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MEDICATION ERRORS IN THE PRESCRIBING AND TRANSCRIBING PHASE IN PRIMARY HEALTHCARE: A QUALITATIVE CASE STUDY

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ABSTRACT

Medication errors are a leading cause of patient safety incidents in primary healthcare settings, particularly during the prescribing and transcribing phases, the initial stages of medication use. This case study examines a medication error related to the incorrect administration of gentamicin skin ointment for an eye complaint in a patient. Data was obtained through medical record reviews, documentation audits, incident reports, and in-depth interviews with involved healthcare workers. The study revealed various discrepancies in the prescribing phase, such as illegible prescriptions, incomplete drug names, omitted instructions for use, and the absence of critical clinical information, including allergy history, prescription date, and patient physiological parameters. In the transcription phase, errors occurred due to inaccurate copying of drug names and instructions for use. A number of systemic factors contributed to this incident, including high workload, limited human resources, and suboptimal implementation of medication safety procedures in accordance with national pharmaceutical service standards. The findings of this study emphasize the need to improve clarity in prescribing, strengthen verification mechanisms, and adhere to SOPs as important steps in minimizing medication errors and improving patient safety.

Keywords

Medication Errors, Prescribing, Transcribing.

INTRODUCTION

Medication errors in primary health care services such as Community Health Centers. (Lester & Tritter, 2001) is a form of health care system failure due to a combination of human factors, work environment, and clinical processes that are not well standardized. (Aljasmi et al., 2018) which show that the high variation in medical personnel competency, lack of clinical supervision, and weak systematic prescription oversight contribute to the increasing potential for errors in the prescribing, transcribing, dispensing, and administration processes, becoming a

critical issue that has a direct impact on patient safety, therapeutic effectiveness, and overall service quality, especially when the analysis conducted by Rusdi (Rusdi AI et al., 2023) identified that most errors in primary care facilities in Indonesia occurred due to inappropriate dosages, dosage form errors, and undetected drug interactions, while research by Chusun and Zuzana (2020) (Iswari, 2020) emphasized that technological limitations such as the absence of an e-prescribing system and the continued dominance of manual prescription use also increased the risk of transcription and interpretation errors by pharmacists, thus the urgency

Research on medication errors in Community Health Centers (Puskesmas) is becoming increasingly important to gain a comprehensive understanding of risk determinants, vulnerable workflows, and the magnitude of the clinical and administrative impact on patients and health facilities; this urgency is also consistent with the recommendations of Dhamanti et al. (Dhamanti et al., 2021) who emphasize the need to strengthen the capacity of health workers, establish a culture of non-punitive incident reporting, increase patient safety literacy, and standardize clinical operational procedures (Okta Muthia Sari et al., 2025) added that the implementation of medical information technology such as *electronic prescribing* , *clinical decision support systems* , and electronic medical records can reduce variations in clinical practice and make a significant contribution to reducing the number of medication errors in primary care, so that all these findings indicate that medication errors are not just an individual technical problem, but a multidimensional phenomenon that requires a systemic, evidence-based approach oriented towards continuous quality improvement at the Puskesmas level.

METHOD

This research used a qualitative approach with a case study method. This method was chosen to gain an in-depth understanding of the process of *medication errors* occurring during the prescribing and transcribing phases at community health centers. Case studies allow researchers to explore the direct experiences of patients and healthcare workers in the context of everyday care.

The study was conducted at the Bojonegoro Regency Community Health Center (Puskesmas), the location where *the medication error occurred* . Data collection took place on August 16–17, 2025, coinciding with the discovery of the incident and the initial investigation by Puskesmas staff.

The qualitative approach was chosen because it aimed to obtain “in-depth information regarding medication errors in administering medication to outpatients at the Community Health Center and the forms of occurrence in the prescribing and transcribing phases” — which is phenomenological and contextual.

RESULTS

RCA (Root Cause Analysis)

Medication Error Incident Report

Incident Date/Time: August 16, 2025 at 10:30 WIB

The incident is Mrs. S (44 years old) **,** an outpatient who came to the Community Health Center on August 16, 2025 At 10:30 a.m., the patient complained of blurred vision and a headache. The patient was examined by a new doctor. who had only been working at the health center for a few weeks. Based on the examination results, the doctor prescribed gentamicin ointment (a skin ointment). for the patient's complaint. Then, at 10:35 a.m. WIB, the patient picked up the medication at the pharmacy. The pharmacist instructed him to apply the ointment to the affected area. The patient then applied the ointment to his eye, which caused severe stinging, redness, and swelling, leading to his referral to the nearest hospital.

