

Original Article

Practical value analysis of nursing risk management in intravenous drug allocation

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Abstract: Objective: To explore the practical value of nursing risk management in intravenous drug allocation. Methods: A total of 1200 patients who received infusion therapy in our hospital were prospectively selected and divided into an observation group (n=600) and a control group (n=600) using a random number table method. The former was given nursing risk management, while the control group was not. The incidence rate of intravenous infusion errors, the incidence rate of infusion reactions, the scores of near-miss items in pharmacy intravenous admixture services and subjective satisfaction were observed and compared between the two groups. Results: The incidence of intravenous infusion errors and infusion reactions in the observation group were lower than those in the control group (P<0.05), while the scores of near-miss items in pharmacy intravenous admixture services and subjective satisfaction were higher than those in the control group (P<0.05). Conclusion: Nursing risk management can reduce the incidence of errors in clinical pharmacy intravenous admixture services and the incidence rate of infusion reactions, improve infusion safety, and promote the improvement of the subjective satisfaction of patients.

Keywords: Nursing risk management, pharmacy intravenous admixture services, error incidence, the scores of near-miss items, subjective satisfaction

Introduction

Clinical medication is an important part of clinical therapy and treatment activities. Normally, drugs are mainly dispensed in the department where they are located, with certain safety risks (drug failure, type and dose mismatch, etc.) [1-4]. In order to solve the above problems, hospitals at all levels have established Pharmacy Intravenous Admixture Services (PIVAS) to manage the intravenous drugs in the whole hospital, including antibiotics, clinical adjuvant drugs, enteral and parenteral nutrition, and chemotherapeutic drugs [5-8]. Compared with the previous self-dispensing in clinical departments, this move not only meets the international quality control requirements, but also has the advantages of improving the rationality of medication, enhancing the occupational protection of dispensing nurses and reducing medical costs. Therefore, it has become the first-line choice for clinical medication and has obtained a good use effect [9, 10].

With the wide application of PIVAS, the factors affecting dispensing safety such as large load, complicated work, and shortage of nursing staff are also exposed during actual use [11, 12]. Therefore, the implementation of risk management for nursing staff has important practical application significance for improving the safety of clinical medication administration. Risk management is an important management method to improve the quality of the industry based on the identification of potential risks in the industry and targeted measures, and it is widely used in various fields [13]. Previous research studies of PIVAS have mostly focused on the medical side but lacked subjective evaluation on the patient side [14]. Based on this, this study implemented nursing risk management measures in PIVAS in our hospital, aiming to explore the role of nursing risk management in improving the safety of clinical medication, in order to provide a potential research direction for improving the application value of PIVAS.

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Material and methods

General data

A total of 1200 patients who received infusion therapy in our hospital from June 2020 to December 2020 were selected, among whom 600 patients were randomly selected as the control group from June 2020 to September 2020, and 600 patients were randomly selected as the observation group from September 2020 to December 2020 and were given nursing risk management. Inclusion criteria: Infusion was performed in the emergency infusion room of our hospital; patients who received PIVAS infusion for the first time in our hospital; age >18 years. Exclusion criteria: Coma; unable to communicate normally; and patients with a history of previous neurological diseases. Patients and their families in the control group and observation group gave informed consent for this study and signed the consent form. This study was approved by the Ethics Committee of our hospital.

Method

The observation group was given nursing risk management measures, while the control group was not. Specific methods: Referring to the previous study results and combining with the actual situations of our center, the potential risk factors and problems of pharmacy intravenous admixture services were identified [15]. It mainly includes the following points: Nursing staff factors: due to the small number of nursing staff and more drugs, the nursing staff has high work intensity and work time, which easily leads to inaccurate dispensing due to difficulty in concentrating; nursing staff do not carry out dispensing operation according to relevant rules and regulations, and there are unreasonable or even unsafe behaviors; poor working environment, a lot of equipment, noise, which easily causes staff irritability; insufficient awareness of the risks of tumor-related drugs and inadequate protective measures; errors occurring in the process of placement process, such as: failure to effectively distinguish similar drug names, strengths, packaging, etc., resulting in wrong placement, placement omission, etc.

The main nursing interventions are as follows: Increase the number of nursing staff (5 nursing staff) while improving the utilization rate of human resources, such as the combination of nurses with long past service/nurses with

short past service (ratio 1:3), combined with the experience of the former to solve any unreasonable intervention of medical orders and the ability to solve difficult problems in clinical practice and the advantages of young nursing staff in terms of allocation speed to obtain good results; improve the relevant rules and regulations of the relevant allocation center, increase the cognitive learning (mainly about static quality control) and strict implementation, complete the learning in the form of examination paper assessment, and carry out a certain degree of reward and punishment mechanisms when necessary; strengthen the learning and treatment measures of occupational exposure related knowledge, regularly (once a month) carry out occupational exposure drills for cancer drugs; relevant identification (using gray, yellow, red, green and other labels) for similar drugs prone to errors which are placed separately to reduce the risk of errors; organize relevant business study (no less than four times a month), master the latest developments of PIVAS and apply them to practical work, so as to keep pace with the times and continuously improve them; improve the nursing process and rules and regulations, so as to master the information of each patient and improve the quality of care.

