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ORIGINAL RESEARCH

Assessment of Nursing Practice Environment and Its Influencing Factors: A Cross-Sectional Study at Shandong Province, Jinan

Ailin Zhao, Li Zhang, Xiaomei Shi

Department of Neurosurgery, Shandong Provincial Hospital Affiliated to Shandong First Medical University, Jinan, Shandong Province, 250001, People's Republic of China

Correspondence: Xiaomei Shi, Department of Neurosurgery, Shandong Provincial Hospital Affiliated to Shandong First Medical University, No. 324 of Jing Wu Road, HuaiYin District, Jinan, Shandong Province, 250001, People's Republic of China, Tel +86 15552519354, Email shixm11xm@163.com

Objective: To investigate the current nursing practice environment in Jinan, Shandong Province, and to identify the factors influencing the practice environment.

Methods: This study is a cross-sectional study for nurses. From October to December 2022, using the clustering and stratified sampling methods, 2426 nurses from internal Medicine, Surgery, Obstetrics and Gynecology, Outpatient Department and Intensive Care Department of the Provincial Hospital of Shandong Medical University were selected and then investigated and analyzed using the revised Nurse Practice Environment Assessment Scale.

Results: The overall mean evaluation of the practice environment scored 75.13±19.87, with a minimum value of 59.74 and a maximum value of 95.82. The items with higher scores were "the hospital has systematic training for new nurses", "the work system is perfect", and "the hospital can provide continuing education for nurses in accordance with the needs of their positions". The items with lower scores were "nurses enjoy legal benefits", "nurses have the opportunity to participate in hospital management decisions", and "nurses have the opportunity to participate in hospital internal management". The results of the multiple linear regression analysis of the factors influencing nurses' practice environment showed that gender, education, position, and years of work were independent influences on nurses' practice environment scores ($p < 0.05$), and they explained 48.127% of the variation in the total scores of the nurses' practice environment scale. The estimated values (β) of sex, education, cheif nurse, nurses staff, work experience (year), and whether the only child variables were 3.141, 3.237, 2.713, 5.471, 2.074 and 0.732, respectively.

Conclusion: The nurse practice environment still needs to be improved, mainly in terms of hospital management participation, human resource allocation and salary distribution system.

Keywords: nurse, practice environment, cross-sectional survey, factor

Introduction

The nurse practice environment is the setting that facilitates or constrains the professional practice of nursing and includes the organizational and physical environment in which nurses work.[1] Healthy nurse practice environment includes having the opportunity to participate in hospital affairs management, nurses' autonomy in work, excellent nursing quality, reasonable nursing manpower and material resources allocation, reliable leadership management, harmonious medical and nursing relationship, reasonable salary and social status, and conducive to professional and personal development.[2] A healthy practice environment positively impacts nurses, patients and hospitals.[3–8] At the nurse level, nurses perceive that a good practice environment increases their sense of organizational commitment and job satisfaction, and reduces burnout and willingness to leave;[3,4] at the patient level, seeking care in a hospital with a good practice environment is conducive to improving their prognostic outcomes and saving medical costs;[5–7] and at the hospital level, hospitals compress management costs and improve the quality and safety of care.[8] Foreign studies[9] have shown that the nurse practice environment is generally better, magnetic hospitals are superior to non-

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magnetic hospitals, but many nursing managers also point out that the study of nurse practice environment is still a serious challenge faced by nursing managers in the 21st century.

At present, there are geographical differences in the practice environment of nurses in China, the development level is unbalanced, the shortage of nursing staff, the tension between nurses and patients, the pressure of nurses, and the low salary and treatment. In this case, it is not only difficult to improve the quality of nursing services, but also easy to produce hidden dangers of medical quality.[10] The current situation of nurse practice environment varies from region to region, and its influencing factors have commonalities and characteristics. The shortage of nurses has become a common problem faced by hospitals, and the high turnover rate also affects the development of hospitals.[10] With the gradual expansion of hospital scale and increasing demand for nurses, building a good nurse practice environment can, to a certain extent, attract more excellent nursing talents and reduce the loss of human resources.[11]

At present, many researchers have investigated and studied the nurse practice environment in local hospitals. Liu et al[12] investigated the nurse practice environment in Shaanxi Province and found that gender, whether it was a career establishment, department type, working years, professional title, and position had an impact on the nurse practice environment. Liu Yang[13] investigated the practice environment of nurses in a tertiary care hospital in northern Jiangsu and found that nurses with different departments, professional titles, and educational qualifications had different practice environment evaluation results, nurses in obstetrics, intensive care medicine, and pediatrics had higher scores, and nurses with intermediate professional titles and highly educated nurses perceived a poor practice environment.

