

**Research Article**

**Numbers and Potential Causes of Medication Error in Inpatient Service of Rumah Sakit Islam Malang**

**Angka dan Potensi Penyebab Medication Error pada Rawat Inap Rumah Sakit Islam Malang**

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**ABSTRACT**

Medication errors, ranging from prescription to administration errors, are still problems of patient safety with an average error rate of 8% - 10% and can cause severe morbidity, prolonged length of stay (LOS) in a hospital, unnecessary diagnostic tests and care, and mortality. The objective of this study is to describe the number of medication errors and their potential causes according to the perceptions of health personnel. The study was carried out by questionnaires, interviews, and data exploration on prescriptions made before the observation period and new prescriptions made during the observation period. The priority determination of the solutions was carried out using Capability, Assessability, Readiness, and Leverage method (CARL) and discussions with related units. The priority root factors that caused medication errors in the inpatient pharmacy at RSI Malang were high workloads and high turnover of inpatient pharmacist, incomplete prescription identity, illegible doctor's writing, and lack of training for the pharmacist. The priority outcome of the alternative solutions to overcome the medication errors in inpatient pharmacist is to regularly conduct training or knowledge refreshing for the inpatient pharmacist at RSI Malang and the implementation of e-prescription.

**Keywords:** Factors, hospital, inpatient, medication error

**ABSTRAK**

Kesalahan pengobatan (*medication error*) mulai dari kesalahan resep sampai dengan administrasi masih menjadi permasalahan keselamatan pasien dengan tingkat kesalahan rata-rata 8%-10% yang dapat menyebabkan morbiditas yang parah, LOS (*Length of Stay*) di rumah sakit yang berkepanjangan, tes diagnostik dan perawatan yang tidak perlu serta kematian. Tujuan dari penelitian menggambarkan angka *medication error* dan potensi penyebabnya menurut persepsi petugas kesehatan. Penelitian yang dilakukan melalui penelusuran data resep yang sudah terjadi sebelum masa pengamatan dan resep baru yang terjadi selama periode pengamatan, kuesioner, serta wawancara. Penentuan prioritas solusi dilakukan dengan metode CARL (*Capability, Assessability, Readiness, dan Leverage*) serta diskusi dengan unit terkait. Prioritas faktor-faktor akar masalah yang menyebabkan adanya *medication error* pada farmasi rawat inap di RSI Malang ialah beban kerja yang tinggi dan *turn over* petugas farmasi rawat inap yang tinggi, kurang lengkapnya identitas resep dan tulisan dokter yang tidak terbaca, serta kurangnya pelatihan atau refreshing ilmu bagi petugas farmasi. Hasil prioritas alternatif solusi untuk mengatasi adanya *medication error* pada farmasi rawat inap adalah melakukan pelatihan atau refreshing ilmu secara berkala bagi petugas farmasi rawat inap di RSI Malang serta pemberlakuan e-resep.

**Kata Kunci:** Faktor, *medication error*, rawat inap, rumah sakit

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## INTRODUCTION

A medication error is one of the most critical patient safety incidents. The incidence of medication errors can occur starting from the prescription process to the administration of drugs with an average incidence of 8-10% (1). These medication errors can be detrimental and injure approximately 1.5 million people in the United States every year and cost 3.5 billion dollars. The incidence of drug side effects due to medication errors for inpatients in the United States is 6.5% to 15%. The prevalence of prescription errors is also quite large for inpatients in hospitals in the Kingdom of Saudi Arabia at around 13%. These data show that drug safety is an important international contributor to morbidity and treatment costs (2).

A medication error is a common cause of iatrogenic harm. This can cause severe morbidity, prolonged length of stay (LOS) in a hospital, unnecessary diagnostic tests and treatment, and mortality (3). Prevention of medication errors can be done through an effective control system. If left untreated, the incidence of medication errors will be a serious problem from pediatrics to adult patients. Medication error has a huge impact on the health system and patients because it can reduce patient confidence in the health system (4).