Outcome measures

Primary outcome measures: Compare the incidence rate of pharmacy intravenous admixture services error (consult the statistics for number of pharmacy intravenous admixture services error registration book)/consult the nursing infusion adverse reaction record book to count its incidence rate (digestive system, nervous system, skin allergic reactions) = number of cases/600*100%.

Secondary outcome measures: The scores of the operation test of near-miss items in pharmacy intravenous admixture services were investigated by questionnaire, and the main items included: drug placement (20 points), drug matching error (30 points) and check link (16 points); subjective patient satisfaction: after the end of infusion a satisfaction survey score was performed.

Data statistics

All data were analyzed using SPSS 22.0 software. The measurement data were expressed as mean \pm standard deviation ($\bar{x} \pm sd$), and independent sample t-test was used for com-

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Table 1. Comparison of baseline data between the two groups

Group	Control group	Observation group	t/ χ^2	P
Sex			1.335	0.248
Male	300	321		
Female	300	279		
Age (years)	50.1±12.9	48.9±13.6	1.568	0.117
Infusion time (h)	1.79±0.34	1.83±0.42	1.960	0.051
Infusion type			0.710	0.400
Outpatient	377	392		
Emergency	223	208		
Whether accompanied by family members			2.412	0.120
Yes	448	423		
No	152	177		
Numbers of infusions			0.944	0.331
Single	172	156		
Multiple	428	444		
Infusion reason and quantity (bag)			0.684	0.514
Infection	5220	5000		
Diarrhea	4600	3900		
Postoperative symptomatic treatment	19800	19700		
Adjuvant therapy related to internal medicine	19380	19400		

Table 2. Comparison of pharmacy intravenous admixture services personnel between the two groups

Group	Control group	Observation group	t/ χ^2	P
Sex			0.000	0.986
Male	4	4		
Female	16	22		
Age (years)	26.5±4.3	26.2±3.8	0.251	0.803
Nurse composition			0.078	0.780
Nurses with long past service	4	5		
Nurses with short past service	11	15		
Composition of personnel			0.039	0.844
Pharmacist	5	6		
Nurse	15	20		

(hypertension, diabetes) and diseases between the two groups (all $P>0.05$). As shown in **Table 1**.

Comparison of pharmacy intravenous admixture services personnel between the two groups during treatment

The results of this study showed that there was no statistically significant difference in the gender, age, nurse composition and personnel composition of the staff in the pharmacy intravenous admixture

services during the two time periods, with comparability (all $P>0.05$). See **Table 2** for details.

Comparison of the incidence rate of errors and infusion adverse reactions between the two groups

The results of this study revealed that the incidence rate of errors and adverse reactions in the observation group was lower than that in the control group (110/48000 vs 470/49000, $P=0.000$; 1/600 vs 10/600, $P=0.015$), preliminarily indicating that the nursing risk measures could reduce the incidence rate of adverse

parison between groups. Enumeration data were expressed as number of cases/percentage (n, %), and chi-square test was used for comparison of rates. A test criterion of $\alpha=0.05$ was also used. $P<0.05$ was considered statistically significant.

Results

Comparison of baseline data between the two groups

In the results of this study, there was no significant difference in gender, age, complications

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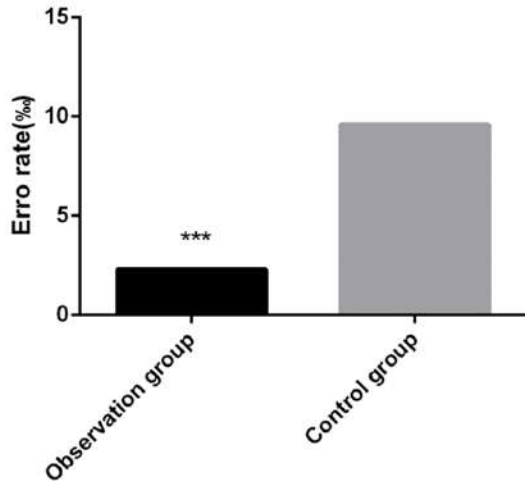


Figure 1. Comparison of error rate between the two groups. Compared with control group, *** $P < 0.001$.

events related to venous allocation to a certain extent. See **Figures 1** and **2** for details.

Comparison of operation scores of near-miss items in pharmacy intravenous admixture services between the two groups

The results of this study showed that the scores of near-miss items operation (drug placement, drug matching and check link) in pharmacy intravenous admixture services of the nursing staff in the observation group were superior to those in the control group ($P < 0.001$). As shown in **Table 3**.

Comparison of subjective satisfaction between the two groups

The results of this study revealed that the satisfaction rate of nursing care in the observation group was significantly better than that in the control group in the following three aspects, and the difference had statistical significance (all $P < 0.001$). See **Table 4** for details.

