Jurnal Akuntansi, Keuangan, dan Manajemen (JAKMAN)
ISSN 2716-0807, Vol 7, No 1, 2025, 15-28 https://doi.org/10.35912/jakman.v7i1.4771

Nurses Perspectives Causes And Management Strategies To Prevent Medication Errors: Qualitative Study

Martha Sasmita Ningrum[1], Jovita Irawati[2]
Universitas Pelita Harapan, Banten, Indonesia[1,2]
marthaningrum10@gmail.com[1], jovitairawati@gmail.com[2]

Article History:
Received on 05 June 2025
1st Revision 10 June 2025
2nd Revision 23 June 2025
3rd Revision 07 July 2025
Accepted on 21 July 2025

Abstract

Purpose: This study aims to explore the causes of medication errors, prevention strategies, and the role of hospital management in reducing such errors, based on the perceptions of nurses.

Methodology/approach: This qualitative research used a thematic analysis approach and was conducted at a private hospital in Surabaya. Data were collected through in-depth interviews with 10 informants—7 shift-leading nurses and 3 head nurses—who met the inclusion criteria. MAXQDA Pro 2024 was used for data coding and analysis. The analysis process included transcription, initial coding, theme development, and interpretation based on Lincoln and Guba's trustworthiness criteria.

Results/findings: The main causes of medication error were identified as lack of double-checking, crowded work environments, poor documentation, communication issues, and limited experience. Prevention strategies included implementation of double-check procedures, communication improvement, regular training, and integration of technology. Management roles such as supervision, SOP revision, and Root Cause Analysis (RCA) were essential in supporting safe medication practices.

Conclusions: Management's role is considered crucial in establishing a system that supports patient safety through policies such as supervision, training, SOP revisions, and conducting Root Cause Analysis (RCA) for any unforeseen incidents, thereby ensuring that the implemented nursing management strategies become more effective and efficient.

Limitations: This study is limited to one hospital with a small number of participants and does not include perspectives from other healthcare professionals like pharmacists or physicians.

Contribution: The study contributes to patient safety literature and provides actionable insights for hospital administrators, nurse managers, and healthcare policymakers to improve medication safety.

Keywords: *Double Check, Medication Error, Nurse Perception, Patient Safety, Thematic Analysis.*

How to Cite: Ningrum, M. S., & Irawati, J. (2025). Nurses' perspectives: Causes and management strategies to prevent medication errors — A qualitative study. *Jurnal Akuntansi, Keuangan, dan Manajemen.* 7(1), 15-28.

1. Introduction

Nurses constitute the largest segment of human resources in hospitals worldwide. Nurses must perform various nursing care activities in the inpatient ward, including administering medication to patients. Administering medication is a routine daily activity performed by nurses; however, in practice, medication errors in drug administration by nurses to patients are still found (Wondmieneh, Alemu, Tadele, and Demis (2020). Such errors can harm patients, posing risks of lawsuits or claims against the hospital (Irawati, 2019). Medication errors occur in every country, and numerous studies have examined medication errors committed by nurses (Salar, Kiani, & Rezaee, 2020).

The World Health Organization (WHO) reported that 10–12% of medication errors occurred between January 2005 and December 2010 in England and in Wales. The report detailed that 50% occurred during the administration stage, 18% during prescribing, 16% involved lost or delayed medications, and 15% involved incorrect dosages. A retrospective study of 21 hospitals in the Netherlands revealed that more than 15% of adverse drug-related effects were recorded, of which 21.2% were considered preventable. In Norway, 10,126 incidents were reported, of which 1,676 were medication errors (Payne, Slight, Franklin, & Avery, 2016). In Indonesia, the recap of Patient Safety Incident (IKP) reports identified medication errors as the most common type (24.8%), ranking first among the top ten reports. The National Patient Safety Committee (KNKP) recorded 7,400 patient safety incidents, 2.3% of which resulted in death. Throughout 2024, the occurrences of medication errors at Hospital X in Surabaya are presented in the following figure:

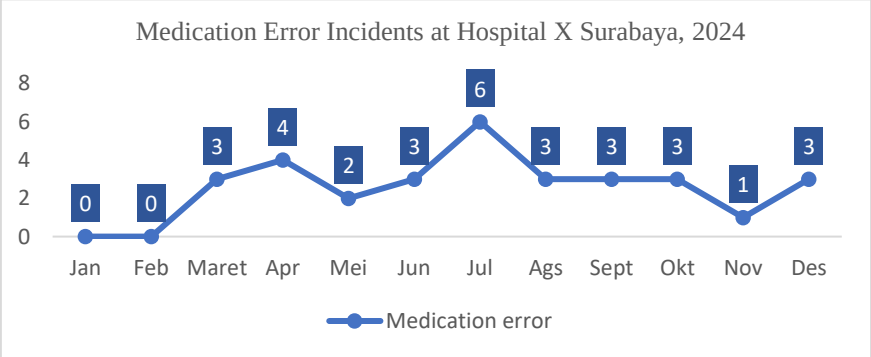

Figure 1. Incidents of Medication Errors at Hospital X Surabaya
Source: Medication Error Incident Report Data, Hospital X Surabaya, 2024