The number of prescription services served by inpatient pharmacy at RSI Malang in 2013 until 2018 tended to increase from year to year. From the report of the incidence of patient safety in RSI Malang, the category of medication and intravenous fluid errors were among the five biggest problems in 2018 (5). The occurrence of medication errors that do not meet the standards in RSI Malang is also caused by the number of prescriptions served. The higher the number of prescriptions, the greater the potential for medication errors by the personnel.

Based on the background mentioned, it can be seen that one of the problems faced by RSI Malang is that there are still many medication errors due to various factors starting from prescribing to administration, so it is necessary to improve drug safety. The purpose of this study is to analyze the factors that cause medication errors to improve drug safety strategies in the hospital.

## METHOD

Data collections were conducted for two months from September 2019 to October 2019 at RSI Malang. Data were collected through questionnaires and interviews with 16 inpatient pharmacy staff and document exploration to the prescriptions that were made one month before observation and two weeks during the study. Calculation of the number of prescription for inpatients at RSI Unisma Malang samples carried out a sample of 80 prescriptions that had been issued one month before and 60 new prescriptions that were issued during the two weeks of observation. Respondents for the survey on the causes of medication errors were all inpatient pharmacy officers at RSI Malang as many as 16 employees consisting of 4 pharmacists, 9 pharmaceutical technical personnel, and 3 administrative staff. The evaluation of medication errors is grouped into four stages, namely prescribing, transcribing, dispensing, and administration. The types of medication errors are presented as percentages at each stage.

## RESULTS

The results of medication error research at the prescribing stage were carried out in 2 periods. Retrospectively, a number of 80 sheets of prescriptions were collected and 60 sheets of recipes were recorded where prescriptions are sent to inpatient pharmacy using individual prescriptions. In this study, identifying the factors that cause medication errors in the prescribing, transcribing, dispensing and administration stages can be seen in the Table 1. Result show that at the prescribing stage, most of the prescription items that were not completely written were information related to patient body weight, medical license number, and patient allergy history. Furthermore, assumption on written prescription due to illegible physician handwriting and wrong medical record number were the most common problem reveals during transcription stage. Study also found that at the dispensing stage incorrect drug dosage and dosage reading by pharmacist, were the two most frequent error.

Study also observe the prescription safety prospectively, and found that incomplete labeling was the most common problems (81,6%), while other less common problems was related to access and availability of the medicine. Incomplete labelling was also found at the administration stage, where inpatient pharmaceutical staff sometimes do not write drug labels such as drug names, quantities and expired date due to time constraints in the process of prescribing.

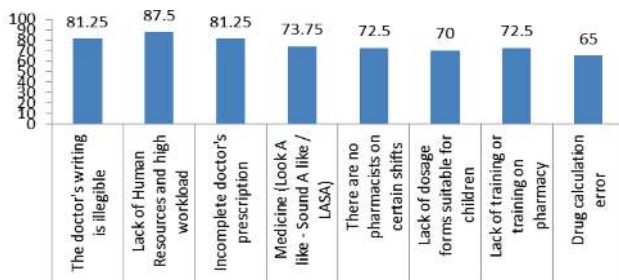
**Table 1. Type of medication error in each stage**

Stage	%
<b>Prescribing:</b>	
Do not write down the doctor's SIP number	85.71
Not writing down the patient's RM	0.71
There are no usage rules	1.43
There is no patient weight	94.29
There is no dose of medicine	8.57
The name of the medicine is not clear	0
Not writing down drug allergies	74.29
Do not write down the recipe date	17.86
<b>Transcription:</b>	
The doctor's writing is illegible	8.57
There is an assumption on the writing	10.71
Error Medical Record Number	0.71
<b>Dispensing:</b>	
Incorrect preparation of drug quantities	5
Incorrect preparation of similar drugs (LASA) due to proximity of places	0
Error reading dose number	5
<b>Administration:</b>	
Incomplete labeling/patient etiquette (Drug Name, Amount, and ED)	81.67
Locked medicine	3.34
Out of stock medicine	8.34

We also performed survey to the 16 respondents asking about respondents' perceptions about the factors that caused medication errors in the inpatients at RSI Malang (Table 1). Result show that physician contribute in two error factors that are illegible hand writing and incomplete prescription. This factor are related to or worsened by problem with looks alike and sound alike drug that increase

the probability of medication error. Other potential causes are related to drug dosage, and human resource capability in term workload and formal competency.

