Psychological resilience mediates sense of professional mission and career success in Chinese intensive care unit nurses: a cross-sectional study

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Abstract

Background The nursing industry's stability and progress are adversely affected by the high attrition rate and shortage of nurses; therefore, it is critical to investigate the variables that influence the professional stability of nurses. The sense of professional mission and career success have positive significance for reducing nurses' job burnout. The purpose of this study is to explore the potential mediating role of psychological resilience in this relationship.

Methods Self-reported questionnaires were utilized by 335 intensive care unit (ICU) nurses to assess their sense of professional mission, psychological resilience, and career success in this cross-sectional study. A structural equation model was developed to validate the relationship between the variables.

Results There is a correlation among sense of professional mission, psychological resilience and career success. Significant mediating effect of psychological resilience exists between sense of professional mission and career success.

Conclusions In this study, psychological resilience plays an intermediary role between sense of professional mission and career success, which provides support for further understanding the mechanism between sense of professional mission and career success and bolstering the case for devising comprehensive intervention strategies for psychological resilience. Nursing managers should focus on nurses' sense of professional mission and psychological resilience, and implement strategies to enhance nurses' psychological resilience in order to boost their career success.

Keywords Psychological resilience, Career success, Sense of professional mission, Nurse

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Background

With the gradual diversification of medical needs and increasing tasks, the modern medical environment is becoming increasingly complex, severe and unpredictable. Nurses are an indispensable part of the health care system, and are also recognized as high-demand and high-risk occupations [1], especially the nursing staff in intensive care unit (ICU). As we all know, ICU nurses are under high pressure and have a high turnover rate [2, 3]. Heavy shifts, long working hours, the responsibility of taking care of patients, witnessing human suffering and uncertainty have put nurses in intensive care unit under great pressure, resulting in a high resignation rate. A research analysis indicates that the turnover rate of nurses globally varies from 15 to 44% [4]. The issue of nurse scarcity and high turnover is global in scope [5], and it hinders the stability and growth of the nursing industry [6]. Due to the high level of professional knowledge of ICU nurses, their training cost is higher and it is more difficult to replace them [7]. The high turnover rate of such groups has an impact on the quality and safety of patient care and serves as a roadblock to nursing development. Therefore, some researchers emphasize the need to understand what prompted nurses to continue to engage in this profession in such a challenging environment [8]. At present, the research is more and more interested in exploring the factors that affect nurses' career stability.

Literature review

Sense of professional mission (SPM)

Sense of professional mission (SPM) refers to a person's strong feelings and recognition of the profession he is engaged in, his belief that the profession he is engaged in can make life meaningful and the sense of meaning and value he experiences from the performance of his duties, so that he can work with passion and tenacious struggle to realize his self-worth and serve the society [9]. The "mission" of nurses is typically defined as unselfish dedication. Nurses with a strong SPM feel more responsible for their patients' well-being and survival. They understand how important their job is to the patients, and this sense of duty and mission will immediately encourage nurses to actively participate in their work [10]. According to studies, SPM can boost job satisfaction among nursing staff [11], promote personal career development [12], to reduce turnover intention[13–15]and job burnout[16–18]has a positive effect. ICU nurses' insistence on their career is more to follow their inner sense of mission and inner call. The existence of SPM enables nurses to have a more positive psychological state, thus arousing their enthusiasm for career success. However, some studies show that although the SPM provides multidimensional benefits, it also poses great challenges [19].

The existence of SPM makes people think that nurses enter this profession because they have this demand[20] so as to be disrespected by organizations and society[21] and low wages. Therefore, it is very important to discuss nurses' SPM in a broad and fair way and realize its complex influence on nursing specialty.

Career success (CS)

Career success (CS) is defined as "the accumulation of positive psychological feelings related to one's own career development and relative accomplishments" [22, 23]. It is a crucial metric for assessing one's own professional development [24]. A number of studies have demonstrated that the progress that nurses make in their careers is beneficial to the promotion of creative behavior among nurses, and that it also plays a significant effect in lowering the turnover rate and enhancing the quality of nursing services [25–27]. Robinson GF et al. demonstrate that when an individual succeeds in his career, he is able to work harder and experience the enjoyment that comes with it, which serves as a benchmark for the sector and makes people aspire for this employment [28]. Focusing on nurses' professional skills is important, but we should also consider their psychological pursuit if we want to foster top-notch nursing talent. CS is one of the psychological mechanisms that affect nurses' career pursuit. Improving CS can not only improve personal happiness and satisfaction, but also foster greater work motivation, reduce job burnout and improve work attitude in their daily work, thus improving work efficiency and quality, achieving higher CS [29]. CS can be evaluated from two different views: objective viewpoints, such as rank position, compensation, promotion, and career prestige; and subjective perspectives, such as job satisfaction, development, and well-being [30]. Subjective CS is more important to nurses than objective CS [31], it can also promote their persistence in their careers. CS is a goal that nurses strive for. Nowadays, studies have shown that psychological resilience helps nurses achieve CS and satisfaction [32]. In light of this circumstance, it is vital to further identify the elements that influence ICU nurses' CS, as well as the interaction between them, so as to provide better career development support for nurses and help nurses achieve CS more effectively.