The investigative team, consisting of a doctor as the head, the quality officer of the Community Health Center and the pharmacist as members, and a notary, began the investigation process on August 16, 2025, and completed it on August 17, 2025. Data collection was carried out comprehensively through a review of documentation, medical records, policies and Standard Operating Procedures (SOPs) related to pharmaceutical services, incident reports, and the pharmacist's duty schedule. In addition to document analysis, the investigation process also included interviews with the prescribing doctor, the head of the pharmacy installation, the quality officer of the Community Health Center, and the pharmacist assistant to obtain a comprehensive picture of the service flow and the factors causing the incident.

The identified incident involved a medication error related to the administration of gentamicin ointment for the skin , when it should have been administered gentamicin ointment for the eye , and was therefore categorized as *a near* miss . Based on the risk assessment, the incident received an impact score of 1 and a probability of 1, resulting in a total risk score of 1, with a *blue color classification* indicating low risk. However, the incident still requires a thorough investigation to prevent a recurrence of similar incidents.

Analysis of incident categories and components revealed several contributing factors. In terms of clinical management , there was a failure in monitoring and a lack of review of the availability and suitability of pharmaceutical preparations in the pharmacy unit. In terms of documentation , there was inadequate recording of the movement of pharmaceutical preparations, medical devices, and consumable medical supplies entering and leaving the unit. Communication was also a significant factor, indicated by the absence of a formal handover process from the storage warehouse to the pharmacy unit, thus creating the potential for misidentification of preparations. In terms of drug administration and the medication process , it was found that drugs were administered without considering the instructions stated in the prescription, indicating weaknesses in the drug verification procedure. The drug component itself, namely gentamicin ointment for skin preparations that are physically similar to eye preparations, also increased the potential for incorrect drug selection. Furthermore, human resources also played a role, with limited staff and inadequate competency increasing the risk of errors.

Overall, these findings indicate that medication error incidents are not solely caused by individual error, but rather result from systemic weaknesses encompassing medication management, documentation, communication, SOP compliance, and the availability of competent personnel. Therefore, systemic corrective and preventive measures are needed to improve patient safety and service quality at community health centers.

Causative factor:

a. Direct Causal Factors:
   Officers: did not carry out the process of monitoring pharmaceutical supplies, medical devices and disposable medical materials when entering and leaving the drug warehouse.
b. Root Cause Factors of the Problem
   Management: SOP already exists, it has not been socialized
   Unit: There is no monitoring process and no documentation.
   Officers: lack of understanding of the monitoring process
c. Recommendations/Solutions

Short-term

O	Root of the Problem	Recommendations/solutions
	The existence of SOP	Socialization of existing SOPs, if necessary, revision of SOPs that are not in accordance
	There is no monitoring process	The monitoring process is carried out and recorded when entering and leaving the Drug Warehouse. Stocktaking is carried out at least once a month.

Long-term

NO	Root of the Problem	Recommendations/solutions
	Lack of officer knowledge	Improving knowledge and skills through internal and external training

The results of this study revealed that the medication error incident began when a doctor prescribed gentamicin ointment, a topical skin preparation, as a therapy for a patient's eye complaint. The prescription was found to have several ambiguities, particularly regarding the instructions for use and administrative completeness, leading to misinterpretation by the pharmacist. This ambiguity led the pharmacist to provide usage information that did not align with the drug's indications, resulting in the patient applying the gentamicin ointment directly to the eye area. This inappropriate use caused a local reaction of severe pain, redness, and swelling, which then required further action and referral to a tertiary healthcare facility for adequate medical treatment.

A more in-depth analysis of *the medication use system process* revealed errors in two main phases: the *prescribing phase* and the *transcribing phase* . In *the prescribing phase* , several discrepancies with good prescription writing standards were found, including difficult-to-read prescriptions, incomplete drug names that matched the required dosage form, lack of clear instructions, and omission of important data such as the prescription date, allergy history, and patient weight and height. The absence of this information is crucial, as it is integral to ensuring accurate dosing, appropriate therapy, and safe medication use.

Meanwhile, during the *transcription phase* , errors were found in the form of mistranslations of the drug name and instructions for use from the original prescription, exacerbating the risk of medication errors. Errors at this phase indicate weaknesses in the internal verification process between pharmacists before administering medication to patients and indicate that the *double-check mechanism* that should be in place has not been implemented optimally.

