ORIGINAL RESEARCH

Subhealth Status of Nursing Staff and Its Influencing Factors in Shaanxi Province

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ABSTRACT

Background • The concept of subhealth, defined as a state between health and illness characterized by diminished vitality and adaptability, is emerging as a significant concern, particularly among nursing staff. In Shaanxi Province, there is a notable prevalence of subhealth conditions among nurses, influenced by various factors, including lifestyle, work environment, and psychological stress.

Purpose • This study aims to investigate the level of subhealth status among nursing staff in Shaanxi hospitals, identify the primary causes and risk factors affecting their subhealth, and propose relevant countermeasures. The goal is to provide a scientific basis for developing strategies to enhance nursing staff's physical and mental well-being. **Methods** • A comprehensive questionnaire survey was conducted among 1068 nursing staff members from different hospitals in Shaanxi Province. The survey assessed various dimensions of subhealth, including physical, psychological, and social aspects. Data were analyzed to determine the relationships between subhealth status and factors like exercise frequency, dietary habits, smoking and alcohol consumption, occupational injuries, work situation, and stress levels.

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INTRODUCTION

Health is now understood through the 'biopsychosocial model' and disease spectrum. The WHO defines health as the absence of disease and complete physical, mental, and social well-being. Sub-health, a state between health and disease, **Results** • Most respondents were female, aged between 21 and 40 years. The study found no significant genderrelated differences in subhealth scores. Key factors affecting subhealth included physical exercise, dietary habits, occupational stress, and work conditions. The data revealed higher physical subhealth but lower psychological subhealth among nursing staff compared to regional norms. Notable relationships were observed between lifestyle choices, work-related factors, and the subhealth status of nursing staff.

Conclusion • The subhealth status of nursing staff in Shaanxi hospitals is influenced by a combination of lifestyle, occupational, and psychological factors. The study underscores the need for targeted interventions focusing on lifestyle modifications, stress management, and improved work conditions to enhance the overall health status of nursing staff. This research provides valuable insights for healthcare policymakers and administrators to develop effective strategies for managing subhealth conditions among nursing professionals. (*Altern Ther Health Med.* [E-pub ahead of print.])

includes various physical, psychological, and social discomforts without specific illness, leading to decreased vitality and adaptability. It's considered a precursor to many diseases and a significant threat in the 21st century. According to a survey, the prevalence of sub-health among nurses in China is about 40%-70%, and the prevalence of sub-health varies among different types of hospitals and different positions of nurses. Only 5% of the global population is truly healthy, with 20% diagnosed with illnesses and 75% in a state of sub-health. This condition is more prevalent in advanced economies with intense competition.^{1,2} In the U.S., 6 million people annually experience sub-health, especially adults aged 20-45. In China, over 700 million, mostly middle-aged, are affected. Studies show that 73.11% of university students and about half of university teachers experience sub-health influenced by stress, emotional disorders, and poor diet.³

Among Chinese nurses, sub-health prevalence ranges from 40%-70%, highlighting a growing concern in healthcare.⁴ This research on the subhealth status of nursing staff in Shaanxi Province is crucial as it sheds light on the prevalent yet often overlooked issue of subhealth among healthcare professionals. The study holds significant clinical value, focusing on identifying the key factors contributing to this condition, such as lifestyle, work environment, and psychological stress. It not only enhances the understanding of nurse well-being but also provides essential insights for healthcare policies to improve work conditions and the overall health of nurses. This, in turn, is vital for ensuring high-quality patient care and setting a foundation for future research in occupational health within healthcare settings.

Recent attention to the subhealth condition of nurses has revealed high prevalence rates: 72% in some Heilongjiang areas,⁶ 76.76% in military hospitals,⁷ and variations between 40.82% and 69.56% across different hospital types.⁸ These rates exceed those in the general population. Factors contributing to this include increased demands in medical services, a severe nursing shortage, and the intensive nature of nursing work, often leading to overtime and limited opportunities for skill advancement.⁹ The challenging work environment, marked by strict regulations, interpersonal and role conflicts, and the emotional toll of patient care, places nurses under significant physical and psychological stress.¹⁰ This stress impacts not only their health but also their ability to provide quality care, underlining the societal importance of addressing nurse health.¹⁰

DATA AND METHODS

Study population

A stratified whole-group sampling method was used to randomly select two hospitals after stratification according to hospital level, and all nursing staff in each hospital were included in the study.