**Table 2. Factors causing medication errors (%)**



## DISCUSSION

Reports of medication error events that occur at the prescribing, transcribing, dispensing and administration stages, are an indication for goals of patient safety, specifically aimed to ensure effective and safe patient medication. This survey turns out the most common causes of prescribing errors were incomplete and unclear prescription writing, such as dosage, number, patient's name. This is due to illegible handwriting and lack of socialization to doctors about the availability of medicines. In addition, doctors did not include their Medical License Number (SIP) in a prescription even though writing the SIP is needed as a guarantee of the patient's right to obtain treatment and be protected by law (6).

The transcribing errors found in RSI Malang were communication failures between the prescriber and the dispenser lead to wrong writing in making a copy of the prescription and reading the prescription, generally for drugs in the LASA (Look Alike Sound Alike) category. The errors also occur when the doctor's writing was illegible. Hence, the pharmacy staff will need extra time to confirm, or the pharmacy staff did not reconfirm the writing because the staff was confident and had assumptions about the writing (7).

Based on the results of observations at the dispensing stage, the most frequent medication error occurrences are drug placement in the drug storage that was close to one another and LASA drug caused the errors at the stage of drug preparation in pharmacy department and results in a wrong prescription. Administration errors were found when the drug was given to another patient with the same name (occurred in the care unit) because the process of labeling on the identity of the drug was incomplete. This was influenced by the existence of drug service time limits, heavy workloads, and lack of socialization of standard drug delivery procedures. These various errors would become obstacles in achieving therapeutic goals to improve the quality of life of patients while minimizing risks in treatment (7). It is emphases that patient safety is

important in hospital services besides financial, property, professional workforce, and environmental risk (6).

The interview result showed that most respondents thought that the main factors causing medication error were lack of human resources and high workloads. The mistake of taking LASA drug is also very influential in the occurrence of medication error. The workload that fits the main task and function will improve the quality of inpatient pharmacy staff, whereas a high workload will reduce service quality and service innovation. Officers perceive factors due to errors in taking LASA drugs could cause medication errors due to assumptions in the reading of doctors' prescriptions that were illegible so that the officers took the drugs according to their assumptions without waiting for confirmation from the doctor (8).

Environmental conditions during the drug preparation process, namely noise due to the building construction process, could also cause officers to feel disturbed in the service process and could cause a lack of concentration for the officers, thereby increasing the risk of errors (9). Another environmental factor that was also stated to be influential was lighting in the area of drug preparation. The low intensity of light in the room would decrease the concentration of officers (10).

Doctors' writing that was illegible and incomplete was also mentioned as the main cause by 81,25 respondents. This showed that medication error could be found on prescriptions, for example, there were still many doctors who wrote prescription drugs without the direction of use, patient body weight, allergies, prescription date, and doctor's license number. This happened a lot among the prescriptions for inpatients because the doctors had unscheduled visit hours. Some doctors chose the visiting hour above 9 pm so that their focus as prescribers had decreased. Illegible doctor's prescription could also cause delays to the patient service because the prescriptions had to be confirmed beforehand with a nurse or the doctor (11).

When the dosage was not written on the prescription, the officer would assume the prescription. This is very risky because several drugs have a number of dosage variations. Age is also a predisposition to the occurrence of side effects of the drug since the side effects of the drug occur more frequently in adult and elderly patients compared to pediatric patients. This is related to the amount of drug consumed and the duration of drug use, especially for long-term therapy. Elderly patients tend to receive several drugs at the same time in the process of treatment due to illness that occurs simultaneously (12). The third factor causing medication error was the lack of pharmacy training (73.5%). In maximizing human resources in health services to reduce the presence of medication errors, one of them is by attending training on patient safety to increase staff awareness on patient safety.

Finding of this study indicate that the root cause of medication errors in inpatient pharmacy is the readability of the doctor's writing and turn over inpatient pharmacy HR staff. Periodic training for inpatient pharmacy staff at RSI Unisma Malang is suggested in addition to ensure the clarity of prescription writing.

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