In recent years, many existing studies on the nursing occupational environment and nurse turnover have been limited to single-department, cross-sectional studies and lack multi-departmental and large-sample research. At the same time, there has been no in-depth analysis of the factors influencing the nurse practice environment in tertiary hospitals in Jinan City, Shandong Province.[14–17]

Therefore, this study uses the revised Nurse Practice Environment Assessment Scale to investigate the current practice environment of nurses in Jinan hospitals in Shandong Province, identify the factors affecting the practice environment, and provide a reference basis for formulating sensitive measures to optimize the practice environment of nurses.

Materials and Methods
Research Subjects
This study is a cross-sectional study, with the estimated required sample size of 1945 cases and the set attrition rate of about 20%, then at least 2426 questionnaires were distributed. From October to December 2022, nurses from the Department of Internal Medicine, Surgery, Obstetrics and Gynecology, Outpatient Department and Critical Care Medicine of the Provincial Hospital Affiliated to Shandong Medical University were selected for the survey. The hospital included three sub-hospitals, selected respondents by cluster sampling and stratified sampling, confirmed the number of nurses in each hospital according to hospital stratification, selected the number of nurses in different departments in each hospital in proportion, and a total of 2426 questionnaires were distributed.

Inclusion and Exclusion Criteria for the Patients
Inclusion criteria: ①Obtained nursing license and registered in the hospital; ②Worked in clinical nursing for 1 year or more; ③Voluntary participation in the study and signed the informed consent.

Exclusion criteria: ①persons in poor health status with major physical illnesses; ②advanced training and transfer personnel; ③Poor compliance and inability to persist in completing the full content of the scale.;④ personnel who had not worked in a clinical department in the previous year.

Tool for Data Collection
The general information questionnaire included sections, gender, age, years of service, job title, position, highest educational background, and creation status.

The evaluation was performed using the Nurse Practice Environment Evaluation Scale revised by the Nursing Center of the Institute of Hospital Management of the National Health and Family Planning Commission.[18] The scale includes 36 items and 1 overall evaluation item in 10 dimensions including hospital management participation, clinical nursing

professionalism, leadership and communication, quality management, internal support, medical and nursing cooperation, professional improvement, manpower allocation, social status, and salary benefits. The scale is scored on a total scale from 0 to 100, with 0 representing very dissatisfied or strongly disagree and 100 representing very satisfied or strongly agree. Nurse's practice environment total score = sum of scores for each item of the scale/36, with higher scores indicating a better practice environment. The total Cronbach's α coefficient of the scale was 0.983, the Cronbach's α coefficient of each dimension was 0.846 ~ 0.948, the total split-half reliability coefficient of the scale was 0.957, the split-half reliability coefficient of each dimension was 0.755 ~ 0.932, and the cumulative variance contribution rate of the structural validity of the scale was 87.576%, which had good reliability and validity.

Survey Method

A questionnaire was used to assess the practice environment of nurses who met the inclusion and exclusion criteria. To ensure the quality of questionnaire completion, a uniform guideline was used, and each entry had to be completed completely before submission, and the research team and the nurse managers of each department supervised the nurses in the department to complete it carefully. The questionnaire was anonymous and nurses could fill it out according to their true feelings, and the results were finally reviewed by the researcher.

Statistical Methods

Statistical analysis was performed using SPSS 23.0 software after collating the data using Excel. Measurement data conforming to the normal distribution were expressed as mean ± standard deviation, and comparisons between different groups were performed using t-test or ANOVA. Count data are presented as frequencies. Multiple linear regression was used to analyze the factors influencing the nurse practice environment. $P < 0.05$ was considered a statistically significant difference.

Results

The survey was conducted in 15 departments of 3 hospitals affiliated to Shandong First Medical University, and 2426 questionnaires were distributed, of which 2082 were valid, with an effective recovery rate of 85.82%.

Total Score of Practice Environment of Nurses with Different Characteristics

The score of practice environment in males was lower than that in females (75.31±21.41 vs 79.31±20.74, t = 3.367, p = 0.004). The education level of junior college and below practice environment evaluation score is the lowest; nurses with working years < 5 years had the lowest score in practice environment assessment. The nurses with high positions had higher scores in the practice environment assessment, and the nurses in the head nurse and nursing department had higher scores in the practice environment assessment than ordinary nurses. There were statistically significant differences in the scores of nurses' practice environment assessment between different genders, education levels, positions, working years, and whether they were only children or not (p < 0.05). See Table 1.