Inclusion and Exclusion Criteria. Clinical nurses who had participated in clinical nursing work in Shaanxi Province hospitals for more than 1 year and held a nurse's practice certificate were selected as study subjects.

Professional Qualification: Only clinical nurses who have been engaged in clinical nursing work for more than one year and hold a valid nurse's practice certificate. Workplace: Nurses currently employed in various departments of hospitals in Shaanxi Province. Age Range: Nurses aged between 20 and 60 years to encompass a broad range of nursing experiences. Work Experience: Inclusion of nursing staff with different experience levels, ranging from new graduates to senior nurses with over 20 years of experience. Willingness to Participate: Nurses who voluntarily agree to participate in the study and provide informed consent.

Survey content

The questionnaire method was used to collect data. Interns and Trainees: Excluding nursing interns and trainees who have not yet acquired full professional status. Limited Work Experience: Excluding nursing staff with less than one year of clinical nursing experience ensures participants have sufficient exposure to the nursing environment. Non-Working Staff: Excluding nursing staff who were not actively working during the survey period, such as those on extended leave, sabbatical, or undergoing further training. Health Conditions: Excluding individuals currently suffering from acute or chronic physical illnesses or diagnosed mental illnesses, as these conditions could independently affect their subhealth status. Conflict of Interest: Excluding nursing staff who might have a potential conflict of interest, such as those involved in the design or conduct of the study. For our study, we enrolled all available nursing staff in the hospital, extending the enrollment period from June 2022 to July 2023. This defined period ensures a clear understanding of the data's timeframe, thereby enhancing the precision and context of our research findings.

General information. The general information of nursing staff included gender, age, years of work, title, education, marital status, department, hospital grade, form of employment, and other basic information.

Sub-health status. Information on the sub-health status of the nursing staff was collected through the sub-health assessment scale, including fatigue, loss of appetite, insomnia, impatience and irritability, interpersonal tension and low work efficiency, tinnitus, and loneliness.

Sub-health influencing factors. Weekly exercise, leisure, eating habits, smoking, alcohol consumption, life events, feelings of stress, sleep, and work were collected from nursing staff through the Subhealth Rating Scale.

Survey instrument

The general Questionnaire is a self-designed questionnaire that combines the nursing staff's sociodemographic characteristics, lifestyle and work situation.

Sub-health rating scale. The SHMS V1.0 (see Appendix II) developed by Xu Jun et al. was used to assess subhealth status of nursing staff, which consisted of 9 dimensions and 39 items, covering physical, psychological, and social aspects of subhealth, with items 1-15 being physical subhealth assessment subscale, items 16-28 being psychological subhealth assessment subscale, and items 29-39 being social subhealth assessment subscale. The subscales are social subhealth assessment subscales. The 39 items in this subscale are rated using an international Likert five-point scale, and because there are both positive and negative items, the original crude score is re-scaled. (4-12, 20-25 questions, respectively), which were re-scored as 6 minus the original score.¹¹ The dimension raw crude score, subscale raw crude score, and scale raw crude score were calculated based on re-scores of 39 items, with each dimension raw crude score being the sum of scores of items included in re-scores; each subscale raw crude score for each scale being the sum of scores of dimensions included in each scale after re-scores; and scale raw crude score being the sum of scores of all subscales after re-scores.¹² The theoretical maximum scores

of physical, psychological, social, and total subscale were 70, 60, 45, and 175, respectively, while theoretical minimum scores were 14, 12, 19 and 35, respectively. The scores of subscales and evaluation criteria of the total score of the scale are shown in Appendix II. In order to facilitate understanding and comparison, raw crude scores of dimensions, subscales, and scales were converted into percentage scores, and conversion scores were used for analysis of results.

Questionnaire on influencing factors of sub-health. Referring to relevant literature at home and abroad, Questionnaire was designed to investigate general conditions, living habits, working conditions, and work and life stress of nursing staff in Shaanxi Province, taking into account their work characteristics.

Definition of Relevant Indicators

(1) Frequency is defined as 0 days/week for "none", 1-2 days/week for "occasionally", 3-5 days/week for "often", and 6-7 days/week for "always"; "Always" is 6-7 days/week.

(2) Smoking and alcohol consumption were defined as smoking: continuous or cumulative smoking for 6 months or more and more than 10 cigarettes in past 30 days; passive smoking: non-smokers inhaled smoke exhaled by smokers for at least 15 minutes per day for more than 1 day in a week; alcohol consumption: 1 or more drinks per week and >25 ml of alcohol per drink.

