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Profile of Medication Error Incidents in the Dispensing Phase at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province

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Abstract: Patient Safety Incidents are unintended events that pose a risk of harm to patients during the course of healthcare services. One common form is a medication error, which refers to mistakes in the medication process, particularly in the dispensing phase (errors in prepar tion and com-pounding of medications). This study aims to analyze medication errors occurring during the dispensing phase. The objective is to identify the causes and determine the percentage of medica-tion errors in the dispensing phase at the Pharmacy Department of RSUD Kesehatan Kerja, West Java Province. This study uses a descriptive analytical method with a retrospective approach. Data were collected using total sampling from all reported medication error incidents in the Pharmacy Department from July 2024 to June 2025. The results showed that the most frequent errors occurred in the category of wrong drug retrieval (72.30%), followed by labeling errors (20%), insufficient quantity dispensed (6.15%), and errors in handing over the medication to pa-tients (1.53%). No errors were found in the categories of administering drugs beyond instructions or dispensing expired or damaged medications. Preventive efforts may include implementing double checks, improving workflow systems and the physical environment, providing regular staff training, and utilizing appropriate technology.

Keyword: medication error, prescribing, transcribing, dispensing, administration

INTRODUCTION

Pharmaceutical services are direct and responsible services provided to patients related to pharmaceutical preparations, with the aim of achieving definite outcomes to improve the patient's quality of life. One of the goals of pharmaceutical services is to protect patients and ensure the rational use of medicines in line with the implementation of patient safety (Ministry of Health Regulation No. 73 of 2016). Patient safety is a system that makes patient care safer, which includes risk assessment, identification and management of patient risks, incident reporting and analysis, the ability to learn from incidents and follow-up actions, as well as implementing solutions to minimize risks and prevent injuries caused by errors in performing an action or failing to take necessary action (Ministry of Health Regulation No. 11 of 2017).

According to a study, medical errors are estimated to cause more than 251,000 deaths per year, making them one of the largest preventable causes of mortality. These findings emphasize the importance of improving patient safety systems in healthcare facilities (Makary & Daniel, 2016). Medication error, according to the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP, 2016), is a preventable incident that may lead to inappropriate medication use and harm to patients. Meanwhile, according to the Indonesian Ministry of Health (2014), a medication error is an event that may harm patient safety due to medication use during medical treatment, which is actually preventable.

Medication errors remain one of the major healthcare challenges, potentially causing a range of health issues from mild to severe, even leading to death (Aronson, 2009). Based on the Indonesian Ministry of Health Regulation (2014), medication errors can occur at any stage of the process, from prescribing, transcribing, dispensing, to administration. Errors in the dispensing stage are one of the most frequently occurring types of medication errors. This finding aligns with reports from the National Reporting and Learning System (NRLS) in the United Kingdom, which noted that 17.8% of all reported medication errors occurred during the dispensing stage (Aldhwaihi et al., 2016). Several national studies also indicate that dispensing errors remain a significant issue. A study in a hospital in North Jakarta reported that 62.16% of all medication errors occurred during the dispensing stage (Tanty, Charles, & Atmawati, 2023).

Dispensing errors cannot be viewed merely as technical mistakes but as the result of a complex series of processes, including interpreting prescriptions, retrieving medicines from storage shelves, adjusting doses, labeling, and handing medications to patients. This complexity makes the dispensing phase highly vulnerable to errors, especially under crowded service conditions, limited human resources, and suboptimal supporting technologies. The most commonly reported dispensing errors include wrong drug, wrong strength, and wrong quantity (Aldhwaihi et al., 2016). This is supported by Pitoyo et al. (2016), who stated that errors in dose unit conversion and limited staff understanding of dosage calculations also contribute to high dispensing error rates.