Based on the table above, the average number of medication error incidents was three per month in 2024, occurring across divisions and involving nurses, doctors, and pharmacy staff. Although none of the medication errors resulted in patient disability or death, appropriate actions must be taken to ensure that such incidents are effectively prevented and managed in the future. Given the importance of preventing medication errors in hospitals, it is essential to obtain full support from hospital management, the nursing department, and other supporting units to collaboratively implement comprehensive prevention strategies in the future.

Medication errors can occur at various stages, from prescription writing, transcription, storage, and distribution to the actual administration of medication to patients. Several factors are commonly associated with medication errors, including high workloads, lack of effective communication among healthcare professionals, insufficient managerial supervision, and negligence in performing verification or double-checking procedures (Mutair et al., 2021; Yılmaz & Sönmez, 2024). As frontline providers of hospital therapies, nurses play a crucial role in ensuring medication safety (Salar et al., 2020). This study employed a qualitative approach to comprehensively explore the causes of medication errors, prevention strategies, and the role of management in supporting safe nursing practices.

Through a qualitative design using thematic analysis, this study aims to reveal the meaning of medication errors from nurses' perspectives, their real-life experiences in handling risky situations, the structural and cultural barriers to prevention, and field-based recommendations. As stated by Xie, Kalia, Strudwick, and Lau (2019), the close engagement between qualitative researchers and participants allows for in-depth insights that quantitative methods may not reveal. These findings are valuable for developing comprehensive and contextually relevant prevention strategies for nursing practice (Xie et al., 2019). This approach holds significant practical value and can directly contribute to healthcare policy and practice when designed rigorously and transparently (Doyle, McCabe, Keogh, Brady, & McCann, 2020).

2. Literature Review and Hypothesis Development

2.1 Betty Neuman's System Model

Betty Neuman introduced the Systems Model in 1972. This model views individuals as open systems that constantly interact with both internal and external environments (Hayden, 2012). The main components of this model are as follows:

1. Stressors: Factors that can disrupt the system's equilibrium.
2. Lines of defense: Adaptive mechanisms that protect individuals from stressors.
3. Reaction to stressors: May manifest as health disturbances or positive adaptation.
4. Types of stressors:
    a) Intrapersonal stressors: Internal stresses related to the individual, such as anxiety and fatigue.
    b) Interpersonal stressors: Stress that arises in relationships with others, such as conflicts with colleagues.
    c) Extrapersonal stressors: Stress caused by external environmental factors, such as excessive workload or inadequate equipment.

This model explains that nurses exposed to multiple stressors, both internal and external, are at a higher risk of committing medication errors. For instance, nurses working under fatigue, lack of rest, noisy environments, or managerial pressure may experience decreased concentration when reading prescriptions or calculating doses (Arakawa, Kanoya, & Sato, 2011). Therefore, a systemic approach, such as the one proposed by Neuman, is essential for designing interventions. The Neuman Systems Model offers a nursing perspective that views individuals as open systems that continually interact with their surroundings. This approach does not merely focus on disease or symptoms but also emphasizes understanding the interrelationships between stressors, defense mechanisms, and client responses to stress—physically, psychologically, socially, and spiritually (Diniz et al., 2019; Hayden, 2012; Kabusi & Yazdi, 2024).

2.2 Motivation Theory

Motivation is the process that drives individuals to act or behave in pursuit of specific goals. According to Ryan and Deci (2000), motivation is the internal drive that directs an individual's behavior toward achieving desired outcomes. It is one of the key factors influencing the work behavior of healthcare professionals, including adherence to clinical protocols, incident reporting, and decision-making in critical situations, such as medication administration. Two theoretical frameworks are particularly relevant in explaining motivation within the context of healthcare services: the Self-Determination Theory (SDT) proposed by Ryan and Deci (2000) and the conceptual model of healthcare worker motivation developed by (Veenstra, Dabekaussen, Molleman, Heineman, & Welker, 2022).

