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Standardized Management of Intravenous Infusion of High-risk Drugs in the Emergency Department

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Abstract: *Objective:* To collect the nursing staff who manage high-risk intravenous infusion drugs in the emergency department of our hospital from 2023.7 to 2025.7. *Methods:* The total sample size is 32 cases. They will implement routine management before July 2024 and define them as the control group; those who will implement standardized management after July 2024 will be defined as the observation group. Evaluate the implementation of management processes between groups, management effectiveness indicators, management quality scores and medical staff satisfaction scores. *Results:* The observation group had higher management process execution scores than the control group, P<0.05. The response time for problem rectification in the observation group was shorter than that in the control group, and the number of monthly quality analysis reports, process optimization suggestions, and cross-department collaboration scores in the observation group were higher than those in the control group, P<0.05. The management quality score of the observation group was higher than that of the control group, P<0.05. The satisfaction score of medical staff in the observation group was higher than that in the control group, P<0.05. *Conclusion:* The implementation of standardized management in the management of high-risk intravenous infusion drugs in emergency departments is of significant value in promoting the implementation of management processes, improving management efficiency and quality, and improving the satisfaction of medical staff.

Keywords : Emergency department; high-risk intravenous infusion drugs; standardized management; management process; management efficiency; management quality; satisfaction

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1. Introduction

The emergency department is the core unit of the hospital's critical and critical treatment. The frequency of use and management difficulty of high-risk intravenous infusion drugs are significantly higher than that of ordinary departments. Drugs have the characteristics of narrow therapeutic window, strong side effects, and high requirements for dosing accuracy. Minor management oversights can lead to serious adverse consequences [1]. Currently, problems such as fragmented drug management processes, lagging risk prevention and control, and poor cross-departmental collaboration are common in domestic emergency departments. The traditional empirical management model is no longer able to meet clinical safety needs [2]. Relevant studies have shown that the application of standardized management in high-risk intravenous infusion drugs in emergency departments can improve medication safety and management efficiency by

building a systematic plan covering process optimization, quality monitoring, multidisciplinary collaboration and personnel training [3]. This study adopted a before-and-after control design, taking management process execution, efficiency indicators, quality scores and staff satisfaction as evaluation dimensions to provide a practical basis for the standardization of high-risk drug management in emergency departments.

2. MateriALS AND METHODS

2.1. General information

The 32 nursing staff who managed high-risk intravenous infusion drugs were all included in the period from 2023.7 to 2025.7, and they were all female; the age threshold was 25-45 years old, and the mean was (35.70±6.57) years old. The baseline data of the two groups were balanced, P>0.05.

2.1.1. Inclusion criteria

Nursing staff engaged in the management of high-risk intravenous infusion drugs in the emergency department of our hospital; working in the emergency department for ≥ 1 year and having the ability to independently perform intravenous infusion operations; holding a valid nurse practitioner qualification certificate and passing the in-hospital drug management training assessment; voluntarily participating in the study and signing an informed consent form.

2.1.2. Exclusion criteria

Those who were transferred from the emergency department or on long-term leave during the study; those who have suffered serious adverse events due to improper management of high-risk drugs in the past year; those who are unable to complete the full follow-up and data collection due to resignation or other reasons; those who are pregnant or lactating nurses, or have mental illness, cognitive impairment, etc. that affect research cooperation; those who have not passed the standardized management training assessment.

2.2. Method

The control group carries out routine management, and nursing staff perform intravenous infusion operations of high-risk drugs according to routine procedures. Daily management is based on empirical operations. Problem rectification adopts a passive response method and individual cases are handled for adverse events that have occurred. The training content focuses on basic operations.

The observation team carried out standardized management: (1) Standardized process construction: Establish operating specifications for the entire process of intravenous infusion of high-risk drugs, covering key links such as drug configuration, infusion speed control, flushing operations, and adverse reaction handling. A graphic operating manual was developed to clarify the technical points and risk control measures of each step. A two-person verification system is established. Two nurses must jointly check patient information, drug dosage, and infusion parameters before drug dispensing and infusion. An electronic medical order system is introduced to achieve closed-loop management of the drug administration process and avoid human errors. (2) Dynamic quality monitoring and improvement: A full-time quality control team is established to conduct special inspections on the management of high-risk drugs every week, covering aspects such as system implementation, operating specifications and record integrity. The PDCA cycle model is adopted to summarize and analyze quality control data every month, and formulate improvement plans for high-frequency problems. (3) Cross-department collaborative management: Jointly form a multidisciplinary management team with the pharmacy, medical and nursing departments, hold regular joint meetings to coordinate and resolve process bottlenecks, and clarify the boundaries of responsibilities of each department. The pharmacy department is responsible for reviewing drug compatibility contraindications, the medical department participates in the formulation of emergency plans, and the nursing department leads operational training and assessment. Establish a standardized handover template, and make the