Errors in the dispensing stage are a serious issue concerning patient safety. Inappropriate medication provided—whether in type, dose, or frequency—can trigger adverse drug events, potentially prolonging hospital stays or even causing death (Um et al., 2024; NCBI, 2023). Considering the high proportion of dispensing errors within the overall medication error chain, system improvements in this stage are crucial. Implementing double-check verification systems, enhancing pharmacy staff competence, and adopting open, non-punitive incident reporting systems are expected to significantly reduce dispensing error rates. A study by Aldhwaihi et al. (2016) found that errors in the dispensing phase were associated with high workload, lack of pharmacy personnel, the presence of NORUM (Nama Obat Rupa Ucapan Mirip), internationally known as LASA (Look Alike Sound Alike) drugs, similar packaging, non-optimal LASA storage systems, and environmental disturbances such as interruptions and loss of focus during work. Therefore, it is important to evaluate the medication service process, especially in the pharmacy installation, to ensure patient safety.

Efforts to enhance patient safety and prevent medication errors in hospitals include implementing strict patient safety protocols, routine staff training, incident reporting systems, utilizing technology to support patient safety, and improving communication among healthcare teams. These efforts are expected to enable hospitals to provide safe healthcare services to patients. Based on the above background, the researcher is interested in conducting a study titled “Profile of Medication Error Incidents in the Dispensing Phase at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province.” This study is expected to provide a comprehensive overview of the types of errors that occur during the dispensing phase and their contributing factors, serving as a basis for improving the quality of pharmaceutical services and patient safety in hospitals.

METHOD

1. Research Location and Time

This research was conducted from July to June 2025 at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province.

2. Type of Research

This study is a descriptive analytical research using a retrospective data collection method.

3. Population and Sample of the Study

Population

The population in this study includes all medication error incidents that occurred at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province during the period of July 2024 to June 2025.

Sample

The sample in this study consists of data on medication error incidents in the dispensing phase recorded in the patient safety incident reports at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province during the period of July 2024 to June 2025. The sampling technique used is total sampling, meaning that all data meeting the inclusion criteria are included as research samples. The inclusion criteria for this study are all medication error incidents occurring in the dispensing phase, totaling 65 data records. The exclusion criteria include medication error incidents that did not occur in the dispensing phase, such as errors during the prescribing, transcribing, and administration phases, with a total of 25 excluded data points.

4. Data Collection

Data obtained from patient safety incident reports related to medication error incidents in the dispensing phase were reviewed and examined to determine the contributing factors. Interviews were also conducted with pharmacists and pharmaceutical technical personnel at the Occupational Health Regional Public Hospital of West Java Province.

5. Data Analysis

The collected data will be analyzed using descriptive analysis, presented in percentage form using a simple percentage formula to determine the proportion of dispensing phase incidents.

$$P = \frac{f}{n} \times 100\%$$

Note:

P = Percentage Result
f = Frequency
n = Total Number of Observations

RESULTS AND DISCUSSION

During the period from July 2024 to June 2025, a total of 48,984 prescriptions were processed by the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province. From this total, a review of medication error reports identified 90 cases that experienced medication errors. This indicates that the overall incidence of medication errors was 0.18% of all processed prescriptions.

Next, the errors were classified based on the phase in which they occurred. Of the 90 identified cases, 65 cases were categorized as medication errors occurring in the dispensing phase, and these were used as the research sample through total sampling. Thus, the proportion of medication errors in the dispensing phase against all serviced prescriptions was 0.13%.

Table 1. Percentage of Medication Error Assessment Results in the Dispensing Phase at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province

Medication Error in Dispensing Phase	Number of Incidents	Percentage (%)
Wrong drug retrieval	47	72.30%
Wrong medication handed to patient	1	1.53%
Label/etiket error	13	20%
Medication given outside instructions	0	0%
Expired or damaged medication dispensed	0	0%
Incorrect quantity dispensed	4	6.15%
Total	65	100%

Table 2. Monthly Highest Number of Outpatient Prescriptions During the Period of July 2024 to June 2025 at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province

Description	Number
BPJS Patients	20,337
General and Employment Patients	3,627
Morning shift prescriptions	2,812
Afternoon shift prescriptions	883
Night shift prescriptions	936

