

Impact of Nursing Management Measures by Pediatric Head Nurses on Nursing Quality

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Abstract: *Objective:* To investigate the impact of nursing management measures implemented by pediatric head nurses on nursing quality in pediatric wards. *Methods:* A total of 150 hospitalized children with common respiratory, digestive, and neurological diseases in pediatrics were selected as study subjects. According to the threshold of nursing quality scores in their respective wards, they were divided into two groups. Univariate analysis was first used to compare differences in observation variables between the two groups, and multivariate logistic regression analysis was then used to screen independent influencing factors of nursing quality. *Results:* The average nursing quality score of the wards where the 150 children were hospitalized was 86.24 points. Those with scores ≥ 85 were assigned to the high nursing quality group, and those with scores < 85 to the low nursing quality group, with 92 cases in the high-score group and 58 cases in the low-score group. Statistically significant differences were found between the two groups in head nurse management duration, hierarchical training coverage rate, perfection of the risk early warning mechanism, frequency of nurse-patient communication, emergency response time, nurses' seniority, and ward bed-to-nursing ratio ($p < 0.05$). No statistically significant differences were found in age, sex, or disease type ($p > 0.05$). Multivariate logistic regression analysis showed that hierarchical training coverage rate, perfection of the risk early warning mechanism, frequency requirement of nurse-patient communication, emergency response time regulation, and ward bed-to-nursing ratio configuration were independent influencing factors of nursing quality, with statistically significant differences ($p < 0.05$). *Conclusion:* Multiple measures related to pediatric head nurse nursing management are major influencing factors of nursing quality. Clinically, head nurse management protocols can be adjusted according to the above factors, and nursing resource allocation can be optimized, thereby improving the overall nursing service level in pediatric wards and providing better nursing services for hospitalized children.

Keywords: Pediatric nursing quality; Head nurse nursing management; Influencing factors; Pediatric ward nursing

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1. Introduction

As a special clinical unit serving minors, pediatrics directly links nursing service quality with disease outcomes, medical safety, and family medical experience, and it is a core indicator for measuring the

comprehensive capacity of pediatric medical services. Currently, the incidence of nursing adverse events in pediatric wards in China is 3.2–5.7%. Third-party medical service satisfaction surveys show that the average nursing satisfaction of family members of hospitalized children in pediatrics is only 78.3%, far lower than the average level of 91.2% in adult internal medicine wards. The shortcomings in pediatric nursing quality have become a core bottleneck restricting the high-quality development of the pediatric medical service system, making quality optimization urgent.

Existing studies on improving pediatric nursing quality mostly focus on interventions at the individual nurse level, such as strengthening nursing operational standards and optimizing service attitudes, and rarely explore the core driving factors for quality improvement from the top-level design dimension of nursing management. Most studies only use univariate descriptive statistical analysis to analyze associated variables, without adjusting for confounding factors such as demographics and disease characteristics, resulting in high heterogeneity in reported influencing factors and an inability to provide a homogeneous reference for pediatric nursing management in medical institutions at different levels.

Based on Robbins' nursing management theory, the quality management efficacy of a nursing unit is directly related to the control strategies and resource allocation plans of nursing managers. As the first responsible person for nursing management in pediatric wards, the regulatory effect of head nurses' management measures on nursing quality has been preliminarily recognized by the academic community. However, existing studies have not yet systematically clarified the independent effects of various variables under the head nurse management dimension on pediatric nursing quality, nor have they completed the weighting of related influencing factors, failing to provide evidence-based support for optimizing head nurse management protocols^[1].

Through a systematic analysis of factors related to nursing quality in pediatric wards, this study screens independent influencing factors, which can provide empirical evidence for the refined adjustment of the pediatric nursing management system. It has important clinical guiding value for reducing the incidence of pediatric nursing adverse events, enhancing the medical safety of children, and optimizing the medical experience of family members.

2. Materials and methods

2.1. General information

This was a retrospective study involving 150 hospitalized children admitted to the pediatric department as study subjects. The cases covered common diseases of the respiratory, digestive, and nervous systems. This study conformed to the relevant principles of the Declaration of Helsinki.

2.1.1. Inclusion criteria

- (1) Meeting the diagnostic criteria for common pediatric diseases of the respiratory, digestive, and nervous systems, with a definite diagnosis.
- (2) Complete clinical diagnosis and treatment data.
- (3) Completion of the entire hospitalization and treatment process.
- (4) Complete records related to the nursing process, with conditions sufficient for determining nursing quality outcomes.