Quality control

Scientific design of general information questionnaires, use of survey scales with high reliability and validity, unified diagnostic criteria, unified training for survey personnel, review of survey data of day, and double entry by entry clerks, to ensure that information collected is true and reliable.¹³ Select reasonable statistical methods for analysis and other measures for quality control to reduce bias and ensure the quality of the survey.

Statistical analysis methods

The data were double-entered by Epi Data 3.1 statistical software and processed by SPSS 19.0 statistical analysis software.¹⁴ The picture was drawn using 2016 Excel. Descriptive statistical analysis, *t*-test for two independent samples, one-way ANOVA and multiple stepwise regression analysis were used for statistical data analysis.

RESULTS

Basic Information

Between January 2023 and April 2023, questionnaires were administered to 1060 nursing staff who met inclusion criteria, of which 1068 valid questionnaires were returned, with a return rate of 92.07%. Among 1068 respondents, more women than men, with 84 male nursing staff (7.9%) and 984 female nursing staff (92.1%); age of nursing staff mainly ranged from 21 to 40 years old, with 616 nursing staff aged 21-30 years old (57.7%) and 284 nursing staff aged 31-40 years old (26.6%); majority of nursing staff had worked for 1-5 years

and 6-10 years, The majority of nursing staff have been working for 1-5 years and 6-10 years, with 454 working for 1-5 years, accounting for 42.5%, and 336 working for 6-10 years, accounting for 31.5%; majority of nursing staff are below junior level and junior nursing staff, with 378 below junior level, accounting for 44.7%, and 368 junior level, accounting for 34.5%; majority of education level are college and university undergraduate, with 560 having a college degree, accounting for 52.4%, and 52.4% having an undergraduate degree. Among the nursing staff surveyed, there are more nursing staff in internal medicine, psychiatry, and surgery, including 462 nursing staff in internal medicine, accounting for 43.4%; in terms of hospital grade, more nursing staff in tertiary hospitals, 630, accounting for 59%; among all survey respondents, number of married people was higher than number of unmarried people, 620 married people, accounting for 58.1%, and 420 unmarried people. In terms of income, the majority of nursing staff were earning less than 5,000 a month, 530 were earning less than 2,500 a month, accounting for 49.6%, and 498 were earning 2,500 to 5,000 a month, accounting for 46.6%; in terms of form of employment, 662 were contract nursing staff, accounting for 71.3%, and 306 were formal nursing staff, accounting for 28.7%. 28.7%. The details of survey respondents can be seen in Table 1.

The transformed scores of psychological, physical, social subhealth, and overall subhealth status of 1068 healthcare workers in Shaanxi hospitals are shown in Figure 1. The scores

Entre entre	Crouning	Number	Composition	
Entry name	Grouping	of people	ratio (%)	
Gender	Male	84	7.9	
	Female	984	92.1	
Age (years)	≤20	8	0.7	
	21~	616	57.7	
	31~	284	26.6	
	41~	106	9.9	
	>50	54	5.1	
	1~5	454	42.5	
	6~	336	31.5	
Years of	11~	84	7.9	
Service	16~	46	4.3	
	>20	148	13.8	
	Below beginner level	478	44.7	
	Primary	368	34.5	
Title	Intermediate	154	14.4	
	Subtropical high and above	68	6.4	
	High school/technical secondary school	130	12.2	
	Junior college	560	52.4	
Education	Undergraduate college	372	34.8	
	Master's degree or above	6	0.6	
	internal medicine	462	43.3	
	Surgery	184	17.2	
	Gynecology	20	1.9	
Department	Pediatrics	28	2.6	
Department	Psychiatry Department	190	17.8	
	Emergency Clinic	98	91	
	Other	86	81	
	Level 3	630	59	
Hospital	Level 2	386	36.1	
level	Level 1	52	49	
	Unmarried	420	39.3	
	Married	620	58.1	
Marriage	Divorce	24	2.2	
	Widow	4	0.4	
Incomo	<2500	530	49.6	
	2500~	248	46.6	
(vuan)	500~	38	3.6	
(yuall)	7500	20	0.2	
	Formal	206	28.7	
Employ	Contract	762	20./	
Employ	Formal Contract	306 762	28.7 71.3	

 Table 1. The general situation of 1068 nursing staff in medical institutions



Table 2. Multiple stepwise regression analysis of factorsinfluencing total score of physiological subhealth amongnursing staff

