

Assessment and Analysis of Medication Errors in the Outpatient Pharmacies of a Private Hospital in Batam

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ABSTRACT

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Medication errors are defined as any preventable event that may cause or result in inappropriate medication use or patient harm when the medication is under the control of a healthcare professional, patient or consumer. Medication errors occur when weak medication systems and/or human factors such as fatigue, poor environmental conditions or understaffing affect prescribing, transcription, dispensing, administration and monitoring practices, which can then result in serious harm, disability and even death. The purpose of this study was to evaluate medication errors in outpatients at a private hospital in Batam City. This study is a cross-sectional study with a retrospective data collection technique from outpatient prescription data in January - March 2022 at a private hospital in Batam City. The sample calculation used the Slovin method with 225 samples. The results of the study stated that the incidence of medication errors at the prescribing stage was 58 (37.7%) unreadable prescriptions, 20 (13%) incorrect doses and 5 (3.2%) inappropriate indications, at the transcription stage there were 11 (7.1%) unexpected drug reaction errors, 34 (22%) errors due to drug interactions, at the dispensing stage there were 22 (14.3%) errors in prescribing dosage forms, 2 (1.3%) due to incorrect manufacturing and preparation and 1 (0.6%) due to incorrect administration of damaged drugs. At the administration stage there were 1 (0.6%) errors due to negligence in giving drugs to patients.

INTRODUCTION

Medication error is a failure in the medication process that has the potential to harm patients in the treatment or care process. These medication errors can cause adverse effects and potentially fatal risks of a disease.(Altowayan & Almuzaini, 2022).. According to WHO, the high incidence of medication errors indicates that it is a global problem. Medication errors can occur at 4 stages, namely prescribing errors, transcribing errors, dispensing errors, and administration errors.(World Health Organization, 2022).

One of the academic hospitals in Brazil reported 114 cases categorized as actual errors (medication errors) and 51 cases of reports categorized as potential errors, the most common type of error was prescription errors (48.25%). (Dalmolin et al., 2013). Another study at one of the government hospitals in Yogyakarta also reported 226 prescriptions with medication errors. Of the 226 medication errors, 99.12% were prescribing errors, 3.02% were pharmaceutical errors and 3.66% were dispensing errors. The most common type of prescribing error was incomplete prescription orders. Physician ordering was the most common stage of errors (99.12%). The pharmaceutical errors were including over dose and under dose of drugs. The dispensing errors included improper drug preparation and incomplete or no drug information. (Perwitasari et al., 2010).

A study in Egypt stated that among the factors causing medication errors in outpatient services for children are incomplete patient data in prescriptions, age and weight, duration of therapy and contraindications for some prescriptions which can affect the efficacy and safety of the drug, so that the role of patient counseling and checking of prescription administration is needed before entering the dispensing stage (Kassem et al., 2021). In Norway, a study of severe and fatal medication errors reported that from 3372 reports included in the study, 68% of medication errors occurred during the administration process, others due to dosage errors, prescriptions and omissions and wrong drugs. The drug groups that most often experience medication errors are analgesics, antibiotics and antithrombotics. More than half of the 62% of errors were dangerous and 0.8% were fatal. A large number of severe and fatal errors that cause harm and death to patients can be prevented by emphasizing the need for medication error strategies and management. (Mulac et al., 2021).

THEORETICAL OVERVIEW

The incidence of medication errors is divided into 4 phases, namely the prescribing phase (errors occurring during prescription writing), the transcribing phase (errors occurring during prescription reading or understanding), the dispensing phase (errors occurring during preparation to delivery of drugs) and the administration phase (errors that occur in the process of using drugs). (Ministry of Health, 2011)

1. Prescribing Error : Medication error in the prescribing phase is an error that occurs in the prescription writing phase. (Article, 2019). This phase includes :
Prescription Errors : The dosage, dosage form, quality, route, concentration, rate of administration, or instructions to use a drug given by a doctor.
Unauthorized Errors : Administration to a patient, of a drug that was not authorized by a valid prescriber for the patient. Includes an erroneous drug,

a dose given to the wrong patient, a drug that was not ordered, a duplicate dose. Errors Due to Incorrect Dosage : The administration to a patient of a dose that is greater or lesser than the amount ordered by the prescribing physician. Error Due to Untreated Indication : A patient's medical condition requires drug therapy but does not receive a drug for that indication. Errors Due to Unnecessary Drug Use : The patient receives a drug for a medical condition that does not require drug therapy.(Karthikeyan et al., 2015).