2.2.1 Self-Determination Theory (SDT)

Self-Determination Theory (SDT), developed by Ryan and Deci (2000), focuses on the importance of intrinsic motivation and basic psychological needs in driving human behavior. SDT posits that three fundamental psychological needs must be fulfilled for individuals to develop optimally: autonomy, which refers to the feeling of having control over one's own actions; competence, which reflects an individual's belief in their ability to perform tasks effectively; and relatedness, which denotes the sense of being connected to and valued by one's social environment (Ryan & Deci, 2000).

2.2.2 Motivation, Behavior, and Service Quality

In their systematic review, Veenstra et al. (2022) found that autonomous motivation has a strong positive relationship with hospital service quality, including dimensions such as patient safety, effectiveness and adherence to standards. Conversely, controlled motivation tends to hinder proactive behaviors, such as speaking up and reporting errors. Veenstra et al. (2022) classified the impact of motivation into two types of behavior: core task behavior, such as complying with SOPs, following medical instructions, and providing accurate technical services, and proactive behavior, such as reporting errors, giving suggestions, and participating in system improvement efforts (Veenstra et al., 2022).

Together, these theories provide a comprehensive understanding that healthcare professionals who possess autonomous motivation, feel competent, and are valued are more likely to act cautiously, comply with SOPs, and report errors willingly (Veenstra et al., 2022). To prevent medication errors, healthcare organizations must develop a work climate that supports nurses' psychological needs and facilitates proactive engagement without the fear of punishment (Ryan & Deci, 2000; Veenstra et al., 2022). Furthermore, both theories emphasize that high-quality service and a strong patient safety culture depend on supporting autonomous motivation through supportive leadership, non-punitive reporting systems, and training programs that strengthen the competence and confidence of healthcare staff. Work motivation is a key determinant of employee performance (Hairudin & Oktaria, 2022). Motivation and work experience directly influence the quality of employee performance (Erisusanto, Satriawan, & Khaddafi, 2025; Farag, Lose, & Gedney-Lose, 2019).

Medication errors are incidents that not only harm patients but also threaten their safety, particularly in the context of medication administration by healthcare professionals (National Coordinating Council for Medication Error Reporting and Prevention, n.d.). Medication errors are also defined as failures in the medication process that lead to or have the potential to cause harm to patients (Aronson, 2009; Gebremariam, Sema, Jara, Mekonen, & Mekonnen, 2023). According to the Decree of the Minister of Health of the Republic of Indonesia No. According to Decree No.1027/MENKES/SK/IX/2004, a medication error is an incident that harms the patient due to the use of drugs during treatment by healthcare workers that could have been prevented.

Salar et al. (2020) in Preventing the Medication Errors in Hospitals: A Qualitative Study classified medication error prevention strategies into two main categories: professional strategies and technical strategies. Professional strategies include nurses' commitment to following procedures, attentiveness, and a sense of responsibility. Technical strategies include double-checking procedures, separation of look-alike/sound-alike medications, use of checklists, and involvement of senior nurses in supervision during medication administration. Management plays a crucial role in establishing a safety system that supports medication error prevention efforts (Salar et al., 2020). According to Zewien, Abed, and Bayoumy (2022), nursing supervision is a key component that can significantly reduce the incidence of medication errors. Supervision functions not only as a control mechanism but also as a means of coaching and evaluating staff competencies for accurate medication administration (Zewien et al., 2022). In 2019, the World Health Organization (WHO) recommended that hospitals establish systems allowing medication error reporting without fear of punishment, accompanied by the implementation of Root Cause Analysis (RCA) as a tool to improve systems rather than to assign blame (Ariyanti et al., 2023). Furthermore, Mutair et al. (2021) emphasized that effective strategies to prevent medication errors should not only involve training and reporting systems but also require organizational culture change and increased staff awareness of patient safety principles (Mutair et al., 2021).

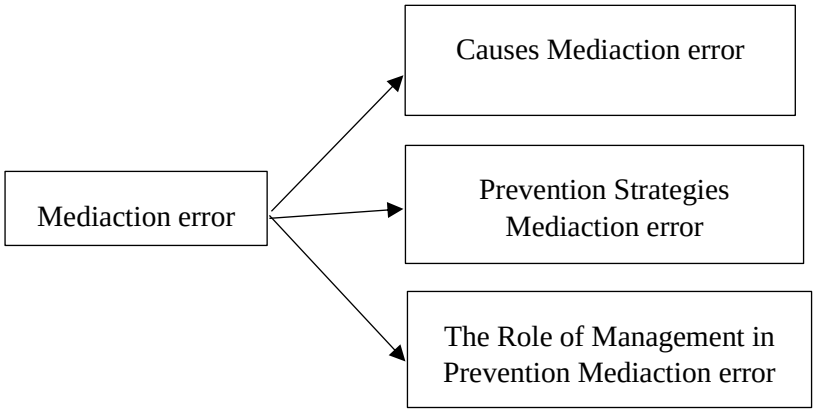

Figure 2. Conceptual Framework
Source: (Salar et al., 2020; Yılmaz & Sönmez, 2024)