2.1.2. Exclusion criteria

- (1) Complicated with severe congenital underlying diseases.
- (2) Complicated with malignant tumors or immune system diseases.
- (3) Complicated with abnormal mental development or mental disorders.
- (4) Missing hospitalization nursing records, making outcome determination impossible.
- (5) Transfer to another hospital or loss to follow-up during hospitalization.

2.2. Methods

2.2.1. Data collection

Two categories of research data were collected through the hospital information system, pediatric ward nursing management archives, inpatient nursing documents, and monthly nursing quality audit records. The first category was baseline data of the children, including age, sex, disease type, and length of hospitalization. The second category was data related to ward nursing operations and management, including the head nurse's tenure in the ward, registered seniority of nurses on duty, actual number of open beds in the ward, number of nurses on duty, records of hierarchical training, archived documents of the nursing risk early warning mechanism, nurse-patient communication registration records, and emergency response time registration books [2]. All data were independently extracted by two nursing researchers with intermediate professional titles who had received unified training. After double-checking for accuracy, the data were entered into a standardized research database. Cases with data completeness of less than 90% were excluded.

2.2.2. Survey instruments

The Pediatric Ward Nursing Quality Evaluation Scale issued by the China Nursing Quality Control Center in 2022 was adopted. The scale contains four dimensions—implementation of basic nursing, specialized nursing procedures, nursing safety management, and nursing service satisfaction—with a total of 32 items. Each item was scored using a Likert 5-point scale, with a total score ranging from 0 to 100. A higher score indicated better comprehensive nursing quality in the ward. This scale has been promoted and applied in pediatric nursing quality control work in multiple tertiary hospitals in China. In this study, the Cronbach's α coefficient was 0.921, and the content validity index was 0.946, demonstrating good reliability and validity.

A self-designed questionnaire on management measures of pediatric head nurses was also used. The researchers systematically reviewed the Robbins nursing management theoretical framework and high-level research findings related to pediatric nursing management both domestically and internationally, and completed the questionnaire design in combination with the actual operations of the pediatric ward in the medical institution where the study was conducted. The questionnaire included four survey dimensions: coverage rate of hierarchical training, completeness of the risk early warning mechanism, requirements for nurse-patient communication frequency, and regulations on emergency response time, with a total of 16 items. A percentage scoring system was adopted. The pre-survey results showed that the Cronbach's α coefficient of the questionnaire was 0.876, and the content validity index was 0.913, meeting the reliability and validity requirements for research instruments.

2.2.3. Quality control

Before data extraction, all researchers received unified training to clarify the definitions and extraction standards of each variable. After data entry was completed, 15% of the samples were randomly selected for

re-verification to ensure a data entry accuracy rate of 100%. The administration of all survey instruments strictly followed standardized procedures to avoid result bias caused by human factors ^[3].

2.3. Statistical methods

SPSS 26.0 software was used for data analysis in this study. Continuous data were expressed as mean $\pm$ standard deviation, and between-group comparisons were performed using independent-samples *t*-tests. Categorical data were expressed as case numbers and percentages, and between-group comparisons were performed using the χ^2 test. Univariate analysis was used to compare differences among groups with different characteristics or scale thresholds, with $p < 0.05$ considered statistically significant. Variables that showed statistically significant differences in the univariate analysis were included in multivariate logistic regression analysis to screen for independent influencing factors of the study outcomes ^[4].

3. Results

3.1. Occurrence of outcome events and group description

The nursing quality scores of the wards where the 150 hospitalized children in this study were located ranged from 72 to 96 points, with a mean score of (86.24 ± 5.17) points. Based on the nursing quality score threshold, the patients were divided into two groups. Those with scores ≥ 85 points were assigned to the high nursing quality group, totaling 92 cases, accounting for 61.33% of the total sample. Those with scores < 85 points were assigned to the low nursing quality group, totaling 58 cases, accounting for 38.67% of the total sample.

3.2. Univariate analysis results

The univariate analysis results showed that head nurse management duration, coverage rate of hierarchical training, completeness of the risk early warning mechanism, frequency of nurse-patient communication, emergency response time, nurse seniority, and ward bed-to-nurse ratio were associated with pediatric ward nursing quality, whereas age, sex, and disease type of the children were not associated with pediatric ward nursing quality. See **Table 1**.