2. Transcription Error : In the transcribing phase, errors occur when reading the prescription for the dispensing process, including misreading the prescription due to unclear writing. Errors in translating prescription orders and signatures can also occur in this phase. The types of medication errors that include transcription errors are : Errors Due to ROM (Adverse Drug Reaction) : The patient experiences a medical problem as a result of ROM or side effects and the reaction is expected or unexpected. Errors Due to Drug Interactions : Patients experience medical problems, as a result of drug-drug and drug-food interactions.
3. Dispensing Errors Errors : in the dispensing phase occur during the preparation and delivery of prescriptions by pharmacy staff. One of the possibilities for errors to occur is taking the wrong medicine from the storage shelf because of the similar packaging or name of the medicine or it can also occur because of its close proximity. In addition, errors in calculating the number of tablets to be compounded or in providing information are also possible. (Lynskey et al., 2010). The types of drug errors that include dispensing errors are : Errors Due to Administration of Defective Drugs : Administration of a drug that has expired or the physical or chemical integrity of the dosage form has been compromised. Includes drugs that are stored inappropriately. Errors due to dosage form : The administration to the patient of a drug preparation in a form different from that ordered by the writing doctor.
4. Administration Error : Errors in the administration phase are errors that occur in the process of drug use.(EMA, 2015). This phase can involve pharmacy staff and patients or their families. Types of drug errors that include administration errors are : Errors Due to Erroneous Administration Techniques Improper procedures or techniques in administering a drug, erroneous routes of administration different from those written and through the correct route, but the wrong place. Errors Due to Patient Non-adherence Improper patient behavior regarding adherence to a written drug regimen.

A common perception is needed in a service system in identifying and reporting medication errors starting from the prescribing, transcribing, dispensing, and administration stages, this requires a common perception and report writing techniques. Doctors, paramedics and nurses must be able to identify medication errors, when to report them and to whom the report is submitted. In every health service, a quality and patient safety unit is needed to control, supervise and intervene regarding medication errors so as to minimize

negligence in making incident reports systematically (Yousef, Abu-Farha and Abu-Hammour, 2022).

The gap in the definition of all caregivers with the knowledge they have and experience affects the prevention of medication errors, a common perception is needed. Hospitals are expected to have guidelines that describe the conditions of each unit and situations that allow medication errors to occur, so that these guidelines can be used, anticipated, recognized and when to be reported to the patient safety quality unit. Preventing medication errors is also done by implementing monitoring, supervision with an online system so that the information produced is comprehensive and accurate as well as a timely reporting system and evaluating effectively and efficiently. Medication errors must always be reported in order to improve patient safety and reduce repeated medication errors that occur (Abdel-Latif, 2016).

METHODOLOGY

This study is a cross-sectional study with a retrospective data collection technique from outpatient prescription data in January - March 2022 at a private hospital in Batam City.

The sample used as the subject in this study was outpatient prescriptions from all service polyclinics that entered the pharmacy installation during the study. Sampling used a purposive sampling method with inclusion and exclusion criteria. Sample calculation using slovin method with formula :

$$n = \frac{N}{1 + (N(e^2))}$$

Where :

n : Number of samples

N : Total population

e : The tolerance limit for sampling error used 10%

The size of samples used in this study was 225.

Data were collected by recording the occurrence of medication errors in the prescribing, transcribing, dispensing and administration phases from observations of outpatient polyclinic prescriptions at a hospital in Batam City. Data were tabulated in the form of percentages and each form of medication error occurrence.

