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Exploring the Intervention Value of Medical Institution Prescription Review Mechanism on the Rationality of Western Medicine Use

Wen Chen

Chunjiang People's Hospital, Xinbei District, Changzhou 213034, Jiangsu, China

Abstract: *Objective*: To explore the intervention value of the medical institution prescription review mechanism on the rationality of Western medicine use. *Methods*: A total of 159 patients (with 159 western medicine prescriptions) admitted to the hospital from January 2023 to December 2024 were selected and divided into an observation group (n=80, adopting the medical institution prescription review mechanism) and a control group (n=79, without prescription review) based on the random number table method. A comparative analysis was conducted on the work quality of medical personnel, irrational prescription drug use, and prescription drug dispensing situations. *Results*: The work quality of medical personnel in the observation group was significantly better than that in the control group ($P < 0.05$). The incidence of irrational prescription drug use in the observation group (22.50%) was significantly higher than that in the control group (7.59%) ($P < 0.05$). The observation group had fewer types of prescribed drugs, lower usage rates of injections and antibiotics, and a significantly higher usage rate of national essential drugs compared to the control group ($P < 0.05$). *Conclusion*: The prescription review mechanism can significantly improve the work quality of medical personnel, increase the detection rate of irrational drug use, reduce the types of prescription drugs and the use of injections and antibiotics, and promote the standardized application of national essential drugs, which has important intervention value.

Keywords: Medical institutions; Prescription review mechanism; Western medicine; Rationality of use; Intervention value

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1. Introduction

The prescription review mechanism in medical institutions, as a crucial aspect of pharmaceutical management, has increasingly prominent effects on regulating the use of Western medicine in recent years. Western medicine, as the primary means of clinical treatment, is directly related to disease treatment outcomes and patient safety. The demand for rational drug use is even more urgent in the management of complex diseases such as chronic illnesses and comorbidities [1]. In response to this background, multiple national policy documents, such as the "Measures for the Administration of Medical Institution Prescriptions" and the "Measures for the Clinical Application and

Management of Antibacterial Drugs," emphasize the importance of prescription review and require systematic prescription auditing and dynamic supervision to enhance the scientific and standardized nature of clinical medication [2]. However, there are still issues such as inconsistent review standards, inadequate implementation, and imperfect feedback loops in the specific implementation of the prescription review mechanism, affecting the sustainability and profoundness of intervention effects. Based on this, this study included 159 patients admitted to the hospital from January 2023 to December 2024 to explore the application effects of the medical institution prescription review mechanism, and the results are reported below.

2. Materials and methods

2.1. General information

A total of 159 patients (with 159 western medicine prescriptions) admitted to the hospital from January 2023 to December 2024 are selected as study subjects. Among the 79 patients in the control group, there are 40 males and 39 females, aged between 18 and 80 years, with a mean age of (57.68 ± 3.43) years. The prescription sources were: 31 from internal medicine, 20 from surgery, 15 from gynecology, and 13 from the emergency department. Among the 80 patients in the observation group, there are 42 males and 38 females, aged between 19 and 78 years, with a mean age of (57.76 ± 3.39) years. The prescription sources were: 34 from internal medicine, 18 from surgery, 14 from gynecology, and 14 from the emergency department. There are no statistically significant differences in baseline data between the two groups ($P > 0.05$). Patients and their families signed consent forms. Relevant written materials have been submitted to and approved by the ethics committee of the hospital.

The inclusion criteria of the study are: (1) Patients receiving Western medicine treatment; (2) No history of drug allergies; (3) Complete medical records. Meanwhile, the exclusion criteria are: (1) Patients with malignant tumors; (2) Patients with severe cardiopulmonary insufficiency; (3) Pregnant or breastfeeding women; (4) Patients with consciousness disorders or mental abnormalities.

2.2. Methods

The control group did not undergo prescription review, while the observation group is subjected to the application of the medical institution's prescription review mechanism. The specific methods are as follows:

(1) Review team construction: The directors of relevant departments served as team leaders, and a professional team is formed with associate chief physicians and senior pharmacists. The team held regular meetings every month to conduct special discussions on the latest medication guidelines, clinical hotspots, and adverse reaction reports, and timely revised the review system and process accordingly.

(2) First prescription review: The pharmacist conducted an initial review of the prescription within 24 hours, focusing on verifying the clinical diagnosis, medication indications, compatibility, contraindications, and safe dosages. If issues such as overdose, duplication, or mismatch of indications are found, prompt feedback is provided to the physician through written or electronic means, and the review opinions were archived.

(3) Dispensing review and dispensing confirmation: After completing the dispensing, the pharmacist double-checked the drug name, dosage form, specifications, and usage and dosage, focusing on checking the interaction risks of multi-drug combinations. After confirmation, the pharmacist explained the dosing regimen and precautions to the patient or family members to ensure compliance and safety.