3. Research Methodology

This study employed a qualitative research method with a thematic analysis approach, using MAXQDA Analytics Pro 2024 software to process and analyze data. Thematic analysis aims to identify, analyze, and interpret meaningful patterns (themes) in the data (Braun & Clarke, 2006). The data analysis steps were as follows: data transcription, comprehensive reading and understanding of the data, coding, grouping codes into themes and subthemes, interpreting and constructing narratives, and validating the findings through triangulation and member-checking techniques.

The validity and reliability of this study were ensured by applying the criteria of credibility, transferability, dependability, and confirmability (Lincoln, Lynham, & Guba, 2011; Mekarisce, 2020). This study was conducted at Hospital X in Surabaya. Data were collected through interviews with 10 participants, consisting of seven shift-responsible nurses and three head nurses. The inclusion criteria for the informants were as follows: Nurses with a D3 in Nursing or Ners (Professional Nurse) qualification, having more than 5 years of work experience, having experienced or witnessed a medication error, and willing to participate as an informant. The interviews were guided by the following questions:

1. Have you ever been involved in or witnessed a medication error?
2. What are the causes of medication errors?
3. What strategies can be implemented to prevent such medication errors?
4. How effective is the management's role in preventing medication errors?

Interviews were conducted after obtaining official permission from the hospital. Participants who agreed to participate signed an informed consent form prior to the study. All interviews took place within the hospital, conducted in a private room to ensure the confidentiality and comfort of the participants. The following section presents the profiles of the nurses who participated in this study.

Table 1. Characteristics of Research Informants

No	Name	Education	Age	Position	Years of Service
1	N	SKep	38 th	Staff Nurse	18 th
2	K	D3 Kep	32 th	Staff Nurse	18 th
3	O	Ners	25 th	Staff Nurse	10 th
4	E	D3 Kep	36 th	Staff Nurse	13 th
5	L	Ners	38 th	Staff Nurse	15 th
6	F	Ners	36 th	Staff Nurse	10 th
7	N	Ners	37 th	Staff Nurse	15 th
8	P	Ners	37 th	Head Nurse	15 th
9	LA	Ners	45 th	Head Nurse	19 th
10	D	Ners	46 th	Head Nurse	20 th

Source: Research Data Processing Results (2025)

4. Results and Discussion

The interview results were transcribed and initially coded to help organize and simplify the data before being interpreted into themes and subthemes. The following table presents the results of the initial coding.

Table 2. Initial Coding

Theme	Subtheme	Segments	Percentage (%)
Causes of Medication Errors	Crowded Work Environment	2	33,33
	Nurse Behavior	2	33,33
	Lack of Experience and Knowledge	1	16,67
	Workload	1	16,67
	Documentation	0	0,00
	Pharmachy	0	0,00

	Number of Medications	0	0,00
	Functional Nursing Responsibilities	0	0,00
	No Patient Identification	0	0,00
	Lack of Preparation	0	0,00
	Failure to Double Check	0	0,00
	Inattention	0	0,00
	Lack of Curiosity	0	0,00
	Postponing Tasks	0	0,00
	Manual Processes	0	0,00
	Communication	0	0,00
	TOTAL	6	100,00
Strategies to Prevent Medication Errors	Technology Integration	3	27,27
	Behavioral Change	2	18,18
	Training	2	18,18
	Improving Communication	1	9,09
	Critical Thinking	1	9,09
	Double Check	1	9,09
	Responsibility for Patient Management	1	9,09
	Time Management	0	0,00
	Workload Distribution	0	0,00
	Implementing Patient Identification SOP	0	0,00
	Clinical Pharmacy	0	0,00
	SOP Revision	0	0,00
	Documentation	0	0,00
	Rechecking Doctor's Orders	0	0,00
	Incident Reporting	0	0,00
	Supervision and Monitoring	0	0,00
	TOTAL	11	100,00
Role of Management in Preventing Medication Errors	Supervision	1	33,33
	Innovation	1	33,33
	RCA	1	33,33
	Incident Learning	0	0,00
	Training	0	0,00
	Clinical Pharmacy	0	0,00
	SOP Revision	0	0,00
	TOTAL	3	100,00

Source**:** Research Data Processing Results

From the results above, several segments still had a value of 0%, indicating the need for refinement of the coding process to achieve a more stable coding structure. The refinement was carried out by merging, separating, or modifying codes where necessary, as well as by adding memos or definitions to each code to ensure clarity and consistency of the codes. The results of the refined coding process are presented below.