RESULT AND DISCUSSION

Based on the research conducted, there were 3250 outpatient prescriptions submitted to the Pharmacy Installation of a private hospital in Batam City in January and March 2022. Based on the calculation, the minimum sample is 225 prescription sheets. Analysis of medication error according to the variables used

Table 1. Medication error data table

Type of Medication Errors	N(%)
<i>Prescribing Error</i>	

Recipe error	58	37,7%
Error due to unauthorized		0%
Error due to incorrect dosage	20	13,0%
Errors due to untreated indications	5	3,2%
Errors due to unnecessary drug use		0%
<i>Transcribing Error</i>		
Error due to incorrect monitoring		0%
Error due to ROM (Adverse Drug Reaction)	11	7,1%
Errors due to drug interactions	34	22,1%
<i>Dispensing Error</i>		
Error due to dosage form	22	14,3%
Errors due to incorrect drug manufacturing/ preparation	2	1,3%
Error due to administration of defective medication	1	0,6%
<i>Administration Error</i>		
Error for neglecting to administer medication	1	0,6%
Error due to wrong time of administration		0%
Error due to incorrect Administration technique		0%
Error for non-compliance		0%
Error due to incorrect route of administration		0%
Error due to failure to receive medication		0%

Data analysis is processed by calculating percentages. Data were collected for 3 months from January to March 2022. Patient medication error data in the form of the number of prescriptions each month, prescribing, transcribing, dispensing, administration that meet the inclusion criteria. Medication error patients in January were 32 (40%) prescriptions, February were 26 (37.1%) prescriptions and March were 29 (38.7%).

From each variable there were 154 cases of medication error:

1. The incidence of medication errors at the prescribing stage was 58 (37.7%) unreadable prescriptions, 20 (13%) incorrect doses and 5 (3.2%) untreated indications, while there were no unauthorized prescriptions and no prescriptions where the use of the drug was not necessary. In this study, the incidence of medication error at the prescribing stage illustrates the highest value because currently the doctor's prescription is manual with handwriting and has not used the electronic prescribing method. By using electronic prescribing, the incidence of medication errors can be reduced. (Pharmaceutical Services Division, 2019).

This is similar to a study conducted by Sendlhofer et al, in reviewing patient safety aspects using handwritten prescriptions. In that study

significant improvements were achieved in the accuracy and legibility of handwritten prescriptions and helped reduce additional workload for nursing staff and thereby improve patient safety. The legibility and completeness of prescriptions increased throughout the evaluation period. The improvement in adherence to SOPs from the first to the second assessment period was likely achieved due to training in prescribing guidelines for physicians, involvement of physicians in self-assessment, and additional internal training by experts (Sendlhofer et al., 2019).

2. Medication errors at the transcribing stage were errors in adverse drug reactions 11 (7.1%), errors due to drug interactions 34 (22%) with major and monitor criteria. Drug interactions are conditions in which the pharmacological effects of a drug are altered by the presence of another drug, food, drink, or supplement. This condition can affect how the drug works in the body, both in terms of effectiveness and safety. These interactions can be divided into two broad categories: pharmacokinetic and pharmacodynamic interactions, each of which has significant implications for the management of patient therapy. One drug may be more active than before or decrease in effectiveness, so more intensive attention is needed for drugs with a narrow therapeutic index (Moudgil et al., 2021). Pharmacokinetic interactions occur when one drug affects the pharmacokinetic profile of another drug, namely, the stages of absorption, distribution, metabolism, and excretion. For example, some macrolide antibiotics can inhibit the cytochrome P450 enzyme, which plays a role in the metabolism of many drugs, including warfarin, an anticoagulant. For this reason, pharmacists must continue to improve their competence in order to be able to properly screen prescriptions, including assessing drug interactions (Bushra, Aslam and Khan, 2011).