Table 1 Different Characteristics of Nurses Practice Environment Assessment Scale Score (Score, Mean ± Standard Deviation)

Item	Number	Score	t/F	p
Gender				
Male	329	75.31±21.41	3.367	0.004
Female	1753	79.31±20.74		
Age(year)				
<30	980	76.08±14.37	0.974	0.641
30–39	732	78.47±16.71		
40–49	278	81.35±13.05		
≥50	92	79.84±17.44		

(Continued)

Table 1 (Continued).

Item	Number	Score	t/F	p
Education degree				
College and below	529	75.17±17.22	2.149	0.031
Regular college course	1457	78.94±16.14		
Master degree and above	96	81.37±18.91		
Marital status			0.415	0.745
Non-married	865	70.17±16.36		
Married	1152	72.15±14.25		
Other	65	71.84±16.09		
Professional title				
Primary	1377	75.33±13.41	1.471	0.097
Intermediate	612	73.47±20.47		
Subtropical high and above	93	77.67±18.94		
Duty				
Nurse	1688	75.17±14.63	3.898	0.002
Chief nurse	29	81.05±19.87		
Nursing staff	365	84.27±23.41		
Working experience (years)				
<5	747	76.44±17.23	3.471	0.004
5–10	1094	82.14±19.87		
>10	241	84.27±15.53		
Whether the only child				
Yes	1205	86.71±17.22	2.791	0.011
No	877	81.47±14.79		
Section			1.278	0.421
Department of internal medicine	760	75.12±17.21		
Surgery	456	74.31±21.17		
Department of obstetrics and gynecology	182	75.39±20.23		
Intensive care unit	279	76.84±17.88		
Clinic	405	79.17±19.55		

Score of Nurse Practice Environment

The overall mean evaluation score for the nurse practice setting was 75.13 ± 19.87, with a minimum value of 59.74 and a maximum value of 95.82. The five items with the highest scores were "the hospital has systematic training for new nurses" with 95.47±11.37 points, "the work system is perfect" with 91.47±15.47 points, "the hospital can provide continuing education for nurses in accordance with the job requirements" with 90.12±13.74 points, and "the department has a good work system" with 91.47±15.47 points, "doctors and nurses in the department have a good working relationship" 88.17±16.74 points; the five lowest scoring entries are "Nurses have access to statutory benefits" 62.67 ±18.74, "Nurses have the opportunity to participate in hospital management decisions" 60.17±20.14, "Nurses have the opportunity to participate in internal hospital management" 58.31±17.38 points, "the hospital's salary distribution system is reasonable" 57.31±19.21 points, "nurses are able to enjoy statutory benefits" 55.74±22.14 points. See Table 2.

Multivariate Analysis of Nurses' Practice Environment Assessment Scores

Multiple linear regression analysis of the influencing factors of nurses' practice environment: collinearity diagnosis was performed on the factors with statistically significant differences in single factor analysis. The variance inflation factor was 1.11–1.15, indicating that there was no collinearity between variables. The total score of the nurse practice environment assessment scale was used as the dependent variable, and the factors with statistically significant differences in the single factor analysis (different gender, education level, position, working years, whether the only child) were used as independent variables for multiple linear regression analysis. The multi-classification variables (education degree,

Table 2 Top 5 Nurse Practice Environment Items and Bottom 5

	Entry	Score
Top 5 Scores		
	The hospital has systematic training for new nurses	95.47±11.37
	The work system is perfect	91.47±15.47
	The department has a good work system	91.47±15.47
	The hospital can provide continuing education for nurses in accordance with the job requirements	90.12±13.74
	Doctors and nurses in the department have a good working relationship	88.17±16.74
Bottom 5 score		
	Nurses have access to statutory benefits	62.67±18.74
	Nurses have the opportunity to participate in hospital management decisions	60.17±20.14
	Nurses have the opportunity to participate in internal hospital management	58.31±17.38
	The hospital's salary distribution system is reasonable	57.31±19.21
	Nurses are able to enjoy statutory benefits	55.74±22.14

working experience) were set as ordered classification variables, and the positions were set as dummy variables. The independent variable assignment method is shown in Table 3a. The results showed that the evaluation index of model fitting effect: adjusted R^2 = 0.481, gender, education level, position and working years were independent influencing factors of nurses' practice environment score ($p < 0.05$), which could explain 48.127% of the total score variation of nurses' practice environment assessment scale. The estimated values (β) of sex, education, cheif nurse, nurses staff, work experience (year), and whether the only child variables were 3.141, 3.237, 2.713, 5.471, 2.074 and 0.732, respectively. See Table 3b.

