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Risk factors and countermeasures of drug safety in medical institutions

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ABSTRACT
With the continuous progress of medical technology, drugs play an increasingly important role in treating diseases and improving patients' quality of life. However, the risk factors of drug safety in medical institutions have also become increasingly prominent, posing serious threats to patients and the normal operation of medical institutions. This paper aims to analyze risk factors of drug safety in medical institutions and proposes corresponding countermeasures, in order to provide reference for improving drug use safety in medical institutions.

KEYWORDS
medical institutions; drug safety; risk factors; coping strategies

1 Introduction

Drug safety is an important part of medical quality, relating to patients' lives, health, and the reputation of medical institutions. However, in the actual medical process, the risk factors of drug safety can not be ignored. This paper discusses the risk factors and countermeasures of drug safety in medical institutions.

2 Risk factors for drug safety in medical institutions

With the rapid development of medical technology, drugs play an increasingly important role in the treatment of diseases. However, in the process of medication in medical institutions, various risk factors also appear, which not only affect the treatment effect of patients, but also may endanger the life safety of patients. Therefore, in-depth analysis of the risk factors of drug safety in medical institutions is of great significance for ensuring drug safety of patients and improving the quality of medical services. Next, this paper will discuss the risk factors of drug safety in medical institutions from multiple perspectives.

2.1 Physician factors

First, the lack of professional quality of doctors.In clinical practice, if doctors lack complete knowledge of drugs, the following problems may occur: First, they have insufficient understanding of the mechanism of action, indications and contraindications of drugs, and may not be able to accurately judge whether patients are suitable for using certain drugs. According to the World Health Organization report (2023), "adverse drug reactions account for 10% of hospitalizations in high-income nations, among which antibiotic allergies constitute the leading cause, a hospital physician failed to fully consider individual patient differences and drug interactions when prescribing for a patient, resulting in a severe allergic reaction after the use of an antibiotic. This not only poses a threat to the health of patients, but also may lead to medical disputes, highlighting the importance of physician professionalism in drug safety.Second, the lack of the ability to identify and deal with adverse drug reactions, once adverse reactions occur, it is difficult to quickly make the correct diagnosis and disposal, thereby delaying the disease, and even endangering the life of patients. In addition, insufficient understanding of drug interactions may lead to adverse reactions when multidrug combinations are used, which increases the risk of treatment. Second, the prescription is unreasonable. In clinical practice, some physicians often do not fully consider the specific conditions of patients, potential drug interactions, and individual differences in patients when prescribing. This oversight can lead to unreasonable prescribing, such as using drugs that are not appropriate for the patient's condition, or ignoring possible adverse reactions among drugs. Such errors not only affect the effectiveness of treatment, but can also pose a serious threat to the health of patients. For example, according to a news report,an elderly patient with high blood pressure was treated by a physician who did not adequately assess his liver and kidney function and prescribed a high dose of a potentially hepatotoxic drug. Shortly after taking the drug, the patient developed abnormal liver function, which was controlled only after emergency treatment. This case reflects that the doctor ignored the individual situation of the patient in the prescription process, which increased the risk of taking the drug.Therefore, doctors should conduct a comprehensive assessment before prescribing to ensure that the drug is safe and effective.

2.2 Pharmacist factor

First, the professional level of pharmacists is not high.As transmitters of drug knowledge and key guarantors of patient drug safety, pharmacists' lack of knowledge directly affects their ability to provide professional drug guidance for physicians. This deficiency may lead to deviations in the drug selection and dosage control when prescribing drugs, which will affect the treatment effect and drug safety of patients. For example,according to a news report,in one medical facility, a pharmacist failed to ask a patient about his allergy history when recommending a drug. As a result, the patient developed a severe allergic reaction after using a drug that contained a known allergen.Second, drug management is not standardized. During drug circulation, non-standardized operations in storage, distribution, or recovery may lead to serious consequences. If the warehouse temperature is not strictly controlled, the medicine may fail due to moisture or overheating; Mislabeling or drug confusion during dispensing will directly affect drug safety; Omissions or delays in the recycling process can result in expired drugs remaining in circulation. These irregularities not only reduce the efficacy of drugs, but also may cause irreversible harm to the health of patients. According to the FDA's (2022) "Guidance for Institutional Drug Dispensing Practices," expired medications may experience reduced potency or form toxic degradation products, necessitating stringent inventory control measures. According to a news report, in a hospital pharmacy, a pharmacist ailed to strictly follow the drug management procedures and update the drug validity information in time due to negligence in his work when dispensing drugs. As a result, a bottle of expired antibiotic medicine was mistakenly given to the patient while the prescription was being prepared for the patient. Shortly after taking the drug, the patient had adverse reactions, which were confirmed by examination to be caused by taking expired drugs by mistake.