Discussion

Hospitals at all levels in clinical practice build pharmacy intravenous admixture services. On the one hand, they optimize the process of clinical medication and reduce the irrationality of dosing. At the same time, in combination with the professional knowledge of pharmacists, they carry out active and effective supervision on all medication in institutions, with the advantages of having high efficiency and high safety factor. Therefore, they are widely used in medical institutions at all levels [16, 17]. However,

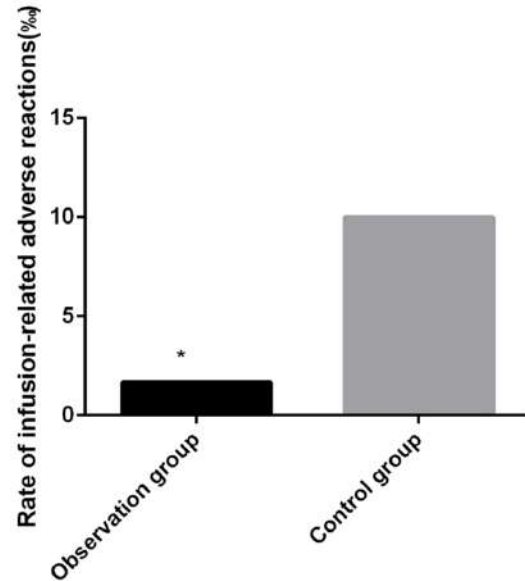


Figure 2. Incidence of adverse reactions between the two groups. Compared with control group, * $P < 0.05$.

due to the high carrier pressure of PIVAS, the work of nurses in pharmacy intravenous admixture services is cumbersome, as there are certain risks, which bring potential unsafe factors to patients' medication [18, 19].

Risk nursing management is a nursing method that has the potential of identifying the industry risks and using targeted measures to reduce the risk accordingly, and previous studies have confirmed its good practical value in clinical work [20, 21]. Practical risk nursing management in pharmacy intravenous admixture services can effectively avoid risks. Previous studies have preliminarily confirmed that the nursing risks in pharmacy intravenous admixture services mainly come from two aspects: the first is that personnel are few, the personnel allocation is unreasonable, in addition to the high work intensity, which easily leads to an error rate; the second is that the nursing staff do not follow the strict dispensing procedures during the dispensing process and can't follow the infusion requirements of various clinical departments, they do not strictly control the dispensing volume, there are too much or too little of a dose, ultimately affecting the clinical drug efficacy and increasing the incidence of adverse reactions of medication [22, 23]. The results of this study showed that after nursing risk control, increasing the number of nurses, optimizing human resources, implementing elastic scheduling to increase nursing rest time,

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Table 3. Comparison of operation scores of near-miss items in pharmacy intravenous admixture services

Group	Drug placement	Drug mismatch	Check link
Control group	15.3±2.9	20.1±2.3	12.2±1.9
Observation group	16.8±3.3	22.7±2.4	14.3±1.7
t	8.364	19.159	20.176
P	0.000	0.000	0.000

Table 4. Comparison of nursing satisfaction score between the two groups

Group	Nursing staff attitude	Nursing comprehensiveness	Operational skills
Control group	93.85±4.07	93.40±5.14	93.48±4.19
Observation group	95.47±4.38	94.40±4.75	95.73±4.64
t	6.637	3.500	8.816
P	0.000	0.000	0.000

so as to ensure the rest time of nursing staff and improve the effectiveness of the work. With this the medication error rate and the incidence of infusion adverse reactions in clinical pharmacy intravenous admixture services were significantly reduced, confirming that risk nursing management can reduce the incidence of clinical medication errors and adverse reactions, supporting the conclusions of previous studies [24, 25].

Previous studies have also preliminarily shown that the Chinese names and packaging have certain similarities, which leads to dispensing errors and checking links, thus affecting the mismatch. In this study, after taking nursing risk management, the learning of similar drugs was increased, the screening ability was improved, and by means of various identifications, the accuracy of dispensing and the accuracy of verification were increased, and finally the mismatch was reduced [26]. The results of this study also indicated that after the implementation of risk management, the scores of the above three links were significantly better than those in the control period, and similar study conclusions existed in the past [27].

In this study, we further analyzed the results of nursing risk management on clinical satisfaction survey, and the results showed that the satisfaction of patients in the observation group was superior to that of patients in the control group in all three dimensions. Compared with the pharmacy intravenous admixture services, which are regularly carried out in busi-

ness learning to improve the nursing business ability, we listened to the problems in the nursing work and handled them in time. Combined with regular dispatch learning, this finally improved the basic knowledge and business ability, thereby promoting the improvement of nursing quality, and then obtained good nursing satisfaction, which was similar to the previous study conclusions [28].

In summary, this study confirmed that the application of nursing risk management in pharmacy intravenous admixture services can effectively reduce the clinical error rate and the incidence of infusion adverse reactions, and improve the

operation item score of near-miss items in pharmacy intravenous admixture services and the subjective nursing satisfaction of patients. However, the number of individuals studied in this research was small and single-center, and it needs to be confirmed by a multi-center larger-sample randomized controlled study to confirm its clinical effect. In addition, how to further improve the standardized nursing measures in pharmacy intravenous admixture services is also the next research focus.

Disclosure of conflict of interest

None.

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