Psychological resilience (PR)

Psychological resilience (PR) is defined as the ability to recover and "rebound" from adversity or major stressors, and it is a personal trait that can be cultivated [33]. Characteristics of PR include the ability to rebound back, flexibility, self-determination, self-esteem/self-efficacy, and a sense of humor, as well as the ability to maintain positive relationships [34]. The protective resource experience

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that nurses build throughout their careers to sustain psychological dynamic balance—a comprehensive psychological process of cognition, emotion, and behavior—is referred to as PR. In the face of difficulties and stress events, excellent PR can help individuals increase their ability to successfully deal, solve problems, and keep drive for career advancement. Enhancing the PR of nurses can lead to an increased SPM accomplishment for them. This is also a necessary way to decreasing nurse turnover, promote their career development and ultimately improve the quality of medical services. PR helps ICU nurses to cope with stress effectively, which is closely linked to their CS and is the most active and important contributor to nurses' job involvement [35]. The importance of nurses' PR to the advancement of nursing specialization has been emphasized more and more in recent years as a result of the study on this topic being continuously enhanced and deepened. Research indicates that nurses who have a stronger SPM are more likely to feel that their work can help others and contribute to society, to recognize the significance and value of the nursing profession, to be more confident, to maintain clear goals, to look forward to the future, and to bounce back from setbacks more quickly. The PR of ICU nurses has an important influence on the smooth development of their career, and how to use it to improve the enthusiasm of nurses in their work is of great significance. Promoting ICU nurses' continuous pursuit of career development and success, improving their PR and helping them learn to create positive emotions with a positive attitude to cope with the pressure of work and life are important conditions for maintaining the sustained and healthy development of nurses' career.

Theoretical framework

This research paradigm is interpreted using the career success (CS) model from sense of professional mission(SPM) perspective [36], which provides a theoretical framework for the impact of SPM and psychological resilience (PR) on CS. The model framework investigates the impact of situational factors and SPM on an individual's CS, which leads to a shift in self-identity. The model demonstrates that individuals with a robust SPM are remarkably clear about the objectives they are striving to achieve, and they maintain a high level of self-efficacy and to do one's utmost to pursue their objectives in order to achieve CS in a personal sense. Scholar Earvolino-Ramirez M [34] states that self-efficacy is a characteristic of PR. Consequently, according to the framework of modelling CS from SPM perspective, PR can serve as an important mediating variable in the process of an individual's achievement of CS, and SPM is a prerequisite for CS. The conceptual framework proposed in this study is constructed with this theoretical framework in mind. We hypothesised that PR may mediate the association between nurses' SPM and CS.

Hypothesis formulation

Based on previous theoretical framework, we propose a conceptual model for this study (Fig. 1). Considering that SPM is the independent variable, CS is the dependent variable, and PR plays a mediating role, we hypothesise the following.

> H1: ICU nurses' SPM will be significantly and positively associated with CS
> H2: ICU nurses' SPM will be significantly and positively associated with PR
> H3: PR of ICU nurses will mediate the association between SPM and CS

Significance of the study and research gap

The problem of scarcity and high turnover of nurses cannot be ignored and CS of nurses plays a significant role in promoting career stability. Nevertheless, nurses' CS is influenced by a variety of factors. El-Gazar HE [1] demonstrated that individuals who regard their profession as a calling are more likely to attain success in their careers. Xue H's study [32] showed that PR assists nurses in achieving CS. Liu Z [10] provided evidence that suggests a positive correlation between the PR of nurses and their SPM. It is apparent that both PR and SPM have a large favorable impact on CS, but their combination impact on
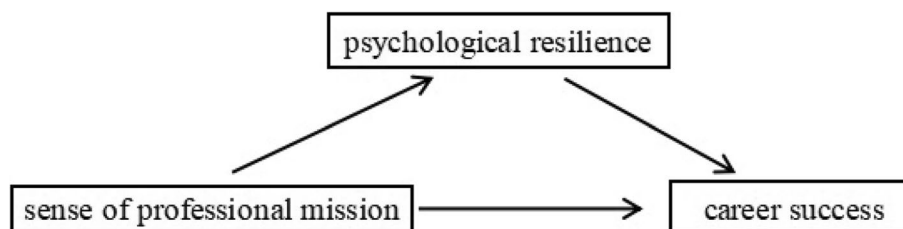
Fig. 1 Simple model of the relationship between the study variables of ICU nurses