From a systems perspective, the main contributing factors to medication errors include an imbalance in workload and inadequate human resource instruments in both pharmaceutical and clinical service units. This condition causes staff to work under high-pressure situations, increasing the likelihood of oversight and negligence in the medication administration process. Furthermore, an evaluation of quality governance indicates that the implementation of Standard Operating Procedures (SOPs) regarding medication errors has not been optimally implemented as mandated by the Regulation of the Minister of Health of the Republic of Indonesia Number 73 of 2016 concerning Pharmaceutical Service Standards in Healthcare Facilities. This implementation gap is evident in the lack of supervision of prescription compliance, inconsistent drug verification procedures, and the absence of a systematic risk control mechanism for high-risk drugs or drugs with similar packaging (*look-alike sound-alike/LASA*) .

Overall, the results of this study confirm that the incidents were not solely the result of individual errors, but rather the product of an interaction between clinical, administrative, and systemic factors. Therefore, holistic and sustainable quality improvement efforts are needed through

strengthening the competency of healthcare workers, harmonizing workloads, optimizing medication verification procedures, improving the implementation of medication error standard operating procedures (SOPs), and implementing a more comprehensive monitoring and evaluation system at community health centers (Puskesmas) to prevent similar incidents from recurring.

The main factor causing medication errors in Community Health Centers was identified as coming from high workloads. And Unbalanced ratio of health workers . Furthermore, although the Baureno Community Health Center has adopted SOPs for pharmaceutical services based on Minister of Health Regulation No. 73 of 2016 concerning Pharmaceutical Service Standards in Community Health Centers , implementation in the field has not been optimal.

As a preventative measure, regular outreach and evaluation involving doctors, pharmacists, and pharmaceutical technicians regarding patient safety standards and medication error reporting mechanisms are needed. This is expected to prevent similar incidents from recurring and improve the quality of pharmaceutical services at community health centers.

DISCUSSION

The results of the study showed that the most dominant errors occurred in the *prescribing phase* , especially in the form of inappropriate drug selection, inappropriate indications, and writing prescriptions without considering allergy history and patient safety standards. This finding is in line with the facts identified in the *transcribing phase* , namely prescription copying errors by pharmacists originating from illegible writing, the use of non-standard abbreviations, and ineffective communication between doctors and pharmacists. The combination of these two factors increases the potential for *adverse drug events* , especially in primary health facilities such as community health centers, where high workloads are often not balanced by clinical decision-making support systems.

Theoretically, *a prescribing error* is defined as an error that occurs when a doctor selects, prescribes, or writes a medication, while *a transcription error* is an error that occurs when the prescription is transferred to another system or document. WHO Patient Safety Curriculum and *National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP)* (Springer, 2006) stated that these two phases are critical points (*high-risk nodes*) in the treatment cycle because they are highly dependent on accuracy, legibility, and communication between healthcare professionals. Various international studies also confirm that 30–50% *of medication errors* occur in these two phases, especially when strong operational standards are not supported and technology such as e-prescribing is minimally used (Sinha et al., 2025) .

Based on the analysis of theory and research facts, the author argues that the root of the problem is multifactorial: (1) varying clinical competence and experience of doctors; (2) lack of two-step verification (*double check*) in pharmacy installations; (3) a suboptimal patient safety culture; and (4) the failure to implement an electronic system that can significantly reduce the risk of errors. To improve patient safety, healthcare facilities need to strengthen electronic prescription SOPs, increase drug rationalization training, and periodically implement *Root Cause Analysis (RCA)* and *Failure Mode and Effect Analysis (FMEA) approaches* to identify potential failure modes before they lead to more serious incidents. Implementation of these strategies is believed to be able to reduce the number of *medication errors* and improve the quality of clinical services in community health centers.

CONCLUSIONS

study concluded that *medication errors in the prescribing* and *transcribing* phases are a major contributor to patient safety incidents in primary healthcare facilities. Errors in the *prescribing phase* primarily involve inappropriate medication selection, inappropriate indications, and unclear or incomplete prescriptions. Meanwhile, errors in the *transcribing phase* are largely caused by poor prescription legibility, the use of non-standard abbreviations, weak verification processes, and ineffective communication between physicians and pharmacists.

These findings indicate that the causes of errors are multifactorial, encompassing individual healthcare worker factors, work systems, workload, and suboptimal implementation of patient safety standards. These two phases have proven to be critical points in the treatment process, as any inaccuracy can potentially lead to inappropriate medication administration and increase the risk of *adverse drug events* .

Therefore, a comprehensive system improvement approach is needed, including strengthening prescription and verification standard operating procedures (SOPs), improving healthcare worker competency through drug rationalization training, enhancing patient safety culture, and utilizing technology such as *electronic prescribing* . Furthermore, the regular implementation of *Root Cause Analysis (RCA)* and *Failure Mode and Effect Analysis (FMEA) methods* is crucial to identify root causes and prevent recurrence of similar incidents. This holistic effort is expected to reduce *medication errors* and improve the quality of healthcare services sustainably.

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