use of high-alert drugs (such as patient, drug name, remaining dose, and infusion rate) a must-check content at the bedside handover to ensure the seamless transmission of high-risk drug information when patients transfer to departments or shifts. Implement a case discussion system and organize multidisciplinary consultations for complex cases to optimize dosing plans. (4) Hierarchical training and ability improvement: Design a stepped training system, with the basic layer covering drug characteristics and infusion specifications, and further layers strengthening risk assessment and emergency response capabilities. A teaching model that combines scenario simulation and case analysis is used to conduct practical exercises every quarter. A tutor responsibility system is implemented, with senior nurses providing one-on-one guidance to new recruits. After training, they must pass the theoretical assessment and operational skills certification before they can operate independently. Those who fail to meet the standards need to be retrained and re-evaluated. (5) Incentive mechanism and continuous improvement: Incorporate process execution, reporting of adverse events and improvement suggestions into performance appraisals, select management pacesetters and share outstanding cases every month, and create a positive competitive atmosphere. Colleagues from the Pharmacy Department conduct a systematic review of the management of high-alert medications in the emergency department every month and provide professional advice. At the same time, frontline staff are encouraged to put forward process optimization suggestions, special rewards are given to those who are adopted, satisfaction surveys are conducted every six months, and management strategies are dynamically adjusted according to the demands of medical staff.

2.3. Observation indicators

Evaluate the implementation of the management process, including four dimensions: completeness of system documents, completeness of emergency plans, compliance with quality monitoring frequency, and completion of training plans. The full score for each item is 100 points.

Evaluate management effectiveness indicators, including problem rectification response time, number of monthly quality analysis reports, number of process optimization suggestions, and cross-department collaboration scores.

Evaluate the quality of management, including four dimensions: risk management, quality control, team building, and innovation management. The full score for each item is 100 points.

Evaluate the satisfaction of medical staff, including four dimensions: process rationality, operational convenience, professional skill improvement, and training effect. Each item is scored 25 points, with a total score of 100 points.

2.4. Statistical methods

The calculation software used for relevant data is SPSS25.0. The implementation of management processes, management efficiency indicators, management quality scores and medical staff satisfaction scores are all measurement data, described by ($\bar{x}$ ±s), and t-value test. P<0.05 is statistically significant.

3. Results

3.1. Compare the two groups' management process execution scores

The management process execution score of the observation group was higher than that of the control group, P<0.05. See **Table 1** for details.

3.2. Compare the two groups of management effectiveness indicators

The response time for problem rectification in the observation group was shorter than that in the control group, and the number of monthly quality analysis reports, process optimization suggestions, and cross-department collaboration scores in the observation group were higher than those in the control group, P<0.05. See **Table 2** for details.

Table 1. Comparison of management process execution scores ($\bar{x}$±s)

Group	n	Integrity of institutional documents	Completeness of emergency plans	Quality monitoring frequency meets standard	Training program completed
Control group	16	84.34±5.67	83.23±6.45	80.67±7.23	84.12±6.78
Observation group	16	92.56±3.45	92.34±4.56	90.45±5.34	93.67±4.23
t	--	4.954	4.613	4.352	4.780
P	--	0.000	0.000	0.000	0.000

Table 2. Comparison of management effectiveness indicators ($\bar{x}$±s)

Group	n	Problem rectification response time (days)	Number of monthly quality analysis reports	Number of process optimization suggestions	Cross-department collaboration scoring
Control group	16	3.45±1.28	2.34±0.78	1.67±0.45	82.67±7.23
Observation group	16	1.62±0.53	4.56±1.23	3.89±1.23	90.45±5.34
t	--	5.284	6.097	6.780	3.462
P	--	0.000	0.000	0.000	0.002

3.3. Compare the management quality scores of the two groups

The management quality score of the observation group was higher than that of the control group, P<0.05. See Table 3 for details

Table 3. Comparison of management quality scores ($\bar{x}$±s)

Group	n	Risk management	Quality control	Team building	Innovation management
Control group	16	85.63±5.62	85.34±6.17	85.12±6.25	80.52±8.36
Observation group	16	94.56±6.12	92.12±4.63	90.36±5.22	88.65±6.43
t	--	4.299	3.516	2.579	3.083
P	--	0.000	0.001	0.015	0.004

3.4. Compare the satisfaction level of medical staff between the two groups

The satisfaction score of medical staff in the observation group was higher than that in the control group, P<0.05. See **Table 4** for details

Table 4. Comparison of satisfaction scores ($\bar{x}$±s)

Group	n	Process rationality	Ease of operation	Professional skills improvement	Training effect	Total score
Control group	16	20.33±2.45	20.50±2.67	19.67±3.12	21.17±2.34	81.67±6.45
Observation group	16	22.33±1.23	22.50±1.56	22.33±1.45	23.17±1.12	90.33±6.82
t	--	2.918	2.587	3.093	3.084	3.670
P	--	0.007	0.015	0.004	0.004	0.001