(4) Error data statistics and in-depth analysis: Outpatient prescription data is exported through the electronic prescription system, and error types such as non-standard diagnosis, compatibility conflicts, and dosage errors were classified and counted. Regression analysis is conducted in combination with dimensions such as patient age, disease type, and department distribution to explore potential risk factors.

(5) Closed-loop rectification and continuous improvement: A rectification plan is developed based on the error analysis, such as improving diagnosis options, optimizing review rules, or updating the medication manual. The quarterly regular meetings reported on the progress and effectiveness of the rectification, invited physicians and pharmacists to discuss improvement strategies, and implemented re-examination for non-compliant links.

(6) Continuous professional training and ability improvement: Clinical and pharmaceutical experts are regularly invited to jointly conduct lectures and case studies on rational drug use, focusing on issues such as the risks of multi-drug combinations and dosage adjustments for special populations. The training effect is tested through online evaluations.

(7) Information support and intelligent warning: Collaborating with the information department to supplement and improve the electronic prescription system diagnosis database and review logic, adding intelligent warning and automatic interception functions to ensure that the review work is efficiently and traceably executed on the system side.

(8) Reward and punishment incentives and assessment closed-loop: Indicators such as prescription rationality rate and problem rectification rate are included in the performance appraisal of physicians and pharmacists. Those who performed well are commended and rewarded, while those who repeatedly violated the rules are interviewed or punished, forming a virtuous circle of positive incentives and restraints.

2.3. Observation indicators

(1) Work quality of medical personnel: An interview evaluation method is used to assess four dimensions: pharmacological knowledge, prescription review, communication skills, and prescription evaluation. Each dimension is scored on a 25-point scale, with a total score of 100 points. A higher score indicated better work quality.

(2) Irrational drug use in prescriptions: This included irrational combination of drugs, improper usage and dosage, repeated use of drugs, incomplete diagnosis writing, and excessively high grades of antibacterial drugs [3].

(3) Prescription drug dispensing situation: The types of drugs prescribed in the two groups are compared, and the usage rates of injections, antibiotics, and national basic drugs are counted.

2.4. Statistical methods

SPSS 22.0 is used to analyze the data. Measurement data with a normal distribution are expressed as ($\bar{x} \pm s$), and the Shapiro-Wilk test is performed. The independent samples t-test is used for comparison between groups. Count data are expressed as relative numbers and analyzed using the χ^2 test. A P-value < 0.05 is considered statistically significant.

3. Results

3.1. Comparison of work quality between the two groups of medical personnel

The work quality of medical personnel in the observation group was significantly better than that in the control group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of work quality between the two groups of medical personnel ($\overline{x} \pm s$, scores)

Group	Number (n)	Pharmacological knowledge	Prescription review	Communication skills	Prescription evaluation capability
Control group	79	20.25 ± 1.17	21.34 ± 1.18	21.03 ± 0.96	3.53 ± 0.62
Observation group	80	22.31 ± 1.22	23.87 ± 1.02	23.24 ± 0.91	4.25 ± 0.38
t	-	10.864	14.469	14.899	8.841
P	-	＜ 0.001	＜ 0.001	＜ 0.001	＜ 0.001

3.2. Comparison of irrational drug use in prescriptions between the two groups

The incidence of irrational drug use in prescriptions in the observation group (22.50%) was significantly higher than that in the control group (7.59%) ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of irrational drug use in prescriptions between the two groups [n(%)]

Group	Cases (n)	Inappropriate polypharmacy	Incorrect dosage/ Administration	Therapeutic duplication
Control Group	79	2 (2.53%)	1 (1.27%)	1 (1.27%)
Observation Group	80	4 (5.00%)	3 (3.75%)	4 (5.00%)
χ^2	-	-	-	-
P	-	-	-	-

Group	Cases (n)	Incomplete diagnosis documentation	Overuse of high-level antibiotics	Overall incidence rate
Control Group	79	1 (1.27%)	1 (1.27%)	6 (7.59%)
Observation Group	80	3 (3.75%)	4 (5.00%)	18 (22.50%)
χ^2	-	-	-	8.697
P	-	-	-	0.003

3.3. Comparison of prescription drug dispensing between the two groups

The observation group prescribed fewer types of drugs, had lower usage rates of injections and antibiotics, and had a significantly higher usage rate of national basic drugs compared to the control group ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of prescription drug dispensing between the two groups [$\bar{x} \pm s$, n(%)]

Group	Cases (n)	Number of medication types	Use of injectables (%)	Antibiotic usage (%)	National essential drugs usage (%)
Control group	79	3.84 ± 0.53	12 (15.19%)	20 (25.32%)	49 (62.03%)
Observation group	80	3.15 ± 0.59	8 (10.00%)	10 (12.50%)	60 (75.00%)
t/χ^2	-	t = 7.754	χ^2 = 1.223	χ^2 = 5.359	χ^2 = 3.899
P	-	< 0.001	0.269	0.021	0.048