	Partial regression	Standard	Standard regression		
Variable	coefficient	error	coefficient	t	P value
Years of Work	0.890	0.397	0.083	2.249	.026
Education	0.737	0.328	0.063	1.916	.036
Department	1.487	0.694	0.058	2.777	.019
Hospital level	-1.144	0.372	-0.050	2.196	.031
Weekly exercise frequency	0.529	0.133	0.065	1.944	.045
Eating vegetables and fruits	1.853	0.755	0.102	2.458	.015
Eating meat	-1.467	0.741	-0.090	-1.982	.049
Edible bean products	2.511	1.192	0.185	2.108	.037
Eating eggs	1.812	0.789	0.095	2.298	.023
Drinking water volume	2.239	0.774	0.112	2.894	.005
Passive smoking	-3.788	0.634	-0.354	-3.830	<.002
Worried about errors and accident pressure	-2.421	0.900	-0.136	-2.692	.008
Promotion pressure	-4.378	1.991	-0.283	-2.200	.029
Tight and stressful relationships among colleagues	-3.154	0.755	-0.280	-3.337	<.002
Life pressure	-3.432	0.956	-0.192	-3.593	<.002
Daily sleep time	4.760	0.803	0.226	5.936	<.002
Weekly working hours	-2.455	0.313	-0.195	-3.888	<.002
Weekly Night Shift Hours	-2.934	0.671	-0.176	-2.915	.007
Weekly night shift situation	-5.575	1.945	-0.109	-2.869	.005

 Table 3. Multiple stepwise regression analysis of factors influencing total score of mental subhealth among nursing staff

	Partial regression	Standard	Standard regression		
Variable	coefficient	error	coefficient	t	P value
Years of Work	0.317	0.084	0.063	1.999	.044
Hospital level	-1.204	0.172	-0.090	2.036	.032
Weekly exercise frequency	0.571	0.123	0.085	1.994	.046
Weekly Meals on Time	0.720	0.086	0.067	2.473	.019
Eating vegetables and fruits	1.639	0.652	0.093	2.338	.020
Eating meat	-1.516	0.501	-0.113	-3.028	.004
Drinking water volume	1.449	0.515	0.107	2.819	.006
Passive smoking	-4.452	1.954	-0.304	5.730	<.002
Worried about errors and	1 780	0.497	0.140	3 602	< 002
accident pressure	-1./09	0.407	-0.149	-3.082	<.002
Promotion pressure	-2.837	0.604	-0.178	-4.513	<.002
Tight and stressful	1.740	0.420	0.125	2 4 4 2	< 002
relationships among colleagues	-1.740	0.450	-0.125	-5.442	<.002
Life pressure	-3.790	0.525	-0.032	-7.236	<.002
Daily sleep time	2.436	0.538	0.172	4.533	<.002
Weekly working hours	-1.728	0.567	-0.117	-3.050	.003
Weekly night shift situation	-3.996	0.948	-0.307	-4.528	<.002

of each subscale for male and female nursing staff were highest for physical subhealth, which was better than Shaanxi regional civil service norm (68.07 ± 14.11 for men and 69.54 ± 14.39 for women), and lower for psychological subhealth than Shaanxi regional civil service norm (66.91 ± 15.81 for men and 67.53 ± 16.81 for women). The mental subhealth score was lower than the Shaanxi civil service norm (66.91 ± 15.81 for men and 67.53 ± 16.81 for women).

Table 4. Multiple stepwise regression analysis of influencingfactors on social subhealth scores of nursing staff

	Partial regression	Standard	Standard regression		
Variable	coefficient	error	coefficient	t	P value
Age	1.338	0.075	0.083	2.004	.042
Years of Work	4.637	0.393	0.242	5.439	<.002
Education	1.806	0.180	0.129	3.453	<.002
Department	1.591	0.094	0.087	2.137	.036
Hospital level	-0.737	0.063	-0.066	1.981	.045
Weekly exercise frequency	0.788	0.096	0.062	2.040	.041
Duration of each exercise	-3.629	0.604	-0.228	4.942	<.002
Meal on time every week	3.825	1.087	0.143	3.521	<.002
Eating vegetables and fruits	5.628	1.176	0.192	4.792	<.002
Eating meat	-0.764	0.070	0.126	3.042	.003
Edible bean products	4.197	1.995	0.250	4.528	<.002
Eating eggs	2.106	0.943	0.172	2.936	.020
Edible dairy products	2.731	1.263	0.111	4.885	<.002
Drinking water volume	5.086	1.221	0.066	4.168	<.002
Active smoking	-3.734	1.046	-0.114	4.332	<.002
Drink wine	-6.507	3.064	-0.076	-2.125	.035
Promotion pressure	-5.821	1.035	-0.262	-4.775	<.002
Tight and stressful relationships among colleagues	-4.868	1.379	-0.183	-3.532	<.002
Life pressure	-3.109	1.142	-0.198	-2.724	.008
Daily sleep time	5.097	1.268	0.190	4.034	<.002
Weekly working hours	-1.793	0.305	-0.100	-2.386	.032
Weekly night shift situation	-1.225	0.259	-0.225	-2.191	.034