There were no medication errors in the monitoring process. Discerning drug interactions using the drug interaction checker application on Medscape Drugs & Diseases. In screening prescriptions, knowledge about pharmacotherapy and applications is needed so that pharmacists are guided to always increase knowledge by attending additional training or workshops.(Altowayan & Almuzaini, 2022).The incidence of medication errors at the dispensing stage was a prescription error in the dosage form 22 (14.3%), due to incorrect manufacture and preparation 2 (1.3%) and due to an error in the administration of damaged drugs 1 (0.6%). Administration of a drug that has expired in the same month of service but the physical or chemical integrity of the dosage form has not changed. Staff do not look carefully before giving medicine to patients, this can also be caused by a lack of human resources (Akhil et al., 2017;Alrabadi et al., 2021).

3. The occurrence of medication errors at the dispensing stage included prescription errors in the dosage form 22 (88%), due to incorrect manufacturing and preparation 2 (8%) and due to errors in administering damaged drugs 1 (4%). Damaged drugs mean that the drugs given to patients have passed their expiration date, expiration is the expiration limit of the drug determined based on stability tests carried out at temperatures and conditions in accordance with ideal drug storage conditions. The expiration date is

calculated from the date the drug is produced until the last test time where the drug is declared to still meet quality requirements or the duration of the drug stability test for which data is available with the results of the drug meeting the requirements. Although the impact of using expired drugs is a decrease in the potential efficacy of the drug caused by a decrease in drug levels, some patients can experience adverse reactions so this must still be watched out for (Arioua and Shaw, 2024).

Pharmacists as health workers who screen all prescriptions before giving them to patients and check treatment records before giving drugs to inpatients are in the best position to detect and find errors. Staff factors were found to be factors causing medication errors, starting from inexperienced staff, lack of knowledge, and interference. Other medication errors include failure to follow work procedures, use of abbreviations, illegible prescriptions, unavailable or inaccurate patient information or records, mislabeling, incorrect instructions on medication containers, and errors in computer data entry. These can be prevented by providing supportive information systems, standardizing the medication use process, performing medication reconciliation, and providing ongoing education and training for pharmacy staff(et al., 2022).

4. Medication errors at the Administration stage were errors due to negligence in giving drugs to 1 patient (0.6%) and there were no errors in the time of drug administration, the method of drug administration and non-compliant patients . Errors due to negligent giving of drugs to patients are known when the patient returns to the hospital on the same day, the patient realizes the name of the drug on the etiquette is not his name so that no unexpected events have occurred. In such a situation, the hospital immediately took wise steps in tracing the error process using a risk management system to analyze the root cause so that the medication error does not happen again.

Medication errors are just one of many types of problems related to medication. These errors occur in all parts of the drug use system, where prescription and administration errors are reported to be the main causes of these errors. Medication errors can be classified into two main types, prescription errors and administration errors. Although the highest percentage of medication errors is administrative errors, these errors should not be ignored. For example, patient information is very important to ensure that the prescription belongs to the right person. Therefore, the medicine will be given to the designated patient. The validity of the prescription is another important aspect to determine whether the prescription is written by a legal entity. This shows the need for pharmacy and medical educators to emphasize the importance of writing clear and complete prescriptions. Therefore, the screening process is carried out by assuming that the prescribed medicine is indicated for the patient. However, before the medicine is given, the person giving the medicine will ask about the patient's problems or illnesses to ensure whether the prescribed medicine is suitable for the patient or not (Abdullah, Ibrahim and Ibrahim, 2004).

CONCLUSION

The results of the research conducted, it is known that medication errors that occur at the prescribing, transcribing, dispensing and administration stages of 225 outpatient prescription sheets in a private hospital in Batam City include the prescribing stage of 36.9%, the transcribing stage of 20%, the dispensing stage of 11% and the administration stage of 0.4%. To prevent medication errors, there needs to be a patient safety team in the hospital that specifically controls errors and improves the competence of health workers through ongoing education and training.

RECOMMENDATIONS

It is necessary to add pharmacists in the Pharmacy Installation, for all caregiving professions, pay attention to things that have the potential to cause Medication Errors, there needs to be a guide that is always updated for patient safety risk management, hospital management needs to increase the knowledge of all care givers about patient safety

FURTHER STUDY

To further researchers, further research should be conducted on Medication Errors in severe and fatal phases with more in-depth research methods

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