2.3 Patient factor

First, patient information is not perfect. In clinical practice, patients do not provide complete medical history and allergy history information, which brings great challenges to doctors' diagnosis and treatment. This may not only cause doctors to be unable to accurately grasp the overall health status of patients, but also may prescribe drugs that may cause serious side effects due to lack of understanding of drug allergy history, seriously affecting the drug safety of patients. For example,according to a news report, in an outpatient treatment, the patient came to see him with a cold. When asked about his condition, the patient only mentioned that he occasionally had headaches and did not mention that he had any drug allergy. When the doctor wrote the prescription, he took into account the patient symptoms and chose a common cold medicine. However, shortly after the drug was administered, the patient experienced a violent allergic reaction, with red, swollen, itchy skin and difficulty breathing.Second, the patient's compliance is poor. Patients do not take the drug according to the doctor's advice, or arbitrarily stop the drug, increase or decrease the drug amount, which is the common cause of poor drug effect. The effectiveness of a drug often depends on a strict medication schedule, and any deviation from the doctor's advice can upset this balance. Arbitrarily adjusting the dose of a drug can make the concentration of the drug too high or too low, which not only affects the effectiveness of the drug, but also increases the risk of side effects of the drug. The Centers for Disease Control and Prevention (CDC) 2021 National Diabetes Statistics Report stated: "Approximately 50% of patients with chronic diseases fail to adhere to prescribed therapies, thereby increasing the risk of complications. According to a news report, a diabetic, due to the lack of understanding of the importance of disease treatment and the fear of drug side effects, she stopped taking the drug and adjusted the dosage at will after receiving drug treatment for a period of time. She believes that as long as the symptoms are relieved, the drug can be discontinued. However, due to poor blood sugar control, the diabetic's condition gradually worsened, eventually leading to acute complications.

2.4 Medical institution factor

First, the allocation of medical resources is unreasonable. The consequences of unbalanced allocation of medical resources are obvious. In some areas, it is difficult for medical institutions to provide high-quality medical services due to the lack of professional talents and advanced equipment. This not only limits patients' access to timely and effective treatment, but also hinders advances in medical technology.The lack of specialized personnel and advanced equipment limits both the level of medical services and the means of disease diagnosis and treatment.The Institute for Healthcare Improvement (IHI) 2020 Medication Safety in Small Healthcare Facilities report states: "Up to 30% of medication errors in primary care settings result from unrecognized drug-drug interactions. According to a news report,in a small community hospital, due to the lack of professional pharmacists, the hospital's prescription review and drug management work could not be effectively implemented. In a patient medication process, the patient used two drugs with interaction at the same time, and because the hospital failed to identify and adjust the medication regimen in time, the patient had serious adverse drug reactions.Second, the management system is not perfect. An imperfect drug safety management system in medical institutions poses constant risks to patients.The lack of strict drug safety management system makes problems

such as misdiagnosis, misuse or drug interaction may occur in the process of drug use, which directly threatens the health of patients. This not only harms the interests of patients, but also increases the legal responsibility of medical institutions. For example, according to a news report, during a drug administration in a hospital, a patient unfortunately used an expired drug, resulting in a severe allergic reaction. The incident revealed gaps in the hospital's drug inventory management.

3 Risk response strategies for drug safety in medical institutions

Facing the risk of drug safety in medical institutions, it is very important to formulate effective coping strategies. The following will discuss how to reduce medication risks and ensure patient safety through improved management systems, enhanced training and monitoring, and the promotion of advanced information technology.