Table 3. Coding Refinement

Theme	Subtheme	Segments	Percentage (%)
Causes of Medication Errors	Failure to Double Check	11	14,67
	Crowded Work Environment	11	14,67
	Nurse Behavior	10	13,33
	Lack of Experience and Knowledge	9	12,00
	Documentation	8	10,67
	Communication	7	9,33
	Workload	6	8,00
	Lack of Curiosity	4	5,33
	No Patient Identification	3	4,00
	Pharmacy	2	2,67
	Functional Nursing Responsibilities	2	2,67
	Number of Medications	1	1,33
	Lack of Preparation	1	1,33
	TOTAL	75	100,00
Strategies to Prevent Medication Errors	*Double Check*	11	18,33
	Behavioral Change	9	15,00
	Technology Integration	9	15,00
	Training	9	15,00
	SOP Revision	4	6,67
	Documentation	4	6,67
	Improving Communication	4	6,67
	Implementing Patient Identification SOP	3	5,00
	Incident Reporting	3	5,00
	Supervision and Monitoring	2	3,33
	Workload Distribution	1	1,67
	Responsibility for Patient Management	1	1,67
	TOTAL	60	100,00
The Role of Management in Preventing Medication Errors	RCA	9	36,00
	SOP Revision	6	24,00
	Training	4	16,00
	Supervision	3	12,00
	Innovation	3	12,00
	TOTAL	25	100,00

Source: Research Data Processing Results

The next stage of analysis was conducted by examining the thematic structure through a code–Subcode Segment Model test for each theme. The main themes identified in this study include the causes of medication errors, strategies for preventing medication errors, and the role of management in preventing medication errors. To further explore the relationships between these themes, analyses were performed using the Code Matrix Browser and Code Relation Browser. The results of these analyses are presented below.

Table 4. *Code Matrix Brwoser*

Code Matrix Browser	**I1**	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**	**I9**	**I10**
Causes of Medication Error	2	1	1	1	1	1	2	1	1	1
Causes of Medication Error > Documentation	0	0	1	1	0	0	0	2	1	3
Causes of Medication Error > Pharmacy	0	0	1	0	0	1	0	0	0	0
Causes of Medication Error > Number of Drugs	0	0	0	0	1	0	0	0	0	0
Causes of Medication Error > Functional Nursing Responsibilities	0	0	1	0	1	0	0	0	0	0
Causes of Medication Error > No Patient Identification	0	0	2	1	0	0	0	0	0	0
Causes of Medication Error > Lack of Preparation	0	1	0	0	0	0	0	0	0	0
Causes of Medication Error > No Double Check	0	1	1	1	3	1	2	1	1	0
Causes of Medication Error > Work Environment (Crowded)	2	1	3	1	1	0	2	0	1	0
Causes of Medication Error > Lack of Curiosity	0	0	1	0	0	0	2	1	0	0
Causes of Medication Error > Nurse Behavior	2	2	1	0	1	1	2	1	0	0
Causes of Medication Error > Lack of Experience and Knowledge	1	0	0	1	1	1	3	1	0	1
Causes of Medication Error > Workload	1	0	0	1	1	0	0	1	1	1
Causes of Medication Error > Communication	0	1	0	0	1	1	1	1	1	1
Strategies to Prevent Medication Error	1	1	1	1	1	1	3	1	1	1
Strategies to Prevent Medication Error > Workload Distribution	0	0	0	0	1	0	0	0	0	0
Strategies to Prevent Medication Error > Implementing Patient Identification SOP	0	0	0	1	1	1	0	0	0	0
Strategies to Prevent Medication Error > SOP Revision	0	0	1	0	0	0	2	0	1	0
Strategies to Prevent Medication Error > Documentation	0	2	1	0	1	0	0	0	0	0
Strategies to Prevent Medication Error > Improving Communication	1	1	1	0	0	1	0	0	0	0
Strategies to Prevent Medication Error > Changing Behavior	3	1	1	1	0	1	2	0	0	0
Strategies to Prevent Medication Error > Double Check	1	1	0	3	2	2	1	0	1	0
Strategies to Prevent Medication Error > Responsibility for Patient Management	1	0	0	0	0	0	0	0	0	0
Strategies to Prevent Medication Error > Reporting Incidents	0	0	0	1	1	0	0	1	0	0
Strategies to Prevent Medication Error > Technology Integration	3	1	0	1	1	1	1	0	0	1
Strategies to Prevent Medication Error > Supervision and Monitoring	0	0	0	0	0	0	0	1	0	1
Strategies to Prevent Medication Error > Training	2	1	0	0	0	0	0	2	1	3
The Role of Management in Preventing Medication Error	1	1	1	1	1	1	1	1	1	1
The Role of Management in Preventing Medication Error > Training	0	1	0	0	1	0	1	0	1	0
The Role of Management in Preventing Medication Error > Supervision	1	0	0	0	0	1	0	0	1	0