Based on Table 1, the analysis of 65 medication error data in the dispensing phase shows that the most frequent type of error was wrong drug retrieval, with 47 cases (72.30%). Other types of errors included label or etiket errors with 13 cases (20.00%), wrong medication handed to the patient with 1 case (1.53%), and incorrect quantity dispensed with 4 cases (6.15%). No cases were found in the categories of medication given outside instructions or dispensing expired or damaged medication. These percentages indicate that most errors originated from the early stages of the dispensing process, specifically during medication selection or retrieval from storage. Wrong drug retrieval is one type of error in the dispensing phase, occurring when pharmacy personnel pick medications that do not match the physician's prescription, whether due to incorrect drug name, dosage form, strength, or similarity in packaging (LASA/Look Alike Sound Alike) (Cousins et al., 2012). Examples include confusing amlodipine 5 mg with amlodipine 10 mg, or mixing up syrup and tablet formulations despite having the same prescribed medication name.

The high rate of errors in the dispensing phase can be explained by the complexity of tasks that pharmacy staff must carry out. This phase involves a series of activities, including retrieving medications from shelves, preparing the dosage form, labeling, and handing the medication to patients. Each of these steps carries the potential for errors, and most are performed manually, making them highly dependent on individual accuracy. Human inaccuracy may lead to wrong drug selection, incorrect dosage, and errors in dosage form. Workload also plays a major role. At the Occupational Health Regional Public Hospital of West Java Province, each shift is handled by four personnel; however, only two are responsible for dispensing, while the other two serve as pharmacists providing patient counseling (PIO). In addition to workload, inconsistent medication storage also contributes to the high rate of dispensing errors. Field observations revealed that medications are sometimes stored inconsistently or moved without proper documentation, increasing the risk of retrieving the wrong drug—especially during high-volume hours or rushed conditions.

These findings align with Aldhwaihi et al. (2016), who reported that suboptimal pharmaceutical logistics management—including unsystematic storage—is a dominant factor contributing to dispensing errors. Such errors pose significant risks to patient safety, especially when the medication retrieved differs from what was prescribed. Preventive efforts should include increasing human resources, implementing proportional task distribution, and providing training for pharmacy staff. Meanwhile, errors such as dispensing expired or damaged medication were not found during the study period. This indicates that the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province maintains an effective stock control system. A consistently implemented mechanism includes FEFO (First Expired First Out) and FIFO (First In First Out), as well as periodic stock opname covering all medications in both the warehouse and service units. These activities ensure the availability of medications, detect items nearing expiration, and prevent their use before reaching patients. If expired or nearly expired items are found during stock opname, they are immediately separated from active stock. This system supports quality assurance in pharmaceutical services and contributes to patient safety (Ministry of Health RI, 2020; WHO, 2012).

Understanding terms such as expired date and best before is essential in medication storage. The expired date represents the manufacturer's guaranteed final date of product stability, safety, and efficacy. Beyond this date, medications may no longer be safe and may pose toxicity risks or reduced therapeutic effects (WHO, 2012). Meanwhile, "best before" is generally used for non-medication products such as supplements or herbal items, indicating the optimal quality period but not necessarily danger beyond that date (FDA, 2020). Similarly, no cases of medication being given outside instructions were found during the study period, indicating adequate quality control in this aspect. However, understanding this category remains important for risk evaluation. Medication given outside instructions occurs when healthcare personnel administer or dispense medications without a written or verbal order or contrary to a physician's prescription (Nabhan et al., 2012). This practice is a form of medication error and may lead to adverse drug events. Examples include giving medication without a prescription, undocumented emergency administration, continuing discontinued medications, or changing dosage forms without confirmation. Prevention includes strict adherence to physician orders, routine staff training, clinical audits, and non-punitive incident reporting (WHO, 2017; ISMP, 2020).