Multifactorial Regression Analysis

A multiple stepwise linear regression analysis was conducted using psychological, physical, and social subhealth scores and total subhealth scores of the Subhealth Rating Scale as dependent variables, and factors such as age, gender, nursing experience, job title, and education after univariate analysis as independent variables. a=0.05 was selected as the level of significance for variables. Results showed that 20 factors affect the physical subhealth of hospital nursing staff. These predictor variables explained 56.5% of variance in physiological subhealth, with the top five being passive smoking, pressure for promotion, stressful relationships between colleagues, sleep time per day, and hours per week. See Table 2.

There were 16 factors affecting the psychological subhealth of hospital nursing staff, and these predictor variables effectively explained 49.7% of variance in physical subhealth, with the top five being: weekly night shift status, passive smoking, pressure for promotion, sleep time per day, and fear of error accident stress. See Table 3.

These predictor variables effectively explained 47.8% of the variance in physical sub-health. The top five were pressure for promotion, weekly night duty, life stress, sleep time per day, and stressful relationships between colleagues. See Table 4.

There were 18 factors affecting the social subhealth of hospital nursing staff, and these predictor variables effectively explained 52.8% of variance in physical subhealth, with the top five being weekly night duty, hours worked per week, duration of each exercise session, hours of sleep per day and life stress. See Table 5.

DISCUSSION

Sub-health, a state between health and disease without clear pathology but with symptoms like fatigue, is considered a major health threat in the modern, stressful world.¹⁵⁻¹⁸ The World Health Organization recognizes it as a functional, non-organic state.¹⁶ If not managed, this condition can

Table 5. Multiple stepwise regression analysis of influencingfactors on the overall subhealth status of nursing staff

	Partial regression	Standard	Standard regression		
Variable	coefficient	error	coefficient	t	P value
Department	1.335	0.329	0.095	2.054	.033
Hospital level	-0.731	0.063	-0.059	2.396	.018
Weekly exercise frequency	2.052	0.583	0.133	3.524	<.002
Duration of each exercise	-3.179	0.814	-0.273	4.673	<.002
Weekly Meals on Time	3.179	0.923	0.181	3.984	<.002
Eating vegetables and fruits	2.074	0.511	0.146	4.063	<.002
Eating meat	-1.517	0.413	-0.124	-3.680	<.002
Edible bean products	2.941	0.732	0.170	4.041	<.002
Eating eggs	2.354	0.747	0.129	2.528	.015
Edible dairy products	2.031	0.450	0.142	5.032	<.002
Drinking water volume	2.177	0.558	0.139	3.909	<.002
Worried about errors and accident pressure	-1.538	0.538	-0.120	-2.864	.005
Promotion pressure	-2.100	0.887	-0.081	-2.370	.019
Tight and stressful relationships among colleagues	-1.858	0.660	-0.133	-2.818	.006
Life pressure	-2.490	0.693	-0.178	-3.600	<.002
Daily sleep time	3.450	0.580	0.209	5.957	<.002
Weekly working hours	-4.038	0.941	-0.280	-3.853	<.002
Weekly night shift situation	-3.823	0.557	-0.302	-3.471	<.002

progress to serious illnesses.¹⁷ Nurses, facing unique professional stresses such as irregular shifts and high responsibility, are particularly susceptible to sub-health, with a high incidence rate.²¹ The situation in Shaanxi Province, a busy coastal area with a diverse range of hospitals, exemplifies this, making it crucial to study and address sub-health among nurses there for the well-being of the workforce and the quality of care they provide.^{22,23}