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CS has yet to be studied. The objective of this study was to examine the correlation between SPM and CS and to evaluate the potential direct and indirect impacts of PR. Consequently, this study addresses this research void from both a theoretical and empirical perspective, enabling organizations to provide more resources, enhancing the support provided to nursing staff. We also aspired to facilitate the career success of ICU nurses by exposing the intricate relationship between SPM and PR, enabling them to better engage in caring for patients and realise their personal and social values. Consequently, the objective of this investigation was to investigate the mediating function of PR and the relationship between SPM and CS.

Objective of the research

The objective of this investigation was to examine the relationship between SPM and CS, in which PR plays a mediating role.

Methods

Design and setting

Three validated instruments were employed to conduct a cross-sectional study of the study variables in accordance with the proposed framework. The research was carried out and the results were documented in adherence to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations.

Participants and sample

Convenience sampling method was utilized to recruit ICU nurses from tertiary Class A comprehensive hospitals in Shaanxi, Shanxi, and Gansu provinces. Inclusion criteria include: (1) nurses who have acquired a professional qualification certificate in the People's Republic of China (PRC); (2) nurses who have completed their rotation and worked in the ICU; (3)informed consent and participated voluntarily.

Exclusion criteria: (1) individuals who are absent from their duties throughout the investigation period (due to maternity leave, sick leave, etc.); (2) Short-term shift change due to pregnancy or other reasons.

We calculate the sample size in accordance with Kendall(1975) [37]. The total number of questionnaire items used in this study is 55, and the 20% increase on this basis is due to the consideration of the potential sample size loss caused by unfinished work, so the sample size is calculated as $N = [(8 + 11 + 11 + 25) \times 5 \times (1 + 20\%)] = 330$, which means at least 330 participants are needed, the survey ultimately gathered 335 questionnaires.

Research tool

General characteristics

The demographic characteristics of the questionnaire consist of gender, age, education level, professional title, marital status, average monthly income, the average monthly number of night shifts, and whether the hospital performs decompression activities on a regular basis.

Career Success (CS) Scale

The Career Success Scale assesses the positive psychological and rational emotions acquired by individuals in the workplace and their professional accomplishments. In 2003, Eby et al.[38]developed the scale, which was subsequently translated and implemented by Chinese academicians. Li ZK et al. [39] applied it to medical personnel and validated the total scale Cronbach's α was 0.91. The survey includes 11 items categorized into two dimensions: career competition (six items) and career satisfaction (five items). Examples include statements such as 'I am content with the advancement I have achieved towards my promotion objectives' and 'My department is confident in my ability to contribute value to the organization due to my expertise and experience'. A scale of the Likert type with five points was used. From completely disagreeing to completely agreeing, each answer gets a score ranging from one to five. With a maximum score of 55, higher scores indicate greater professional success. The scale in question has been widely applied in research at the national level and has established robust validity and reliability [40–42]. In this study, the overall Cronbach's α was 0.89, and the Cronbach's α of career competition and career satisfaction were 0.80 and 0.90, respectively.

Sense of Professional Mission (SPM) Scale

The scale assesses the extent of employees' professional mission through 11 items divided into three dimensions:altruism (4 things), guidance (4 items), and meaning and worth (3 items). which was developed by Zhang CY [43] and the overall Cronbach's α was found to be 0.890. The respondents were asked to rate their level of alignment with a professional mission on a 5-point Likert scale ranging from "not at all in line" to "completely in line" The cumulative score was 11–55; higher scores indicated a stronger sense of professional mission. The scale is highly reliable and valid, making it widely used in domestic research, with Cronbach's α ranging from 0.849–0.927 [10, 44]. In current study, the overall Cronbach's α was 0.88, and the Cronbach's α of altruism, guidance and meaning and worth were 0.61, 0.81 and 0.72, respectively.