4. Discussion

Western medicine encompasses chemically synthesized drugs, biological products, and natural medicine extracts. Its clinical mechanism of action is primarily based on the interaction between drugs and bodily targets, regulating receptors, enzyme activity, or ion channels to alter pathophysiological processes [4]. Rational drug use not only emphasizes targeting symptoms and diseases but also requires consideration of the patient and dosage. This involves scientifically selecting drug types, formulations, administration routes, dosages, treatment durations, and monitoring indicators based on a clear diagnosis, combined with the patient's age, weight, liver and kidney function, concomitant medications, and potential drug interactions. Patients with chronic diseases (such as hypertension and diabetes) and severe infections (such as community-acquired pneumonia) often face multiple medication risks due to long disease durations and concomitant use of multiple drugs, leading to issues such as drug-drug interactions, accumulation of adverse events, and decreased compliance [5]. Both the national basic drug system and antimicrobial drug classification management measures clearly state that prescription review and clinical pharmacist intervention are key links to ensure medication safety and improve efficacy. The core objective is to timely identify and correct unreasonable prescriptions through systematic and standardized medication review processes, reduce the incidence of adverse reactions, optimize medical resource allocation, and thereby improve overall medical quality and patient benefits [6].

This study shows that the interview scores of medical personnel in the observation group were significantly higher than those in the control group ($P < 0.05$), indicating that the prescription review mechanism has a positive effect on improving pharmacological knowledge mastery, prescription review, and communication and review abilities. On the one hand, the review team regularly discusses the latest medication guidelines and typical cases, enabling physicians and pharmacists to continuously stay updated on clinical pathways and new developments in adverse drug reactions, enhancing the pertinence and practicality of theoretical learning. On the other hand, the dual pharmacist review process and instant feedback mechanism promote interaction between prescribing and dispensing links, allowing medical personnel to continuously reflect on and optimize medication decisions in practical work, thereby improving overall professional literacy and operational norms. Additionally, continuous education and training, as well as case analysis, further consolidate key and difficult knowledge points such as drug-drug interactions and dosage adjustments for special populations, enabling medical personnel to consider patient individual differences more comprehensively when evaluating prescriptions [7].

In the research results, the incidence of unreasonable prescriptions in the observation group (22.50%) was higher than that in the control group (7.59%) ($P < 0.05$). This seemingly contradicts expectations, but actually

reflects a significant enhancement in the ability of the review mechanism to identify "blind spot" prescriptions. In the traditional mode without reviews, some unreasonable drug use, such as high dosages, compatibility conflicts, or overly high-grade antibiotics, was difficult to detect in a timely manner. However, in the systematic review process, the dual checks of the initial and secondary review stages, as well as the deep analysis of error data, can comprehensively capture multi-dimensional error types, resulting in a significant increase in the exposure rate of clinical misunderstandings in the observation group [8]. This high detection rate does not mean that the review mechanism causes more errors, but rather that its identification sensitivity and coverage are broader. At the same time, the types of drugs prescribed in the observation group decreased, and the usage rates of injections and antibiotics were significantly lower than those in the control group ($P < 0.05$), while the usage rate of national essential drugs increased significantly ($P < 0.05$). This indicates that besides error correction, the review mechanism can also guide prescriptions to be more standardized and evidence-based. On the one hand, the first prescription review strictly controls the indications for the use of injections and high-grade antibacterial drugs, reducing the risk of excessive intravenous drug administration and antibacterial drug abuse. On the other hand, closed-loop rectification and updates to the medication manual prompt physicians to prefer commonly used drugs within the essential drug list, reducing unnecessary drug types. This not only complies with the national essential drug policy but also lowers patients' medication costs and reduces adverse drug events [9].

The core of the prescription review mechanism lies in a systematic process, dynamic feedback, and continuous improvement. Firstly, the construction of the review team and the "double review and double verification" process effectively ensure the professionalism and timeliness of medication reviews. Secondly, the statistics and deep regression analysis of error data have constructed a data-driven risk identification model, making rectification more targeted. Additionally, the information-based intelligent warning module provides medical personnel with "pre-event reminders and post-event tracking" double protection by automatically intercepting high-risk prescriptions. Finally, the performance appraisal and reward-punishment mechanism closely links medication compliance with personnel incentives, forming a positive cycle. Based on the results of this study, it is recommended to further introduce clinical pathway guidelines and individualized dose calculation tools into the information system, and to integrate review results with electronic health records to enhance cross-department collaboration efficiency. Simultaneously, strengthening differentiated strategies for medication reviews for special populations (such as elderly, pediatric, and renal insufficiency patients) can help further improve the accuracy and applicability of the review mechanism [10].

5. Conclusion

In summary, the prescription review mechanism in medical institutions significantly improves the work quality of medical personnel and the level of medication standardization by constructing a multi-level and multi-link review and feedback system. It has significant intervention value in promoting the rational use of western medicine, optimizing the prescription structure, and implementing the national essential drug policy.

Disclosure statement

The author declares no conflict of interest.

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