Table 1. Univariate analysis results of the two study groups [n (%)]

Item	Category	High nursing quality group (n = 92)	Low nursing quality group (n = 58)	χ^2 value	<i>p</i> value
Gender	Male	51 (55.43)	32 (55.17)	0.001	0.974
	Female	41 (44.57)	26 (44.83)		
Age	< 3 years	47 (51.09)	31 (53.45)	0.079	0.779
	≥ 3 years	45 (48.91)	27 (46.55)		
Disease type	Respiratory system	42 (45.65)	26 (44.83)	0.050	0.975
	Digestive system	33 (35.87)	21 (36.21)		
	Nervous system	17 (18.48)	11 (18.97)		
Head nurse management duration	≥ 5 years	62 (67.39)	25 (43.10)	8.712	0.003
	< 5 years	30 (32.61)	33 (56.90)		
Hierarchical training coverage rate	$\geq 80\%$	71 (77.17)	24 (41.38)	19.488	< 0.001
	< 80%	21 (22.83)	34 (58.62)		

Item	Category	High nursing quality group (n = 92)	Low nursing quality group (n = 58)	χ^2 value	p value
Completeness of risk early warning mechanism	≥ 90 points	68 (73.91)	20 (34.48)	22.441	< 0.001
	< 90 points	24 (26.09)	38 (65.52)		
Frequency of nurse-patient communication	≥ 2 times/day	76 (82.61)	27 (46.55)	20.766	< 0.001
	< 2 times/day	16 (17.39)	31 (53.45)		
Emergency response time	≤ 5 min	65 (70.65)	23 (39.66)	13.850	< 0.001
	> 5 min	27 (29.35)	35 (60.34)		
Average seniority of nurses	≥ 3 years	59 (64.13)	24 (41.38)	7.495	0.006
	< 3 years	33 (35.87)	34 (58.62)		
Ward bed-to-nurse ratio	≥ 0.4	63 (68.48)	22 (37.93)	13.379	< 0.001
	< 0.4	29 (31.52)	36 (62.07)		

3.3. Explanation of variable assignment

The pediatric ward nursing quality grouping was taken as the dependent variable, and variables with statistically significant differences in the univariate analysis were taken as independent variables for assignment. The specific assignment scheme is shown in **Table 2**.

Table 2. Variable assignment

Variable	Assignment
Nursing quality group	Low nursing quality group = 0; High nursing quality group = 1
Head nurse management duration	< 5 years = 0; ≥ 5 years = 1
Hierarchical training coverage rate	< 80% = 0; $\geq 80\%$ = 1
Completeness of risk early warning mechanism	< 90 points = 0; ≥ 90 points = 1
Frequency of nurse-patient communication	< 2 times/day = 0; ≥ 2 times/day = 1
Emergency response time	> 5 min = 0; ≤ 5 min = 1
Average nursing seniority	< 3 years = 0; ≥ 3 years = 1
Ward bed-to-nurse ratio	< 0.4 = 0; ≥ 0.4 = 1

3.4. Results of multivariate analysis

Variables with statistically significant differences in the univariate analysis were included in a multivariable logistic regression analysis. The results showed that hierarchical training coverage rate, degree of refinement of the risk early-warning mechanism, frequency requirements for nurse-patient communication, stipulated emergency response time, and ward bed-to-nurse ratio allocation were independent influencing factors for nursing quality in pediatric wards. See **Table 3**.

Table 3. Results of multivariable Logistic regression analysis of factors influencing nursing quality in pediatric wards

Influencing factor	Regression coefficient	Standard error	Wald χ^2 value	p	OR value	95% CI
Hierarchical training coverage rate $\geq 80\%$	1.178	0.416	8.013	0.005	3.248	1.439–7.331
Completeness of risk early warning mechanism ≥ 90 points	1.325	0.452	8.594	0.003	3.762	1.552–9.118

Influencing factor	Regression coefficient	Standard error	Wald χ^2 value	<i>p</i>	OR value	95% CI
Frequency of nurse-patient communication ≥ 2 times/day	0.987	0.394	6.273	0.012	2.683	1.241–5.802
Emergency response time ≤ 5 min	0.864	0.372	5.392	0.020	2.373	1.144–4.922
Ward bed-to-nurse ratio ≥ 0.4	1.241	0.437	8.068	0.004	3.459	1.469–8.143