Based on the study results, most dispensing-phase medication errors at the hospital fall under the category of Near Miss (KNC). This indicates that most errors were intercepted before reaching patients, providing opportunities for broader preventive efforts. The study also found that most medication error incidents in the dispensing phase occurred among BPJS patients, reaching 78.46%, compared to 16.92% in general patients and 6.1% in BPJS Employment patients. This distribution does not necessarily indicate poorer service for BPJS patients. Rather, it reflects the fact that BPJS patients constitute the majority of visitors. As a government hospital, RSUD serves as a major referral center for BPJS participants, resulting in high prescription volume. Additionally, BPJS prescription processing tends to be more complex due to the requirement to follow the National Formulary (FORNAS). When prescribed medications are not in FORNAS, pharmacists must verify the prescription before dispensing. This increases workload and processing time, especially during peak hours.

This aligns with Alshahrani et al. (2021), who found that administrative burden—especially in public healthcare settings with strict regulations—is a risk factor for medication errors. Furthermore, the Internal Medicine Clinic recorded the highest proportion of dispensing-phase medication errors at 35.38%. This reflects the complexity of patient conditions in this clinic, where most patients suffer from chronic diseases such as diabetes mellitus, hypertension, heart disease, kidney failure, and autoimmune disorders. Patients often undergo polypharmacy (five or more medications), increasing the risk of interactions, side effects, and dispensing errors (Masnoon et al., 2017; Tsegaye et al., 2020). Another contributing factor is the high patient

volume in the Internal Medicine Clinic, one of the busiest outpatient clinics in government hospitals. Consequently, the number of prescriptions generated is high, leading to increased workload for pharmacy staff, especially during morning shifts.

An analysis of the timing of dispensing-phase medication errors showed that most occurred during the morning shift, which had the highest volume of prescriptions. During July 2024–June 2025, the morning shift processed 2,812 prescriptions, significantly higher than the afternoon (883) and night shifts (936). On average, the morning shift handled 94 prescriptions per day. With only two staff members assigned to dispensing, each handled approximately 46 prescriptions per day—indicating a heavy workload and increasing the risk of fatigue, reduced concentration, and higher error rates. This is consistent with research by Yosefin et al. (2016), which identified high workload and insufficient staffing as major predictors of dispensing errors, and Aldhwaihi et al. (2016), who highlighted the role of staffing limitations and environmental distractions. Based on the study results, the incidence of medication error has not met the Ministry of Health's ideal standard stated in Permenkes No. 1691 of 2011, which emphasizes zero tolerance for medication error.

Therefore, referring to Aldhwaihi et al. (2016), increasing pharmacy staffing—especially in the morning shift—is a strategic solution to improve service quality and patient safety. Comprehensive prevention strategies must include staffing improvements, enhanced workflow design, a supportive work environment, routine training, and technology adoption. Effective prevention will significantly improve patient safety and the quality of pharmaceutical services. Literature also supports that improved workflow, routine training, and reduced interruptions can significantly decrease errors (Lindquist et al., 2020). At the global level, the WHO's Medication Without Harm initiative (2017) highlights strategies such as strengthened reporting culture, strict surveillance, and improved healthcare workforce governance.

CONCLUSION

Based on the results of the study conducted at the Pharmacy Installation of the Occupational Health Regional Public Hospital of West Java Province during the period of July 2024 to June 2025, a total of 90 medication error reports were recorded, with 65 cases (72.22%) occurring in the dispensing phase. The most frequent type of error in this phase was wrong drug retrieval (72.30%), followed by labeling or etiket errors (20%), incorrect quantity dispensed (6.15%), and wrong medication handed to the patient (1.53%). No cases were found related to administering medication outside the instructions or dispensing expired or damaged drugs. The absence of cases involving expired medication indicates that stock management in the pharmacy installation has been implemented effectively, particularly through the consistent application of the FEFO (First Expired First Out) and FIFO (First In First Out) systems, along with regular stock opname activities. These mechanisms ensure that drugs nearing expiration are promptly identified and separated, thereby minimizing the risk of medication errors and enhancing patient safety.

Most errors were found to occur during the morning shift, when the volume of incoming prescriptions is the highest. However, the number of pharmacy staff remains limited to only four personnel, creating an imbalance between workload and available human resources. This condition increases the risk of errors due to fatigue, reduced concentration, and greater time pressure compared to other shifts.

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