3.1 We will strengthen the ranks of doctors and pharmacists

In the field of medicine, physicians and pharmacists are the core forces of drug use and management, and the degree of their drug knowledge is directly related to the health and safety of patients. In order to adapt to the constantly updated medical knowledge system and clinical needs, it is particularly necessary to improve the medical knowledge of physicians and pharmacists through training and further education. The training and further education of physicians and pharmacists is not only aimed at learning the results of new drug research and development,but also to comprehensively deepen the mechanism of drug action, clinical application, identification and treatment of adverse reactions. By participating in various professional training, doctors can master the latest diagnosis and treatment technology, and pharmacists can improve the professional level of drug management.Further education provides a platform for in-depth clinical practice and communication with peers, which helps physicians and pharmacists to find and solve problems in practice and enhance clinical thinking and judgment. In addition, regular participation in academic conferences and seminars allows physicians and pharmacists to keep up with the pace of international pharmaceutical development and understand the frontier dynamics, which is of great significance for improving personal professionalism and the overall strength of the team. In short, through various forms of training and further education，doctors and pharmacists can continuously enrich their knowledge base, improve the mastery of drug knowledge, and provide patients with safer and more effective medical services.

3.2 Standardize drug administration

First, strict implementation of drug procurement, storage, distribution, recovery and other aspects of the management of regulations to ensure drug quality. As a key tool for the treatment of patients, the quality and safety of drugs are directly related to the life and health of patients. In order to ensure the quality of drugs, it is essential to strictly implement the management regulations of drug procurement, storage, distribution, and recovery. When purchasing, it is necessary to follow legal procedures such as bidding and inquiry, strictly review the qualification of suppliers, and ensure the regular source of drugs. In the storage process, it shall be stored according to the attributes of the drug, and the temperature and humidity shall be checked regularly to prevent the deterioration of the drug. In the process of distribution, check the drug name, specification, batch number and other information to ensure that it is correct before distribution. At the time of recovery, the expired and damaged drugs shall be registered in a timely manner to prevent them from flowing into the market.Standardizing the entire management process fully guarantees the patient's medication safety. The second is to strengthen drug information management and establish a comprehensive drug information database. With the rapid development of pharmaceutical industry, it is particularly important to strengthen drug information management. The establishment of perfect drug information database is the key to improve the efficiency of drug supervision and ensure the safety of public drug use. The database should cover the basic information of drugs, production batch number, quality inspection results, market circulation status, etc., to achieve real-time update and sharing of drug information.Integrating online and offline resources to build a drug information management platform enhances the scientific rigor and effectiveness of drug supervision,ensure the quality of drugs, and safeguard the interests of patients.

3.3 Improve patients' medication compliance

First, strengthen health education for patients and improve their awareness of drug safety. Medication safety concerns the health of every patient. In order to strengthen the health education of patients, we should popularize the knowledge of drug safety. First of all, educate patients to correctly understand the side effects of drugs, follow the doctor's advice, and do not increase or decrease the amount of drugs without authorization. Second, improve patients' awareness of drug

interactions to avoid the risk of multiple drug use. Finally, advocate patients to actively participate in the monitoring of adverse drug reactions, and jointly maintain drug safety. The second is to strengthen communication with patients, understand patients' medication needs, and improve patients' medication compliance. When communicating with patients, carefully ask about medication experience, targeted answers to questions, and pay attention to patients' feelings about medication. Through listening and guidance, trust is built and patients are more confident in the treatment process, thus improving medication compliance. Through these measures, we can effectively improve patients' awareness of drug safety and protect patients' health.