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Psychological Resilience Scale (PR)

XiaoNan et al. [45] revised the Psychological Resilience Scale which was originally developed by Connor and Davidson [46] developed a Chinese version of the Psychological Resilience Scale(CD-RISC), with a Cronbach's alpha coefficient of 0.910. The PR Scale primarily used to assess individuals' psychological resilience when encountering hardships and stressful events. The assessment has 25 items categorized into three distinct dimensions: resilience (13 items), strength (8 items), and optimism (4 items). It has been extensively utilized in national research studies [10, 35, 47]. On a 5-point scale, 0 means "not true at all" and 4 means "true all the time." The total score is between 0 and 100. Increased scores correlate with elevated levels of psychological resilience. The total Cronbach's α for this study is 0.95, whereas resilience, strength, and optimism have Cronbach's α of 0.92, 0.88, and 0.71, respectively.

Data collection

After getting approval from the Ethics Committee of the Second Affiliated Hospital of Air Force Military Medical University we carried out data collection. Prior to data collection, we contacted the Nursing Department of the hospital and obtained the Director's support. We also provided the head nurse of the ICU department with an explanation of the study's purpose and content. Upon obtaining permission, we distributed the electronic questionnaire link to the department through the Nursing Department, along with a copy of the informed consent form attached to the questions. In accordance with the specified criteria, nurses who are interested in participating may electronically complete the questionnaire. The data were gathered from March 6, 2024, to April 10, 2024. To avoid receiving duplicate questionnaires, we have configured the back end of the questionnaire program to only accept each IP address once. In addition, intelligent logic is built in the back end to recognize and validate invalid replies(all questions are answered the same, which is not consistent with reality: for example, "the number of night shifts is 300" etc.). Finally, it was excluded that the questionnaire could be completed in less than 10 min, and two researchers independently verified the questionnaire's validity to ensure the accuracy of the data.

Moral recognition

This study is based on the Helsinki Declaration [48], which establishes the ethical standards required in. The Independent Ethics Committee of the Second Affiliated Hospital of Air Force Medical University gave their approval to the study (NO: K202403-06), and all of the participants were required to obtain written informed consent that was anonymous. Additionally, they were apprised of their prerogative to decline involvement in the research or to discontinue their involvement at any juncture throughout the study. The questionnaire is completed in an anonymous manner.

Data analysis

The data analysis was conducted using the IBM SPSS26.0 version. Counting data was represented by frequency and component ratio, while measurement data was represented by mean and standard deviation. *T* test of two independent samples and one-way analysis of variance were used to compare the difference of sense of professional mission of nurses with different characteristics in ICU. Pearson correlation coefficient was used to analyze the correlation between variables. We use IBM AMOS 24.0 to create and measure the structural model to test our hypothesis. The hypothesised model includes three latent variables (CS, SPM and PR) and eight observed variables (career competition, career satisfaction, altruism, guidance, meaning and worth, resilience, strength, and optimism). With 2000 bootstrapping the 95% confidence interval does not contain 0, which represents a significant mediation effect.

Results

There is a possibility of common method bias, as all variables in this study were collected through a self-evaluated questionnaire survey. As a result, the Harman single factor technique was utilized in this investigation to identify common method bias. The exploratory factor analysis of 47 items identified 9 factors with eigenvalues greater than 1, with the variance explanation rate of the first factor was 39.1% ($< 40\%$). This suggests that there is no significant common methodology bias in this investigation.

The questionnaire was completed by 335 out of the 360 nurses who participated in the research study, resulting in a completion rate of 93.06%. Of those nurses, 316 (94.3%) were female, and 291 (86.9%) of them had earned bachelor's degrees of the nurses, or 203 (60.6%) of them, admitted that they did not regularly participate in decompression training. Detailed general demographic characteristics are shown in Table 1.

In order to compare the sense of professional mission (SPM) among a variety of general demographic data, an independent sample T-test or ANOVA was implemented. Significant differences in the SPM of ICU nurses were observed in relation to their age, professional title, and whether they conducted decompression activities on a regular basis ($p < 0.05$). Table 1 provides additional general information regarding the participants.