Table 3 Multiple Linear Regression Analysis of Influencing Factors of Nurses' Practice Environment

a	
Independent variable	**Item**
Gender	female=0=, male=1
Education degree	college and below=0, regular college course=1, master degree and above=2
Duty	nurse=0, chief nurse=1, nursing staff=2
Working experience	<5=0, 5–10=1, >10=2
Whether the only child	yes=0, no=1

b					
Variables	**Nonstandard coefficient**	**Standard error**	**Standard coefficient**	**t**	**p**
Constant	54.781	4.472		10.128	<0.001
Sex	3.141	0.068	0.182	5.335	0.018
Education degree	3.237	1.018	0.037	8.389	0.005
Chief nurse vs nurse	2.713	1.357	0.414	3.421	0.013
Nursing staff vs nurse	5.471	1.727	0.307	7.214	<0.001
Working experiences(year)	2.074	0.437	0.018	4.035	0.027
whether the only child	0.732	0.074	0.018	1.092	0.064

Notes: R^2=0.513, adjusted R^2=0.481, F=49.871, p<0.001.

Discussion

In this survey, the total score of nurse practice environment was 75.13 ± 19.87, which was lower than the national total score (78.74 ± 6.22),[19] indicating that the total score of nurse practice environment in tertiary hospitals in Shandong Province was lower than the national average and needed to be improved. The study showed that the five items with the highest scores were "the hospital has systematic training for new nurses", "perfect work system", "the hospital can continue to educate nurses according to job requirements", "harmonious working relationship between doctors and nurses in the department", "nurses in the work team can be competent for nursing work". It showed that the hospital attaches importance to the establishment of the responsibilities and institutional processes of each nursing post, pays attention to the post training and ability improvement of the staff, and the nurses clarify the post responsibilities and processes, and self-perception can get more satisfactory learning and training opportunities. At the same time, the hospital departments pay attention to team building, medical communication and coordination, effective collaboration. "Nurses can enjoy statutory benefits", "nurses have the opportunity to participate in hospital management decisions", "nurses have the opportunity to participate in hospital internal management", "hospital salary distribution system is reasonable", "nurses can enjoy statutory benefits". It shows that the nurses in the region feel that the participation of hospital affairs is low, and the human resource allocation of the hospital is insufficient and the salary is unreasonable. Some hospitals regard nurses as employees, and there are few opportunities for them to participate in management and decision-making, resulting in increased fatigue of nurses.[13,19,20] The results of Liu Yang[13] showed that the scores of most items of nurse practice environment evaluation in a tertiary care hospital in northern Jiangsu were lower than the average values in Jiangsu Province and China, and the total average score of practice environment evaluation was lower than the average values in Jiangsu Province and China. The scores of these two items, "nurses have the opportunity to determine hospital affairs" and "nurses have the opportunity to participate in the internal management of hospitals", were the lowest. It can be seen that the decision-making of hospitals often ignored the opinions of nurses, resulting in low recognition of nurses' work in society and hospitals, while nurses' work intensity was high, their work was trivial, their payment was not directly proportional to the harvest, and occupational burnout was easy to occur. It is suggested that decision makers should encourage nurses to participate in hospital management, provide suggestions for managers, and increase personal sense of organizational commitment, achievement and belonging. At present, Chinese hospitals mainly use qualitative analysis to achieve nurse allocation, including subjective experience method and expert survey method.[21] In foreign countries, Laffela system and patient classification system are used to evaluate the nursing items needed by each type of patients, and the number of nurses at different levels is calculated according to the time of each nursing item. Nursing managers can refer to the fixed proportion allocation method and the dynamic allocation method, based on the workload, incorporate factors such as work risk, technical difficulty, and environmental impact, and comprehensively consider patient needs and nurse workload to allocate manpower.[22] A reasonable salary distribution system is conducive to stimulating the intrinsic motivation of nurses and increasing their satisfaction.

