in the relationship between colleague solidarity and job performance was significant, which could be interpreted by the influencing mechanism of positive emotion. Individuals with positive emotions are goal-oriented and have enough enthusiasm to perform work tasks well, while medical professionals with emotional exhaustion have poor interpersonal cooperation and medical care performance [45]. Besides, emotion has a contagious characteristic [46]. Results of this study indicated that individuals' positive emotions could influence their colleagues to create the motivational situation described by the JD-R model [32]. Positive emotion is a job resource and works better with colleague solidarity to promote job performance in a motivational atmosphere. The more positive emotions that individuals have, the more colleague solidarity they have to promote job performance.

Nurses' turnover intention was negatively related to job performance, and it significantly mediated the relationship between

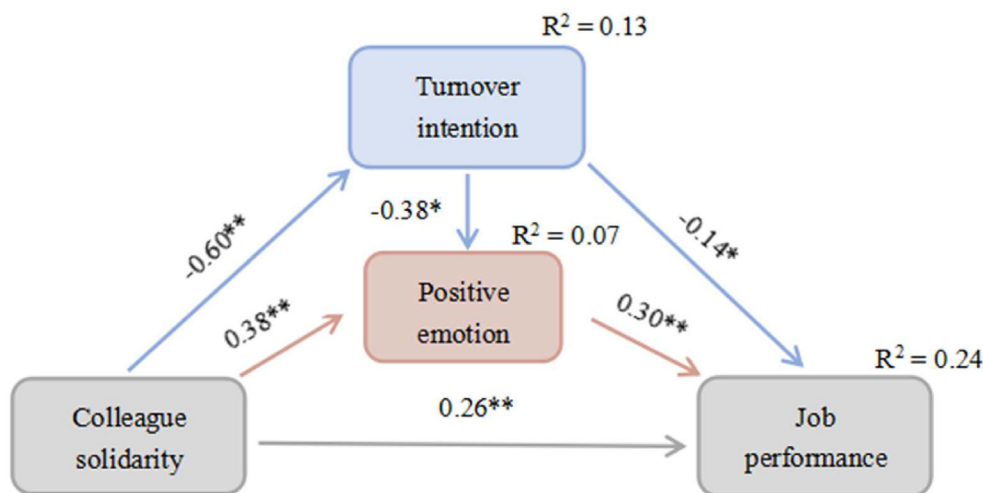


Fig. 1. Model of the mediating effect of turnover intention and positive emotion on the relationship between colleague solidarity and job performance. **Note:** **p-value <0.01; *p-value <0.05.

Table 3

Path analysis of the direct and indirect relationships between colleague solidarity, turnover intention, positive emotion and job performance (N = 324)

Path	Effect	95% confidence interval
Colleague solidarity - turnover intention - job performance	0.08	(0.12, 0.36)
Colleague solidarity - positive emotion - job performance	0.11	(0.47, 0.80)
Colleague solidarity - turnover intention - positive emotion - job performance	0.07	(0.22, 0.25)
Total indirect effect	0.27	(0.16, 0.24)
Directed effect (colleague solidarity - job performance)	0.26	(0.28, 0.37)

colleague solidarity and job performance. A study suggested that better teamwork predicted lower turnover intentions and higher caring performance [47]. According to the health-impairing process reported by the JD-R model, individuals cannot achieve their working goals when internal or external resources are lacking to fulfill job demands [33]. In such a situation, nurses' self-protection mechanisms will be motivated to leave the job to prevent further disappointment [35]. Therefore, nurses' turnover intentions emerge as a consequence of negative impacts.

Moreover, we found that turnover intention and positive emotion played chain mediating roles in the relationship between colleague solidarity and job performance. From a personal perspective, nurses with strong turnover intentions tend to experience emotional exhaustion and lower professional efficacy [48], which aggravates the decline in job performance [49]. When nurses have turnover intentions, medical organizations have to confront the risk of talent loss, weakened morale among other

employees, and damage to their reputation [25,50]. The negative impacts brought by turnover intention exist in the health-impairing process stressed by the JD-R model, which damages nurses' positive emotions and reduces their work engagement. The imbalance of job resources and job demands brought on by turnover intention weakens individuals' positive emotions and diminishes the proactive impact of colleague solidarity on job performance.

4.3. Relevance for clinical practice

Theoretically, the present study enriches the application of the JD-R model among nurses by exploring subjective thought and emotional status. It inspires researchers to think that future studies should contain more individual resources. And nurse managers can develop multiple management strategies to meet job demands and improve job performance. Practically, nurse managers' abilities and