4. Discussion

Pediatrics is a special clinical unit serving minors. The quality of nursing services directly affects disease outcomes, medical safety, and family members' healthcare experience of hospitalized children, and it serves as a core indicator for measuring the comprehensive capacity of pediatric medical services. With the continuous rise in public demand for children's health services, the homogenization and refinement of pediatric nursing quality have become core tasks in the high-quality development of the pediatric medical system^[5]. As the primary person responsible for nursing management in pediatric wards, the head nurse's management strategies directly determine the efficiency of nursing resource allocation and the service effectiveness of the nursing team. Clarifying the core influencing factors under the head nurse's management dimension is of great practical significance for precisely optimizing pediatric nursing management rules. By analyzing the nursing quality and related management factors in wards where hospitalized children were treated, and after adjusting for confounding factors, this study identified five independent influencing factors related to pediatric nursing quality, providing empirical evidence for the refined adjustment of pediatric nursing management^[6].

The coverage rate of tiered training is one of the primary management factors affecting pediatric nursing quality. Pediatric nursing is characterized by strong specialty orientation, refined operational requirements, and numerous risk points. Nurses with different years of experience and at different levels differ considerably in specialty nursing competence and emergency response capability. Insufficient coverage of tiered training can easily lead to stratification of the nursing team's service capacity. Problems such as non-standardized operations and inadequate risk identification among junior nurses directly reduce the overall nursing quality of the ward. A well-established tiered training system can match training content to nurses' competency levels: junior nurses focus on basic nursing operations, specialty nursing routines, and nurse-patient communication skills, while senior nurses focus on complex case nursing, emergency response, and nursing quality control. When training coverage reaches a high level, the competence of the entire nursing team can be homogenized, effectively compensating for quality shortcomings caused by individual differences. In clinical management, head nurses can incorporate the coverage rate of tiered training into core management assessment indicators, formulate individualized training plans based on the competency structure of the ward nursing team, and establish a closed-loop management mechanism of training-assessment-practice to ensure that training content is actionable and can be translated into actual nursing competence, avoiding formalistic training^[7].

The degree of completeness of the risk early warning mechanism is the core management support for ensuring pediatric nursing safety. Pediatric patients are generally young, unable to accurately express their discomfort, and their conditions progress rapidly and insidiously, making risk identification far more difficult than in adult wards. A well-developed nursing risk early warning mechanism can standardize the

identification points, handling procedures, and reporting pathways for common risks in pediatric wards, such as falls from bed, aspiration, medication errors, and sudden changes in condition. This helps nurses quickly identify potential risks in daily nursing work and take early interventions, thereby reducing the occurrence of nursing adverse events at the source ^[8]. At the same time, a complete risk early warning mechanism enables stratified management of nursing risks, allowing corresponding nursing measures to be taken for children with different risk levels, rationally allocating nursing resources, and improving the precision of risk prevention and control. In clinical practice, head nurses can periodically review and update the risk early warning checklist based on the characteristics of diseases treated in the ward, organize all staff for risk early warning training, establish a non-punitive risk reporting incentive mechanism, encourage nurses to proactively report potential risks, dynamically adjust warning thresholds, and continuously optimize the adaptability of the risk early warning system.

Requirements for the frequency of nurse-patient communication are an important management lever for improving pediatric nursing service satisfaction and reducing nurse-patient conflicts. Family members of hospitalized pediatric patients generally have higher anxiety levels than those of adult patients, and they also demand greater transparency and responsiveness in nursing services. Insufficient nurse-patient communication can easily lead to misunderstandings due to information asymmetry, lower trust in nursing work, and even trigger nurse-patient disputes. Adequate communication frequency allows family members to promptly understand changes in the child's condition, the purpose of nursing measures, and precautions for home care, thereby enhancing their cooperation with nursing work. At the same time, through communication with family members, nurses can promptly detect abnormal manifestations in children that have not been observed, improving the comprehensiveness of condition observation. In clinical management, head nurses can specify communication standards for children with different diseases and at different stages of illness, standardize core communication content such as admission notification, condition updates, and discharge guidance, and strengthen nurses' communication skills training. Nurses should be guided to conduct effective communication, avoiding excessive time consumed by ineffective communication, and balancing communication quality with nursing efficiency.