The results of multivariate analysis showed that gender, education level, position and working years were independent influencing factors of nurse practice environment. Male nurses' self-perceived nurse practice environment is relatively poor. Female nurses are superior to men. The results of this study showed that male nurses' self-perceived nurse practice environment was relatively poor. Compared with women, male nurses have higher career development expectations, expect more recognition and motivation from managers, and are more likely to leave when the value of work is not reflected.[19] Hospital managers can establish a corresponding incentive mechanism, build a career development platform for male nurses, encourage male nurses to actively participate in organizational management, give full play to their advantages in organizational decision-making, and enhance the enthusiasm of male nurses.[23] With the deepening of high-quality nursing, the writing requirements of nursing documents, the standards and contents of nursing evaluation are updated in real time. It is difficult for nurses with low education to adapt to the update speed of various evaluation tools and related system requirements in a short time, and use them freely, which undoubtedly increases the difficulty of work. Long-term in this working environment, can not get high-quality experience, so the score is low. Nurses with working years less than 5 years have lower satisfaction with the practice environment. Compared with senior nurses, new nurses are in the early stage of career development, facing various problems in the early stage, and are prone to job burnout and

turnover intention. Additionally, the study suggests that different circumstances may apply to nurses without siblings, as related studies found that they tend to have better self-awareness and adaptability in the occupational environment.[24]

According to the analysis of the above results, nurses have the opportunity to decide hospital affairs and nurses have the opportunity to participate in hospital internal management scored lower, and may be affected by the traditional management mode of the hospital, ordinary nurses in hospital management, lack of voice, lack of participation in hospital management and affairs, decision-making opportunities, coupled with the spirit of the relevant meeting can not be conveyed in time, the hospital affairs and development trends do not understand. Therefore, it is suggested to construct a joint participatory nursing management model,[25] empower nurses and establish a professional organization management structure, create a working environment for equal communication and cooperation, and guide clinical nurses to actively participate in nursing management and decision-making. On the other hand, some nurses are not aware of the form and way of participating in management, and it is recommended that managers strengthen hospital culture construction, enhance nurses' sense of ownership, and enhance nurses' sense of control and satisfaction with their work. For example, hospitals can establish a mechanism for front-line nurses to participate in hospital management, add nurse quotas in Party work groups and other departments, and select clinical nurse representatives to participate in hospital management and policy proposals to transmit the voices of clinical nurses. In recent years, due to the poor practice environment, the number of nurses leaving their jobs has increased, which is also a common problem. Some of the leaving staff are backbones. Increasing the same number of new nurses in time can not be competent for clinical work quickly, which undoubtedly increases the difficulty of nursing management. Remind managers can not ignore the value-added of human resources, personnel training process requires a lot of investment, scientific co-ordination of human resources investment and the resulting economic and social benefits in order to sustainable development. It is suggested that managers can adopt various empowerment strategies to create a supportive working environment, improve nurses' job satisfaction and quality of care for patients, reduce the occurrence of adverse events, and reduce the turnover rate of nurses.[26,27] At the same time, we will continue to deepen the construction of nursing culture, integrate high-quality nursing services into it, attract more nursing talents, continuously enhance the cohesion of the nursing team, fully stimulate their creativity, improve the patient's medical experience, and ultimately improve patient satisfaction and nursing management quality. According to the current situation of unreasonable salary distribution, managers should regularly investigate the salary level of various industries in their region, combine with the hospital performance evaluation system, establish a salary distribution system that is consistent with the objectives of health care reform in China and can reflect the ability, labor and service quality of nursing staff in different posts, reflect fairness and meet the wishes of nursing staff, establish an incentive mechanism, so that nurses can pay reasonable remuneration and fully mobilize enthusiasm.

This study has some limitations. First, the survey site is limited to a hospital in Jinan City, Shandong Province, there are no hospitals in other regions and levels, it is a single-center study, and the generalizability of the study results may be poor; second, the sample size of the survey is small, and its sample representativeness may not be enough; finally, this study is a cross-sectional study, reflecting only the situation at that time, and its situation will change with the adjustment of the hospital. Therefore, in future studies, we will go deep into hospitals in different regions and levels, and expand the sample size for investigation and research; and consider conducting follow-up studies to observe long-term changes in the nurse practice environment in order to provide more valuable information.

Conclusion

Based on the current survey results, nurses' practice environment has the potential to improve in some places, mainly in hospital management participation, human resource allocation and salary distribution system. Furthermore, gender, education level, position and years of work experience were identified as independent factors influencing nurses' practice environment scores. It is suggested that nursing administrators should establish a joint participatory nursing management model and improve the practice environment of nurses.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Shandong Provincial Hospital Affiliated to Shandong First Medical University. The ethics approval number is No. SWYX2023-193. Written informed consent was obtained from all participants.

Data Sharing Statement

All data generated or analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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