As indicated in Table 2, the overall scores for SPM, psychological resilience(PR) and career success(CS)

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Table 1 Demographic characteristics and comparison of Professional Mission among ICU nurses (*N* = 335)

Variables	N (%)	Professional Mission				
		Mean ± SD	F or t	P	Post hop test	p
gender			-0.20	0.839		
female	316(94.3)	38.51 ± 7.00				
male	19(5.7)	38.84 ± 6.78				
age			5.29	**0.001		
20-30 years	178(53.1)	37.36 ± 6.73			②>①	0.014
31-40 years	128(38.2)	39.32 ± 7.01			③>②	0.141
41-50 years	23(6.9)	41.61 ± 7.33			④>③	0.386
>50 years	6(1.8)	44.33 ± 3.93			④>①	0.015
education level			1.72	0.18		
junior college	22(6.6)	36.00 ± 9.00				
Undergraduate	291(86.8)	38.77 ± 6.78				
Postgraduate and above	22(6.6)	37.55 ± 7.39				
marital status			2.94	0.054		
unmarried	155(46.3)	37.54 ± 6.63				
married	175(52.2)	39.38 ± 7.19				
divorce or separation	5(1.5)	39.40 ± 7.37				
professional title			5.08	*0.002		
nurse	118(35.2)	37.83 ± 7.01			①>②	0.440
nurse Practitioner	90(26.3)	37.09 ± 6.23			③>②	0.006
nures-in-charge	108(32.8)	39.78 ± 7.20			④>③	0.108
associate chief nurse and above	19(5.7)	42.53 ± 6.54			④>①	0.006
average monthly income			1.94	0.123		
< 5000	70(20.9)	36.87 ± 7.33				
5000-8000	190(56.7)	38.79 ± 7.05				
8000-11000	53(15.8)	39.06 ± 6.57				
>11000	22(6.6)	40.18 ± 5.46				
average monthly night shifts						
0-3	86(25.7)	38.34 ± 8.12	1.41	0.24		
4-6	151(45.1)	39.31 ± 6.25				
7-10	90(25.9)	37.52 ± 6.92				
>10	8(2.3)	37.00 ± 6.95				
Regular decompression activities			6.12	**0.001		
Yes	132(39.4)	41.27 ± 6.30			①>②	<0.001
No	203(60.6)	36.74 ± 6.82				

SD Standard deviation, *N* Number

* *p* < 0.05

** *p* < 0.001

Table 2 Correlations among study variables (*N* = 335)

Variables	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11
1. career satisfaction	18.86 (3.47)	1										
2. career competition	19.82 (3.50)	.602**	1									
3. career success	38.69 (6.23)	.894**	.896**	1								
4. altruism	14.16 (2.40)	.563**	.546**	.619**	1							
5. guidance	13.5 (3.31)	.586**	.575**	.648**	.661**	1						
6. meaning and worth	10.87 (2.07)	.696**	.640**	.746**	.680**	.765**	1					
7. sense of professional mission	38.53 (6.98)	.678**	.650**	.742**	.859**	.928**	.893**	1				
8. optimistic	9.73 (2.55)	.525**	.575**	.615**	.371**	.438**	.487**	.480**	1			
9. strength	21.07 (4.82)	.637**	.617**	.701**	.528**	.518**	.645**	.618**	.747**	1		
10.resilience	32.41 (7.87)	.586**	.621**	.674**	.475**	.514**	.591**	.582**	.717**	.874**	1	
11.Psychological Resilience	63.21 (14.32)	.630**	.652**	.716**	.505**	.535**	.629**	.614**	.823**	.950**	.971**	1

SD Standard deviation

** *p* < 0.01

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are 38.53 ± 6.98, 63.21 ± 14.32, and 38.69 ± 6.23. Person correlation analysis reveal strong positive association between the variables. There was a positive correlation between SPM and PR ($r = 0.614$, $p < 0.01$), a positive correlation between SPM and CS ($r = 0.742$, $p < 0.01$), and a positive correlation between PR and CS ($r = 0.716$, $p < 0.01$).

AMOS 24.0 should be used to test the research hypothesis and view the resulting associations. Figure 2 displays the results of the path coefficients.

Table 3 illustrates that the Cronbach's alpha values for all three variables exceed the commonly recommended threshold of 0.7, suggesting that the variables exhibit satisfactory internal consistency. In addition, the composite reliability scores for all three variables were acceptable. Extracted average variance (AVE) is a convergent validity measure. At the recommended cut-off point of 0.5, all

three variables possess a dependable indicator of the convergent validity of the AVE values.

Table 4 illustrates that all indexes are within the desired range, suggesting that the data is well-fitted to the model [49].

The path analysis results are presented in Table 5. This hypothesis is supported by the direct impact of SPM on CS(H1) ($\beta = 0.654$, SE $= 0.065$, $p < 0.01$), direct impact of SPM on PR (H2) ($\beta = 0.704$, SE $= 0.036$, $p < 0.01$), direct effect of PR on CS ($\beta = 0.391$, SE $= 0.061$, $p < 0.01$) and indirect effect of SPM on CS via PR(H3) ($\beta = 0.930$, SE $= 0.032$, $p < 0.01$).