The Role of Management in Preventing Medication Error > SOP Revision	0	0	1	1	1	1	1	0	0	1
The Role of Management in Preventing Medication Error > Innovation	1	0	0	0	0	1	0	0	0	1
The Role of Management in Preventing Medication Error > RCA	1	1	1	0	2	0	0	1	2	1

Source: Research Data Processing Results

The table above presents the distribution of themes and subthemes based on the participants' responses. The first row shows the main theme, "Causes of Medication Errors," which was mentioned by all informants (I1–I10) with segment variations ranging from 1 to 2. This indicates that all the informants shared perspectives or experiences related to the factors contributing to medication errors. Each subsequent row represents a subtheme derived from the main theme.

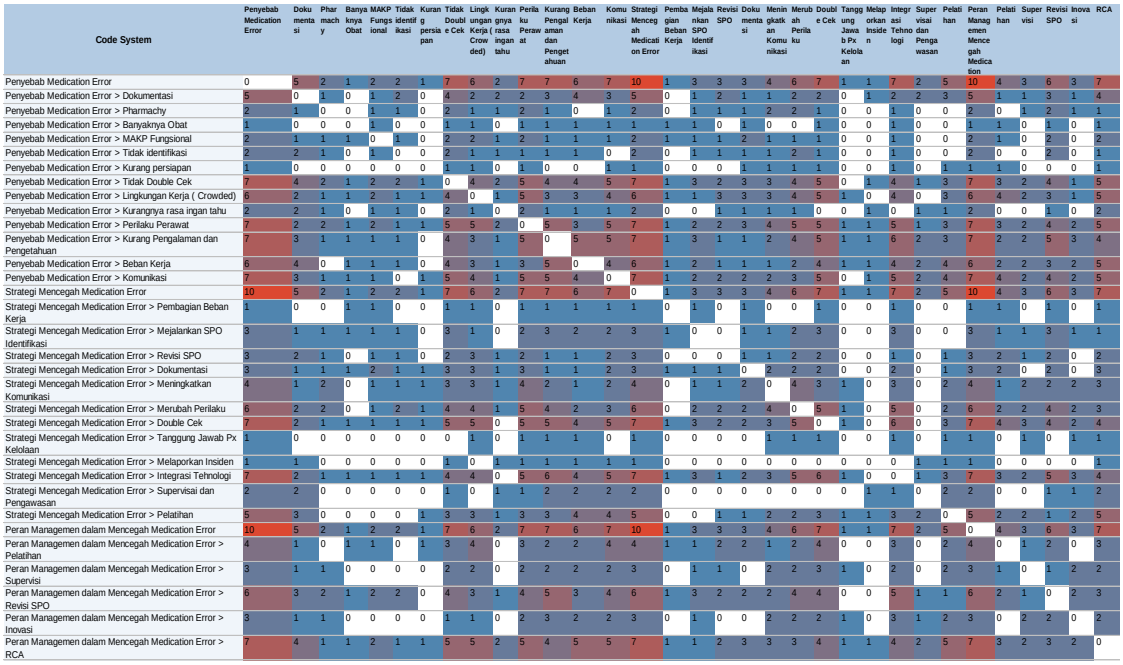

Figure 3. Code Relation Browser
Source: Data processed using MAXQDA (2024)

4.1 Theme: Causes of Medication Errors

The Code Matrix Browser (Table 3) shows that the main themes related to the causes of medication errors include lack of preparation (7 occurrences), failure to perform double-checks (7 occurrences), and crowded work environments (6 occurrences). These findings indicate that insufficient preparation, failure to conduct proper verification, and high-pressure work environments significantly contribute to medication errors. Additionally, factors such as lack of curiosity (6) and nurse behavior (7) highlight that motivation and professional conduct among healthcare workers are key determinants of preventing errors. Analysis from the Code Relations Browser further shows that failure to double-check is directly related to documentation issues (four co-occurrences) and crowded work environments (two co-occurrences). This suggests that verification errors often occur in the context of inaccurate documentation and high workload pressure. This data analysis aligns with the statement of Informant 10 (I10), who explained that inaccurate documentation can lead to medication errors: "There was a medication that should have been discontinued but was still administered because the information was not properly communicated. Sometimes doctors do not write a stop order in the medical record, so nurses continue to administer the medication*."*