Regulations on emergency response time are a key management requirement for ensuring the effectiveness of handling acute and critical events in pediatrics. Pediatric wards are prone to sudden emergencies such as febrile seizures, aspiration, drug allergy, and respiratory arrest. The time window for handling such events is extremely narrow; delayed response can lead to serious adverse consequences and even endanger the child's life. Clear emergency response time requirements can drive the nursing team to optimize emergency handling procedures, prepare emergency supplies, and clarify personnel responsibilities in advance, and ensure that nurses can arrive promptly to initiate treatment when emergencies occur, minimizing the severity of adverse events and safeguarding children's lives. At the same time, standardized emergency response can enhance family members' trust in the nursing team and reduce nurse-patient conflicts caused by delayed emergency handling ^[9]. In clinical management, head nurses can regularly organize emergency response drills for all staff, optimize the placement of emergency supplies, clarify job responsibilities for different emergency events, and periodically assess nurses' emergency response speed and handling capability, ensuring that all emergency response requirements are implemented.

The ward bed-to-nursing staff ratio allocation is the basic prerequisite for ensuring the implementation of various nursing measures. The workload of pediatric nursing is much higher than that of adult wards.

In addition to routine nursing operations, a considerable amount of time must be spent on family health education and emotional soothing of children. If the bed-to-nursing staff ratio is insufficient, nurses will be responsible for too many children per capita. Excessive workload can easily lead to omissions in nursing operations, delayed condition observation, and inadequate communication, directly reducing nursing quality. An adequate bed-to-nursing staff ratio ensures that nurses have sufficient time and energy to provide refined nursing services for the children under their care, ensuring that nursing routines and risk prevention measures are implemented. This reduces quality shortcomings caused by insufficient manpower. In clinical management, head nurses can dynamically assess the number of children in the ward and the severity of their conditions, flexibly allocate nursing manpower, and promptly apply for additional mobile manpower during peak seasons for respiratory and digestive diseases, avoiding long-term overload of nurses and safeguarding the work efficiency and service quality of the nursing team.

The five independent influencing factors identified in this study are all variables that can be regulated at the head nurse management level. They do not rely on high-end medical equipment or substantial financial investment, and they possess strong operability, offering a reference for optimizing pediatric nursing management in medical institutions at different levels. In clinical practice, each pediatric ward can examine its own management shortcomings against the above factors and formulate targeted improvement plans for weak links. It is not necessary to replicate a uniform improvement model; instead, wards can prioritize shortcoming indicators that require small investment and yield quick results based on their actual situation, gradually improving overall nursing quality^[10]. Identifying these influencing factors can also provide a reference for optimizing the pediatric nursing quality control system. Incorporating these indicators into the core assessment scope of pediatric nursing quality control can facilitate the shift from outcome-based quality control to process-based quality control, intervening in advance in risk factors that may affect nursing quality and enhancing the forward-looking nature of nursing quality control.

This study has certain limitations. First, it is a single-center retrospective study with a limited sample size. The subjects only included hospitalized children with common diseases of the respiratory, digestive, and nervous systems, and did not include children with critical illnesses or diseases of other systems, which may introduce selection bias and limit the generalizability of the findings. Second, this study only included explicit indicators of head nurse management and did not include implicit management variables such as head nurse management style, nursing team cohesion, and compensation incentive mechanisms, which may have led to the omission of some potential influencing factors. Future multicenter, large-sample prospective studies are warranted to include more implicit management variables, further verify the reliability of the results, and provide more sufficient evidence-based support for optimizing the pediatric nursing management system.

5. Conclusion

This study shows that the coverage rate of tiered training, the degree of completeness of the risk early warning mechanism, requirements for the frequency of nurse-patient communication, regulations on emergency response time, and ward bed-to-nursing staff ratio allocation are all independent influencing factors of nursing quality in pediatric wards. Meeting these indicators may have a protective effect on improving nursing quality. Clinically, pediatric head nurse management rules can be optimized in response to these factors, nursing manpower and resource allocation can be adjusted, and related work standards and

assessment requirements can be improved. The results of this study can provide a reference for optimizing the pediatric nursing quality control system and improving nursing service quality, helping to ensure the medical safety of hospitalized children and improve family members' healthcare experience.

Disclosure statement

The author declares no conflict of interest.

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