Discussion

It is crucial to enhance the career fulfillment of nurses, stabilize the nursing team, and preserve the physical and mental health of clinical nurses by promoting their
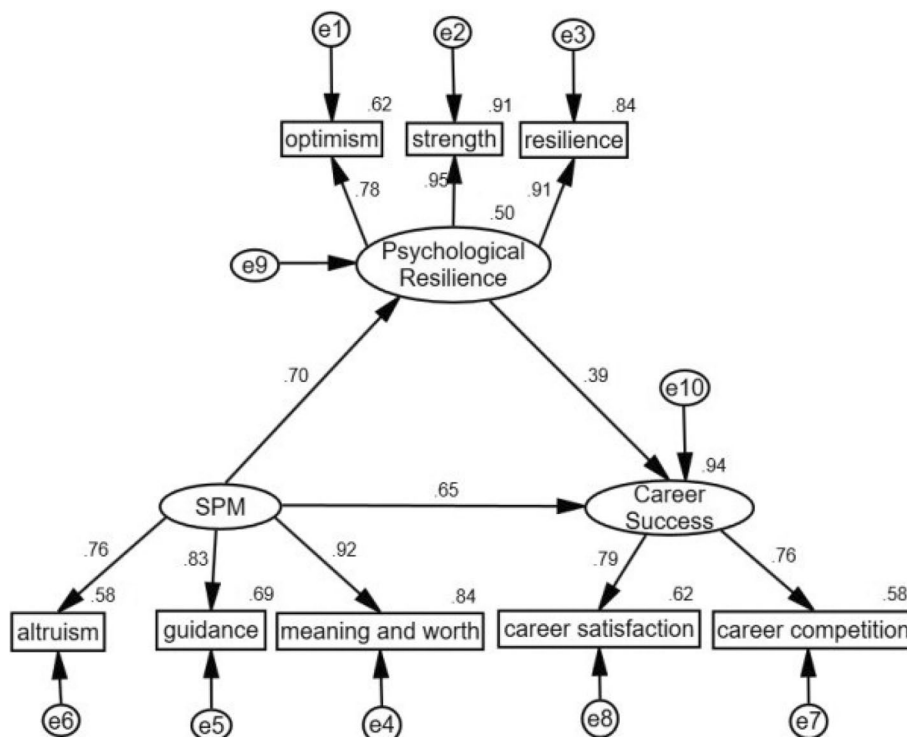
Fig. 2 The validated model. SPM sense of professional mission

Table 3 Cronbach's alpha, composite reliability, and average variance extracted

	Cronbach's alpha	CR	AVE
Career Success	0.89	0.602	0.752
Sense of professional mission	0.88	0.703	0.876
Psychological Resilience	0.95	0.917	0.788

AVE Average variance extracted, *CR* Composite reliability

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Table 4 Comparison of model fit for the modified model to the hypothetical model

Index	χ^2	df	χ^2/df	GFI	AGFI	NFI	IFI	CFI	TLI	SRMR	RMSEA
Fitted model	41.330		2.431	0.972	0.941	0.980	0.988	0.972	0.980	0.020	0.065
Fitting criteria	>0.05	17	<5.0	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	<0.08	<0.08

Abbreviations: χ2 Discrepancy Chi Square, χ2/df Chi-square/degree of freedom, *CFI* Comparative fit index, *TLI* Ticket-levis index, *RMSEA* Root-mean- square error of approximation, *SRMR* Standardized root mean square residual, *CI* Confidence interval, GFI Goodness-of-fit index, *AGFI* Adjusted Goodness of fit, *NFI* Normed fit index, *IFI* Incremental fit index

Table 5 The mediating analysis of psychological resilience on career mission and career success($N = 335$)

Effect	Model path	β	SE	95%CI		*p*
				LLCI	ULCI	
Direct effect	SPM-CS	0.654	0.065	0.545	0.759	<0.01
Indirect effect	SPM-PR	0.704	0.036	0.640	0.758	<0.01
	PR-CS	0.391	0.061	0.286	0.489	<0.01
Total effect	SPM-CS	0.930	0.032	0.873	0.978	<0.01

SPM Sebse of professional mission, *PR* Psychological resilience, *CS* Career success

career success (CS). This study establishes a connection between CS and sense of professional mission (SPM) by utilizing the CS model from the perspective of SPM and examines the mediating effect of psychological resilience (PR). The objective of this investigation was to deepen the understanding of improving nurses' PR for CS.