3.4 Improve the drug safety management system in medical institutions

First, establish a sound drug safety management system, and clarify the responsibilities and authority of each post. In order to ensure the drug safety of patients, medical institutions need to establish a set of sound drug safety management system. The system should clearly define the responsibilities and authority of pharmacists, doctors, nurses and other positions to ensure the standardized operation of drug procurement, storage, allocation, use and other links. The pharmacist is responsible for the quality control and reasonable storage of drugs; The doctor is responsible for prescribing according to the patient's condition, and giving guidance on drug indications and contraindications; The nurse is responsible for the accurate dispensing of drugs and guiding patients in medication use according to doctors' instructions. Through clear division of labor and responsibility, medication errors can be effectively prevented and medication safety can be guaranteed for patients. The second is to strengthen drug safety supervision and conduct timely investigation and treatment of drug safety incidents. In order to improve the quality of medical treatment and ensure the safety of medication for patients, we must strengthen the supervision of drug safety. Medical institutions should establish and improve drug safety management systems, respond quickly to suspected drug safety incidents, and carry out timely investigation and treatment. By strengthening the supervision of drug procurement, storage, distribution and use, as well as tracing and improving drug use errors, the risk of drug use can be effectively reduced and the life and health of patients can be guaranteed. The whole society should also improve the awareness of drug safety and participate in drug safety supervision.

3.5 Strengthen IT application

First, promote the application of electronic medical records, electronic prescription and other information means to improve the level of drug safety. With the development of medical information technology, the application of electronic medical record and electronic prescription has become an important means to improve the level of drug safety. Electronic medical records can reduce prescribing errors caused by handwriting errors, and electronic prescribing systems can help enable accurate management and tracking of medications. Through information technology, doctors can quickly obtain patient history and medication records to ensure the suitability and safety of drug use. At the same time, the electronic process can also improve the efficiency of prescription circulation, reduce medication errors, and provide patients with safer and more convenient medical services. The second is to strengthen the construction of adverse drug reaction monitoring and reporting system, and improve the early warning capacity of drug safety. In order to ensure the safety of public drug use, it is urgent to strengthen the construction of adverse drug reaction monitoring and reporting system. By establishing and improving the monitoring network, improve the monitoring coverage, and ensure the timely collection and reporting of adverse reaction information. At the same time, strengthen the ability of data analysis, early warning of potential risks, and achieve effective supervision of drug safety. This is not only a necessary measure to protect the rights and interests of patients, but also a key link to promote the healthy development of the pharmaceutical industry.

4 Conclusion

Drug safety in medical institutions is an important part of medical quality, which is related to the life and health of patients and the reputation of medical institutions. In view of the risk factors of drug use safety in medical institutions, corresponding countermeasures should be taken to strengthen the construction of the team of physicians and pharmacists, standardize drug management, improve patients' medication compliance, improve the drug use safety management system in medical institutions, and strengthen information construction, so as to ensure patients' medication safety and improve medical quality.

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References

[1] Hur H K,Kim K K,Lim Y M,et al.Patient safety interprofessional education program using medical error scenarios for undergraduate nursing and medical students in Korea[J].J Interprof Care,2023,37(6):944-953.

[2] Grimaldi G. Simulations in continuing education for more patient safety: Do simulation and skills training influence patient safety in Germany?][J]. Unfallchirurgie(Heidelb) , 2023, 126(4): 268-273.

[3] Song M O, Yun S Y, Jang A. Patient safety error reporting program for future undergraduate nursing education: A scoping review protocol[J]. PLOS ONE, 2022,17(8):e0273737.

[4] Lee S E, Morse B L, Kim N W. Patient safety educational interventions: A systematic review with recommendations for nurse educators[J]. NURSING OPEN, 2022,9(4):1967-1979.

[5] Hibbler B,Korzilius H.Federal institute for drugs and medical devices:making innovations available quickly and safely[J].Research Gate,2015,10 (1):34-39.

[6] Emerson K. An integrative framework for collaborative governance[J]. Journal of Public Administration Research and Theory Advance Access, 2017(5):78-81.

[7] Kontoghiorghes G J. Differences between the European Union and United States of America in drug regulatory affairs affect global patient safety standards and public health awareness:The case of deferasirox and other iron chelating drugs[J].Medicines,2021,8(7):36.

[8] Angelis A, Phillips L D. Advancing structured decision-making in drug regulation at the FDA and EMA[J]. British Tournal of Clinical Pharmacology,2020,87(2):395-405.

[9] Aronson K J.Post-marketing drug withdrawals:pharmacovigilance success,regulatory problems[J].Therapie,2017,72(5):556-560.

[10] Mayora C,Kitutu F E,Kandala N B,et al.Private retail drug shops:what they are,how they operate,and implications for health care delivery in rural Uganda[J].BMC Health Serv Res, 2018,18:532.