4. Discussion

High-risk intravenous infusion drugs in the emergency department mainly include vasoactive drugs, antiarrhythmic drugs, chemotherapy drugs, and hypertonic solutions. Their pharmacological effects are strong and their effects are rapid. Configuration errors, infusion speed deviations, or monitoring oversights during the administration process may cause serious adverse events [4]. The management of this type of drugs needs to meet both rescue timeliness requirements and medication accuracy standards, posing dual challenges to the professionalism and process standardization of nursing staff [5]. Due to the high-load operation characteristics of the current emergency environment and the complex and changeable patient conditions, establishing a standardized management system that adapts to the characteristics of emergency work has become an urgent need to ensure medication safety and improve the quality of treatment [6]. Routine management mostly relies on individual experience and basic operating procedures and lacks systematic risk prevention and control design. Problem handling is mainly based on passive responses. Quality monitoring remains at formal spot checks. Training content fails to be in-depth based on the characteristics of high-risk drugs. The fragmented management model is difficult to cover risk points in the entire chain of drug configuration, infusion, and monitoring, resulting in the accumulation of hidden dangers and lagging improvements [7]. Standardized management achieves full-process closed-loop management of high-risk drugs by building a standardized operating system, a dynamic quality monitoring network and a multidisciplinary collaboration mechanism. The core purpose is to replace experience dependence with institutional constraints, make up for post-event remediation with pre-emptive prevention and control, and break through departmental barriers with team collaboration [8]. Specific advantages are reflected in three aspects. At the process level, human errors are eliminated through double-person verification and the electronic medical order system; at the quality control level, continuous improvement is achieved by relying on the PDCA cycle; at the training level, stepped teaching is used to improve risk response capabilities, and systematic management transforms discrete operations into a coherent behavioral chain, forming a traceable and quantifiable safety barrier [9].

The results showed that the management process execution score of the observation group was higher than that of the control group, $P<0.05$. The response time for problem rectification in the observation group was shorter than that in the control group, and the number of monthly quality analysis reports, process optimization suggestions, and cross-department collaboration scores in the observation group were higher than those in the control group, $P<0.05$. The management quality score of the observation group was higher than that of the control group, $P<0.05$. The satisfaction score of medical staff in the observation group was higher than that in the control group, $P<0.05$. Analysis of reasons: The construction of standardized processes solves the problem of random operations through graphic manuals and parameter verification; the weekly inspection and monthly analysis system of a full-time quality control team ensures early detection and early intervention of risks; multidisciplinary team collaboration optimizes the efficiency of decision-making on drug compatibility and dosing regimens; hierarchical training and mentorship effectively fill the knowledge and skill gaps of nursing staff[10]. In particular, electronic closed-loop management fundamentally eliminates the disconnect between delivery and execution of medical orders, while the quality and safety points system promotes the consciousness of standard implementation through positive incentives. Systematic integration constitutes a key driver for improving management efficiency.

In summary, the implementation of standardized management in the management of high-risk intravenous infusion drugs in the emergency department has significant value in promoting the implementation of management processes, improving management efficiency and quality, and improving the satisfaction of medical staff.

Disclosure statement

The author declares no conflict of interest.

References

[1] Yan X, Yu KY, He C, 2025, Application of Nursing Management Model Based on Swiss Cheese Model in Safe Medication Use in Emergency Departments. *China Health Industry*, 22(19): 139-141+150.

[2] Jin CJ, Wang YT, 2025, Discussion on Risk Management and Medical Quality Management of Traditional Chinese Medicine Injection in the Emergency Department of a Hospital. *Journal of Traditional Chinese Medicine Management*, 33(16): 192-194.

[3] Wu R, Yu DF, 2025, Practice of Special Risk Management to Improve the Rational Use of Chinese Patent Medicines in Emergency Departments. *Journal of Traditional Chinese Medicine Management*, 33(15): 49-51.

[4] Yan X, Yu KY, He C, 2025, Application of Risk Prevention Management Under the Guidance of Hain's Law in Emergency Department Nursing Management. *China Health Industry*, 22(13): 189-191+196.

[5] Xu C, Chen B, Chen W, et al., 2025, Evaluation of the Effectiveness of Emergency Intravenous Glucocorticoid Management Based on Rational Drug Use System Prescription Review. *Chinese Prescription Drugs*, 23(12): 41-45.

[6] Wei CH, Li LZ, 2025, Observation on the Effect of Applying Drug Therapy Management Model in Intravenous Antimicrobial Drug Management in Emergency Departments. *Chinese Journal of Drug Abuse Prevention and Control*, 31(6): 1044-1046.

[7] Zhou L, 2021, Observation on the Effect of Safety Management on the Application of High-Risk Drugs in General Emergency Departments. *Journal of Traditional Chinese Medicine Management*, 29(13): 201-203.

[8] Xu T, Wang YJ, Zhang JP, et al., 2025, Application of Integrated Medical and Nursing Management in the Safe Use of Chinese Patent Medicines in Emergency Departments. *Journal of Traditional Chinese Medicine Management*, 33(7): 131-133.

[9] Chen Q, Feng MP, 2023, Application of Standardized Management Based on JCI System in the Management of High-Risk Drugs in Neurology. *Journal of Traditional Chinese Medicine Management*, 31(5): 116-118.

[10] Han CY, 2022, Analysis of Influencing Factors on Emergency Department Nurses' Cognition of Intravenous Infusion of High-Risk Drugs. *Chinese and Foreign Medical*, 41(15): 124-128+133.