Research has demonstrated that the improvement of nurses' SPM may result in a succession of advantageous outcomes [50]. The SPM score of Chinese ICU nurses was 38.53 ± 6.98. By analysing the relationship between demographic information and SPM we found that age, title and whether or not they regularly participated in stress reduction activities had a significant impact on ICU nurses' own SPM.

The SPM of ICU nurses increases as they age in the 20–50 age cohort. This is due to the fact that highly experienced nurses will hold nursing in higher regard as a profession. The subjects of this study were ICU nurses, due to the nature of the work, nurses over the age of 50 find it difficult to execute this sort of work; thus, the sample size of nurses over the age of 50 in this study is only 6. The lower the sample size, the greater the error in estimating the overall mean, which impacts the accuracy of the significance test. To ascertain whether nurses over the age of 50 have a higher SPM than nurses in lower age groups, more nurses must be polled. In the future, scholars should investigate this feature further.

By comparing the professional title with SPM, it is found that the SPM of nurses with professional titles nurse practitioner is lower than that of nurses, but overall, the higher the professional titles, the stronger the SPM of nurses. The reason for this result may be that according to China's national conditions, most nurses got married when their professional title is nurse practitioner, and they need to assume another new role at this time [14, 51], to a certain extent, weakened the role of nurses. After that, with the balance between family and work, her SPM gradually rose.

The study revealed that organizing group decompression activities for medical staff can significantly enhance ICU nurses' SPM. This may be due to the fact that regular training in stress reduction improves the PR of nurses. According to Liu Z's [10] study, PR is positively correlated with SPM. Consequently, hospital managers should prioritize scheduling regular decompression activities. The strong correlation between these parameters and SPM has crucial implications for nursing practice. Given that the existence of an SPM can alter throughout a person's career and be influenced by a variety of factors [19]. It is vital for nursing supervisors to consider factors on both sides from personal and organization when training nurses.

This study found that SPM can positively predict CS, which is consistent with El-Gazar HE's [1] findings. Previous studies have shown that SPM has a wide range of

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benefits in nursing practice. When ICU nurses have a high degree of SPM, they can devote themselves to their work from the heart and spend a lot of energy and time trying to do their best, accumulate more positive subjective and objective labor results, so that they can feel successful, and the accumulated experience and knowledge will also contribute to the improvement of their internal and external competitiveness and gain more success. Terefore, organisations should provide internal motivation and education opportunities to nurses to foster nurses'SPM. This goal can be achieved by providing inspirational role models and promoting the importance of nursing as a profession. But Meleis [52] pointed out that the traditional image of nurses as altruistic women has a strong influence on nurses' professional identity, which hinders them from critical thinking. Therefore, hospital administrators also should pay attention to the working conditions and rights of nurses while cultivating their SPM. This shows that if hospitals and relevant health departments formulate policies to improve nurses' SPM while protecting the rights and interests of nurses, it will help promote nurses to achieve their career success.

The total score of ICU nurses' resilience is 63.21 ± 14.32. This score is lower than Xue H's research findings on the PR of clinical nurses in Central China [32]. This is a result of the intense workload that ICU nurses in Grade 3 and Grade A hospitals face. Moreover, 94.33% of the survey participants are female nurses who are responsible for caring for their families in addition to fulfilling their hospital duties. The persistent stress they experience can result in negative emotions and hinder the healthy psychological development of individuals. As a result, nursing management ought to use practical strategies to raise nurses' PR standards.

In this study, the score of ICU nurses' CS is 38.69 ± 6.23, indicating that there is still room for improvement. Similar to Wu's research results on the career success of clinical nurses in northwest China [41]. But lower than Xue's research on the career success of clinical nurses in Central China [32]. The CS scores of ICU nurses in China are generally not high, which is related to job burnout, social environment and nurse-patient relationship of clinical nurses in China [53–55]. In addition, this study was conducted on nurses in tertiary care hospital, stressful work environments also contribute to the low level of CS of this group. Yamadad mentioned in a summary that work resources and environment are external factors that affect nurses' CS [56]. Therefore, administrators in tertiary care hospitals should focus on providing nurses with resources to support their CS.