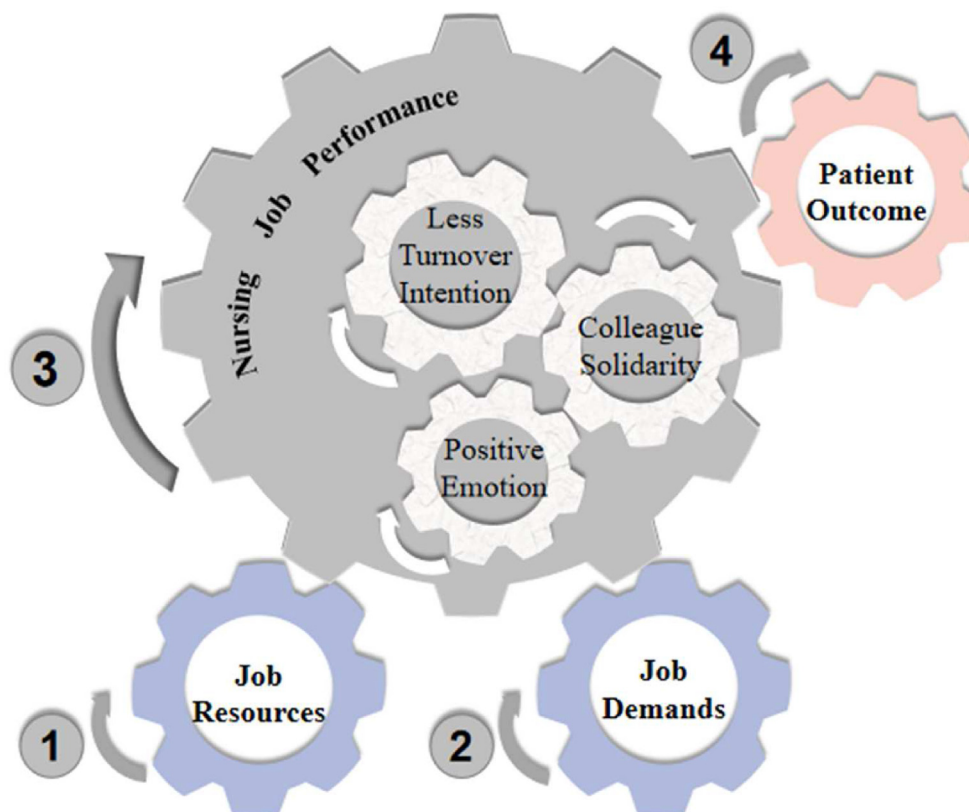


Fig. 2. Conceptual framework among magnet hospitals, nursing managers, nursing-related variables, and patient outcomes. **Note:** The blue gears represent job resources and job demands based on the JD-R model. The gray gear represents nursing job performance, which contains three little white gears representing less turnover intention, colleague solidarity, and positive emotion. The pink gear represents patient outcome. The gears drive each other step by step. The arrows represent the rotation direction of the gears, which indicate the driving relationship between the variables. Arrows 1 and 2 show the consumption of job resources and satisfaction of job demands. Arrow 3 means that the gray gear, which represents job performance, is operating effectively under the balance between job resources and job demands and will motivate patient outcomes. In addition, the white arrows represent the dynamic balance between the three variables, which is conducive to the stable operation of nursing job performance. Arrow 4 indicated that a satisfactory patient outcome can be obtained with the successful running of nursing job performance gear.

leadership were necessary to ensure positive supports for nurses, maintain intrinsic motivation, and promote job satisfaction to improve their job performance. Nurse managers can take triple supportive measures, including enhancing both emotional and academic solidarity, formulating positive emotion, and decreasing turnover intention, to improve nursing job performance. Concrete measures include reasonable labor resource division, harmonious atmosphere, shorter working time, promotion opportunities, an optimized salary policy, and so on. Apart from this, because Chinese nurses are busy with their daily nursing work, they have less opportunity to participate in nursing management. Promoting the free expression of the whole hospital's nurses helps managers understand nurses' subjective thoughts and emotional changes at any time. Accordingly, they can adjust management measures to achieve a dynamic balance between job resources and job demands.

4.4. Limitations

The present study has several limitations. Firstly, we have just investigated the impact of colleague solidarity on job performance in nurse groups. However, the impact of colleague solidarity among the whole medical staff on nursing job performance is worthy of further discussion. Secondly, the essence of the mediation model is to analyze the causal relationship between variables as it unfolds over time [51]. Even if the mediation model parameters are significant, cross-sectional data for mediating effect analysis tends to generate substantially biased estimates [52]. Therefore, longitudinal mediation models such as an autoregressive model or a random effect model are valuable to be applied to explore the relationship between nurses' colleague solidarity, turnover intention, positive emotion, and job performance in future studies. Thirdly, data on job performance are reported by nurses in the present study, which may bring single-source bias. Since job performance reflects nurses' contribution to caring for patients and the healthcare service levels of hospitals, future studies can add objective evaluations from doctors, nursing managers, and patients to measure nurses' job performance comprehensively.

4.5. Conclusions

The present study has investigated the positive relationship between Chinese nurses' colleague solidarity and job performance. And the chain mediation model indicates the mediating effects of turnover intention and positive emotion in this relationship. In addition to management strategies for improving colleague solidarity, nursing managers can make efforts to reduce turnover intention and enhance positive emotion to optimize job performance according to the mediation model and the JD-R model.

Conflicts of interest

There is no conflict of interest in the present study.

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