Additional statements from Informant 3 (I3) and Informant 8 (I8) highlighted that crowded working conditions often result in nurses failing to perform double-check procedures *"*There were too many patients—new patients arriving continuously without a break, which divided our focus. Then, there is the patient call bell, which distracts us, so some tasks are missed. As a result, we fail to carry out proper identification SOPs and double checks" The findings align with Betty Neuman's System Model (1972), which explains that nurses exposed to multiple internal and external stressors are at higher risk of committing medication errors. For example, fatigue, lack of rest, noisy work environments, and managerial pressure can disrupt concentration when reading prescriptions or calculating dosages (Arakawa et al., 2011; Li et al., 2024). Similarly, Yılmaz and Sönmez (2024) reported that busy and noisy work environments, long working hours, and staff shortages are the major causes of medication errors. Nurses in their study acknowledged that the lack of double-checking was often due to limited time and heavy workloads, factors that ultimately contribute to avoidable mistakes.

Moreover, other studies have shown that documentation errors and medication administration mistakes are frequently triggered by emotional stress, fear, and unsupportive systems for error reporting. Nurses have expressed that they struggle to perform thorough checks or proper documentation under stressful and poorly supervised conditions (Schelbred & Nord, 2007; Yang et al., 2025). According to the World Health Organization (WHO, 2019), high workloads, non-conducive work environments, and lack of training or supervision are key factors that increase the risk of medication administration errors. These findings reinforce the results of the present study, where crowded work environments and lack of experience emerged as dominant subthemes closely linked to failure to double-check and poor documentation. This also aligns with motivation theory, which suggests that healthcare professionals with autonomous motivation who feel competent and valued tend to be more careful, compliant with SOPs, and willing to report errors (Veenstra et al., 2022).

4.2 Theme: Strategies for Preventing Medication Errors

Regarding medication error prevention strategies, the highest frequencies were observed for codes such as workload distribution (10), implementation of patient identification SOPs (10), and SOP revision (5). This indicates that effective workload management, proper application, and continuous revision of standard operating procedures (SOPs) are key steps in reducing the risk of medication errors in the future. Other prominent strategies include improving communication (7), double-checking (7), and training (7), all of which are commonly associated with preventive efforts to address the root causes of the errors. Communication and the work environment also significantly impact job satisfaction; miscommunication and an unsupportive work atmosphere are major contributing factors to increased medication errors (Luthfiana & Rianto, 2023).

This study reinforces the finding that managerial strategies for preventing medication errors must involve improving team communication systems and creating a work environment that supports both concentration and collaboration. These findings align with Salar et al. (2020), who identified two primary approaches to preventing medication errors: acting professionally and implementing technical strategies. Within technical strategies, they emphasized the importance of independent double-checks by two nurses for high-risk medications, separating storage for look-alike/sound-alike drugs, and assigning skilled nurses to administer medications (Salar et al., 2020). The implementation of independent double-checks by two nurses has been shown to significantly increase the detection of medication errors (Douglass et al., 2018). According to Prakoso and Budiono (2025), a safe and supportive work environment strongly influences employee commitment and performance. Nurses who work under heavy workloads, lack supervision, and feel excluded from managerial processes are more likely to make medication errors (Hariyati, Mediawati, & Eryando, 2021). Therefore, management strategies for preventing medication errors should not only focus on technical aspects, such as training and SOPs, but also address work conditions and the creation of a healthy organizational climate. Leadership is a key factor in reducing medical errors (Adams, 2022).

Furthermore, Mutair et al. (2021) highlighted the importance of developing medication error reporting systems and integrating technology as preventive measures. Their study indicated that the use of electronic systems for tracking and evaluating medication errors can significantly reduce the risk. Such

systems facilitate root cause analysis (RCA) and promote non-punitive reporting, which are essential for fostering a culture of patient safety (Mutair et al., 2021). This is consistent with the statements of informants in this study: “Electronic documentation helps nurses analyze patient conditions more easily and speeds up interventions. Technologies such as Micromedex and drug calculators are helpful in preparing medications before administration. The team reports every incident through an RCA, which often results in corrective solutions. For example, when a wrong patient incident occurred, the RCA revealed that it was due to unequal workload distribution. After making improvements in task allocation, workload distribution became more balanced.”