Previous studies have shown that "regular meals", "proper diet" and "physical activity" are protective factors for subhealth, while "irregular diet", "lack of sleep" and "stress" are risk factors for sub-health.²⁴ "The present study was conducted to investigate risk factors of subhealth. In this study, a multifactor stepwise regression analysis of the subhealth status and it's influencing factors showed that 20 factors affecting the physical subhealth of nursing staff, and the top five factors in descending order of influence were "passive smoking", "pressure for promotion", "stress among colleagues", and "stressful relationships among colleagues", The top five factors, in descending order of influence, were "passive smoking", "pressure for promotion", "tension between colleagues", "sleep time per day" and "working hours per week". The top five, in descending order of influence, were "weekly night shifts", "passive smoking", "pressure for promotion", "sleep time per day", and "working hours per week". The top five factors affecting the social subhealth of nursing staff, in descending order of influence, were "pressure for promotion", "weekly night duty", "life stress", and "working hours per week". The top five factors in descending order of influence were "promotion pressure", "weekly night shift", "life stress", "daily sleep time" and "stressful relationships between colleagues."25 Therefore, it is important to intervene in factors that affect subhealth so that nursing staff can move from a Sub-healthy state to a healthy state and better serve patients. According to research results on the subhealth condition of nursing staff and its influencing factors, the following suggestions are made to improve subhealth condition of nursing staff and promote physical and mental health of nursing staff: (1) strengthen education on

occupational protection, improve working environment, raise wages and welfare benefits of nursing staff, and improve relevant regulations and systems to protect rights and interests of nursing staff, etc.; (2) strengthen awareness of humane management, and take the principle of meeting needs of patients as basis to safely and reasonably allocate nursing human resources. (2) Strengthen awareness of humane management, take principle of meeting needs of patients, allocate nursing human resources in a safe and reasonable manner, implement flexible scheduling, increase manpower appropriately during peak work periods, and take appropriate breaks when work is not busy; (3) Manage health records of nursing staff, and give nursing staff with a high degree of subhealth life and mental comfort or temporary transfer to a department or leave to relieve their pressure, so as to effectively reduce incidence of subhealth among clinical nursing staff (4) For nursing staff who have to bear double pressure of work and family and have a heavy psychological burden, nursing managers can adopt a three-level stress management model to help nursing staff cope with stress and maintain their psychological health; (5) nursing managers can provide necessary consultation assistance, actively carry out spare-time cultural life, promote communication among colleagues and form a good working atmosphere; (6) do a good job in managing family communication of nursing staff. (6) improve management of nursing staff's family communication, such as using association, telephone or e-mail greetings to promote nursing staff's family members, and encourage nursing staff to communicate with their family members so as to obtain their family's understanding and support of their work, and strong social support can help maintain nursing staff's health status.

Limitations

(1). The study primarily included female nursing staff from Shaanxi Province, which may limit the generalizability of the findings to other regions or to a more diverse gender representation; (2). The reliance on self-reported questionnaires for data collection can introduce biases, as responses may be influenced by the participants' perceptions and willingness to disclose information; (3). The cross-sectional nature of the study limits its ability to establish causality between the observed factors and subhealth status; (4) While the study covered a range of factors, there may be other relevant variables not included in the survey that could influence subhealth status, such as specific workplace environments or personal life stressors; (5). The study does not track changes over time, which would be valuable for understanding subhealth status's progression and long-term impact.

Future Prospects

(1). Future studies could involve a broader geographical area or multiple regions to enhance the diversity and applicability of the findings. (2). Implementing longitudinal research designs could help in understanding the evolution of subhealth status over time and its long-term consequences.

(3). Including a more diverse sample in terms of gender, age, and socio-economic backgrounds could provide a more comprehensive understanding of subhealth status across different demographics. (4). Exploring additional factors, such as specific workplace conditions, personal life events, and coping mechanisms, could provide a more nuanced understanding of the determinants of subhealth. (5). Based on the findings, developing and testing interventions aimed at improving the subhealth status of nursing staff could be a valuable area of future research. This could include stress management programs, workload adjustments, and lifestyle interventions.

COMPETING INTERESTS

The authors declare that they have no competing interests

AUTHOR CONTRIBUTIONS

Xi Zhou, Qian Wang, and Xiaozhen Li contributed equally to this work.

ACKNOWLEDGMENTS

Not applicable.

DATA AND MATERIALS AVAILABILITY

The datasets in the current study are available from the corresponding author on reasonable request.

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