The research indicates that CS, as a critical protective factor for the career development of nurses, has a beneficial impact on the quality of nursing services and the reduction of the brain outflow of nursing talents [27]. Among ICU nurses, there is a correlation between PR and CS. Understanding this relationship is crucial as it affects the performance of nurses at work. Therefore, this study contributes to nursing management. By creating strategies (flexible scheduling, organising group stress reduction activities, psychological counselling, etc. to improve nurses' PR to frustration) to keep nurses in a positive and healthy state of mind can improve nurses' sense of CS. Hence, it is vital for nurses to promote awareness of PR in their clinical practice and employ all available resources to expedite their own recovery from stressful incidents. Nursing management should focus on developing appealing nursing environments for nurses, offering training in PR and effective coping strategies for handling stressful events, enhancing humanistic support, and providing nurses with adequate organizational and social resources, to further enhance the PR of nurses.

The results of the empirical study confirmed the hypothesis H3 of this study, which indicated that the SPM directly or indirectly affects nurses' CS through PR. The findings shed light on the underlying mechanisms and suggest that PR is a key factor in explaining why SPM affects CS. Specifically, the stronger the nurses' SPM, the higher their PR, thus increasing their CS. Nurses with a strong SPM are more enthusiastic, focused, and committed to their work, and have higher levels of professional engagement. They are good at coping with stress and adjusting negative emotions at work, which leads to better performance and more subjective and objective success at work.

Restriction
The limitations of this study are as follows: our research is based on a self-report questionnaire, so the results may be subjective. This results in bias in the data collected and restricts the generalizability of the findings. In addition, our study was conducted only among intensive care unit nurses and used convenience sampling. The sample was not representative and the results may not be generalisable to populations in other geographical areas. In order to facilitate generalization, future research should recruit nurses through random sampling. Thirdly, this investigation was cross-sectional in nature and was unable to establish a causal relationship between variables. It is advised that follow-up studies be conducted to confirm the causal relationships between these variables in the context of nurses. Finally, in this study, there is no longitudinal study to observe the changing trend of several variables and no intervention. In the future, psychological intervention measures should be initiated among frontline nurses, and best practices should be improved to improve nurses' resilience to stress. Meanwhile, further

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qualitative research is needed to understand the environment and conditions conducive to cultivating resilience.

Conclusion

This study validates the mediating role of psychological resilience (PR) in ICU nurses' sense of professional mission(SPM) and career success(CS), providing theoretical support for further understanding the mechanism between SPM and CS and implementing comprehensive interventions to improve PR. The study highlights that PR is the key mediator between nurses' SPM and CS. Nursing managers should focus on nurturing nurses' SPM and enhancing their PR to boost their CS.

Enlightenment for nursing managers

Hospitals and nursing managers should improve the sense of professional mission(SPM) of clinical nurses so as to promote their career success(CS), because this will not only help nurses achieve their CS, but also stabilize the team of nurses. Nursing managers should provide more substantial rewards and support of material resources, pay attention to the innovation and concept of nursing work, adopt the opinions of different nursing staff reasonably, ensure the autonomy of nurses, stimulate their enthusiasm in work and help them achieve CS. Nursing managers can also help nurses with poor psychological conditions by setting up a seminar room for mental health education, a mental health consultation website and a psychological reading room, and at the same time provide nurses with a "decompression package" to organize decompression activities for nurses from time to time to improve their psychological resilience(PR). Hospitals should pay attention to cultivating nurses' ability to cope with problems and help them improve their emotional control ability. At the same time, it is necessary to consolidate the professional of nurses, improve their problem-solving ability, and thus promote their CS.

Abbreviations

SPM	Sense of professional mission
CS	Career success
PR	Psychological resilience
ICU	Intensive care unit
SEM	Structural Equation Modeling
$\chi2$	Discrepancy Chi Square
$\chi2$ /df	Chi-square/degree of freedom
CFI	Comparative fit index
TLI	Tucker–Lewis index
RMSEA	Root-mean-square error of approximation
SRMR	Standardized root mean square residual M:Mean
SD	Standard deviation
CI	Confidence interval
GFI	Goodness-of-fit index
AGFI	Adjusted Goodness of Fit
NFI	Normed fit index
IFI	Incremental Fit Index

Availability of data and materials

Data Availability Due to the privacy of the study participants, the data generated in the course of this study will not be made public, but can be made available to the corresponding author upon reasonable request.

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Declarations

Ethics approval and consent to participate

This study was performed in line with the principles of the Declaration of Helsinki. All the participants consent to participate and providing written informed consent. Approval was granted by the Independent Ethics Committee of The Second Affiliated Hospital of Air Force Military Medical University.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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