4.3 Theme: The Role of Management in Preventing Medication Errors

The role of management in preventing medication errors is reflected in the frequent appearance of codes such as “Supervision and Oversight” (7) and “Root Cause Analysis (RCA)” (7), emphasizing the importance of managerial support and monitoring to ensure that procedures and prevention strategies are effectively implemented in the clinical setting. These actions help identify the root causes of medication errors using a quality improvement approach. As stated by Informant 4 (I4), “When it is crowded, there is not enough time to double-check. What matters is getting the medication administered and finishing my work. I just sign off that the medication has been given so my task is done “ This statement illustrates that medication errors can occur due to individual negligence. Therefore, firm action from hospital management is essential to address such incidents, as negligence is considered malpractice.

According to Moeljatno (2008) and Sutantyo (2016) negligence (negligence) is the most common type of malpractice in healthcare services. Moeljatno (2008) explained that negligence occurs when medical personnel fail to perform an action that should have been carried out according to professional standards. Sutantyo (2016) provides examples such as failure to verify patient identity before administering medication, failure to document treatment administration, or ignoring standard operating procedures (SOPs). Even unintentional negligence can cause significant harm to patients and legal consequences for healthcare professionals and institutions. The Just Culture framework acknowledges the need for disciplinary measures for repeated or deliberate careless behaviors. The system must not tolerate negligent actions without consequences (Davis et al., 2025; Rogers, Griffin, Carnie, Melucci, & Weber, 2017). Moreover, leadership plays a critical role in preventing such errors. Leaders must possess emotional intelligence to perform effectively. High emotional intelligence contributes to a leader’s ability to manage interpersonal dynamics and reduce errors associated with stress and miscommunication (Antariksa, 2025).

5. Conclusions

Based on the research results and analysis conducted using MAXQDA Analytics Pro 2024, the following conclusions can be drawn: medication errors are caused by a combination of individual, system, and managerial factors. Individual factors included failure to perform double-checks, lack of experience, and insufficient knowledge. System-related factors include a crowded work environment, poor documentation, and ineffective communication among healthcare professionals (nurses, doctors, and pharmacists). Managerial weaknesses include inadequate supervision, unstructured revision of standard operating procedures (SOPs), and limited training on nursing pharmacology.

However, the study also revealed weaknesses in the implementation of medication error prevention strategies, such as the inconsistent application of double-checking by nurses, weak communication and coordination between nurses and doctors, and manual drug recording, which makes it difficult for nurses to read and interpret doctors’ orders. According to the World Health Organization (WHO), effective prevention of medication errors requires a multidimensional and cross-functional approach. Hospital management can take several measures to prevent medication errors, including building a safety culture focused on prevention, encouraging error reporting, and promoting learning from such incidents. Management can also provide rewards to nurses who adhere to and properly implement SOPs. Conversely, hospitals should enforce punitive measures against staff who deliberately violate procedures.

This is essential because the risk of malpractice claims in the healthcare sector is high and can affect a hospital's public reputation. Management should also develop a Failure Mode and Effect Analysis (FMEA) for new services that have the potential to cause medication errors in the future so that undesired incidents can be prevented early. Furthermore, hospitals should conduct audits of double-check implementation in wards and designate medication errors as quality indicators within the Nursing Committee, ensuring that the double-check procedure is consistently practiced by all nurses. Each medication error should be followed by a Root Cause Analysis (RCA) using the Quality Improvement Process approach to identify root causes and determine effective follow-up actions.

In addition, hospitals should create a risk register related to medication errors as part of risk mitigation efforts and take corrective actions on the highest risk indicators to prevent recurrence. The nursing pharmacology curriculum should be reformed to make it more applicable, ensuring that nurses have adequate knowledge of safe medication administration, particularly in practical aspects such as dosage calculation, intravenous dilution, and drug interaction management. Finally, hospitals should develop and distribute "Drug Information Guidelines" in every service unit to assist nurses in drug dilution procedures and increase their understanding of drug–drug interactions. A regular review and revision of SOPs on Medication Administration Management must also be conducted to maintain their relevance and effectiveness.

Limitations and Future Research

This study had several limitations. First, the limited number of respondents drawn from a single hospital restricts the generalizability of the findings to other hospital contexts with different systems and organizational cultures. Second, although in-depth interviews provided rich qualitative data, the potential for subjective bias from both informants and researchers remains a challenge inherent to qualitative studies. Third, due to time constraints, this study did not explore the perspectives of hospital management or other professional groups (such as doctors and pharmacists) who also play significant roles in the medication-administration cycle. Therefore, future research should adopt a multi-perspective approach involving various healthcare professions and conduct comparative studies across multiple hospitals to better understand contextual differences and effective prevention strategies.

Acknowledgments

The researchers express their sincere gratitude to all parties who supported this study, especially the informants and the research team.

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