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## Occurrences and Types of Medication Errors and its Associated Factors in Public Hospitals in the Philippines: A Retrospective Study

*Encarnacion, Criza Clare Obeña<sup>1</sup>; Monteroso, Judy Grace<sup>2</sup>; Lakkian, Sitti Jehan<sup>3</sup>; Laroza, Edna<sup>4</sup>; Saguinsin, Cherryl Lynne Magsipoc<sup>5</sup>, Saguinsin Erwin M. Faller (Adviser)<sup>6</sup>*

Post Graduate School, St. Bernadette of Lourdes College, Quezon city, Philippines

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### ABSTRACT

#### Background:

Medication errors pose a significant threat to patient safety in Philippine public hospitals. Despite efforts to address this risk, comprehensive insights into the occurrences, types, and associated factors of medication errors are essential for enhancing healthcare quality.

#### Methods:

This retrospective study, conducted from January 2020 to August 2023 in selected public hospitals, investigates medication errors. Historical data from this period are analyzed to comprehensively explore occurrences, types, and associated factors.

#### Results:

Dispensing errors were the most frequent, followed by administration errors. Factors contributing to medication errors included competencies (lack of training, new staff nurses), personal factors (stress, fatigue, cognitive load), and working environment (workload, staffing levels, technology influence).

#### Conclusion:

The research underscores the critical concern of medication errors in Philippine public hospitals. Interventions are needed to address contributing factors, emphasizing the importance of enhancing medication safety protocols for improved patient care.

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### Introduction

Medication errors pose a substantial global healthcare challenge, impacting patient safety and healthcare outcomes throughout different phases of the medication utilization (Naserallah et al., 2022; NCCMERP, n.d.). As defined by the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) in the United States, medication errors encompass "any preventable event that may result in inappropriate medication use or harm to the patient, occurring while the medication is under the control of healthcare professionals, patients, or consumers" (The Lancet, 2019).

The impact of medication errors spans from no or mild harm to severe consequences, including fatalities (World Health Organization, 2016; Kohn et al., 2000). Illustratively, in the United Kingdom, an alarming 237.3 million medication errors are reported annually, with 66 million deemed potentially harmful (The Lancet, 2019). This statistic is associated with 712 documented deaths, contributing to over 1700 fatalities within a single year (The Lancet, 2019). On a global scale, the World Health Organization (WHO) has projected a staggering economic toll, estimating the cost of medication errors to be around \$42 billion annually (World Health Organization, 2016). Additionally, these errors exert a profound psychological toll on patients, their families, and healthcare practitioners (Kaldjian et al., 2003; Wallace et al., 2009).

One concerning aspect is the underreporting of medication errors, with evidence suggesting that up to 60% of such errors go unreported (Kaldjian et al., 2003; Vincent et al., 1999). It is crucial for healthcare providers to detect and report medication errors and for researchers to rigorously investigate and analyze these errors to promote patient safety (Oyebode, 2018).

The objective of this study is to conduct an umbrella review encompassing systematic reviews that explore the contributing factors to medication errors in varied healthcare settings. The investigation will delve into understanding the characteristics of these factors, the methodologies and theories applied for their identification and classification, as well as the terminologies and definitions employed to articulate them.

In the Philippines, a retrospective study by De Leon (1984) investigated medication errors made by nursing students during their internship at a base hospital. This study aimed to identify common medication errors and the procedures or incidents that preceded them, shedding light on issues within the nursing education system.

Moreover, in a study by Alayon (2016), an exploration was undertaken to investigate factors linked to medication errors among staff nurses in designated hospitals in Roxas City. The study delved into aspects such as the nurses' understanding of medication administration rights, practices in medication administration, and a spectrum of personal and work-related factors influencing medication errors.

Furthermore, a research team at the Philippine Heart Center in 2010 conducted a study that analyzed individual and organizational factors contributing to medication errors in clinical nursing practice. This study revealed that various factors, such as workload, interruptions, and high patient-to-nurse ratios, had a significant impact on the occurrence of medication errors.

Within the setting of the Philippine Orthopedic Center, a study conducted by Rolsanna R. Ramos (2021) concentrated on the perspectives of nurses regarding medication administration errors (MAEs) and the impediments to reporting such incidents. It found that factors such as illegible medication orders, inadequate staffing levels, and a focus on individuals rather than systemic causes were common reasons for MAEs. Moreover, this study revealed that a significant number of medication errors remained unreported.

Understanding the occurrences and types of medication errors in the Philippines is essential to improve patient safety and healthcare practices. This study seeks to contribute to this knowledge by examining medication errors from a national perspective, encompassing various settings, and identifying the factors contributing to these errors.

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## Methods:

### Study Design

This study is to adopt a retrospective approach, delving into historical incident reports to investigate and understand occurrences and types of medication errors, as well as their associated factors in public hospitals in the Philippines. This entails analyzing past data to gain insights into the medication practices within the selected hospitals during the specified period. Thus, a retrospective analysis of historical data is conducted to achieve the study's objectives.

### Research Locale

In this study, the research is carried out in designated public hospitals situated in the Southern Luzon and Mindanao Regions of the Philippines. These hospitals serve as a representative and diverse sample of healthcare settings within the country, encompassing the involvement of healthcare professionals, including nurses and pharmacists, as reflected in the collected data and results.

### Subjects or Participants

The primary subject of this study is the incident reports from the selected public hospitals. Incident reports encompass inpatients who have been exposed to medication practices within the hospitals during the defined data collection period.

### Data Measure

Incident Reports filed by Nursing Service and Quality Assurance Departments within the hospitals are used to identify and document instances of medication errors.

### Data Collection Procedure

Historical data covering a period from January 2020 to August 2023 are collected from the incident reports of the selected public hospitals.

Data extraction involves identifying and recording instances of medication errors, including their types and associated factors.

Patient identifiers are anonymized to ensure data confidentiality and compliance with ethical standards.

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## Results

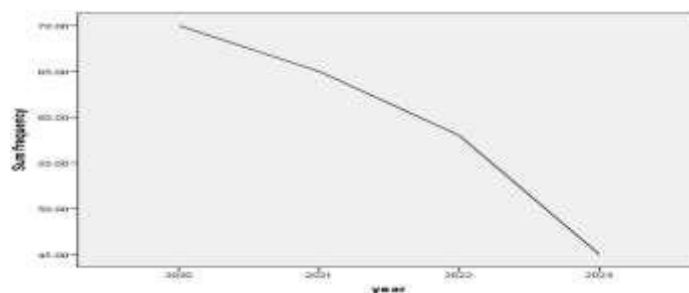


Figure 1.1 Occurrence of Medication Errors in Public Hospitals in the Philippines in terms of Frequency

Result shows the occurrence of medication errors in public hospitals in the Philippines in terms as to frequency based on a 4-year record. It was noticed that year 2020 has the highest record of error as to frequency while 2023 got the lowest record. Thus, it was observed that there is a decreasing record of medication error from the year 2020 to 2023.

Table 1.1

Significant Relationship Between Types of Medication Errors and Associated Factors as to Competencies

Types of Medication Errors	Associated Factors (Competencies)					
	Lack of Training			Newly Board Passers		
	$\lambda^2$	p-value	Interpretation	$\lambda^2$	p-value	Interpretation
Administration Error	8.000 <sup>a</sup>	0.238	NS	6.000 <sup>a</sup>	0.199	NS
Prescribing Error	12.000 <sup>a</sup>	0.213	NS	8.000 <sup>a</sup>	0.238	NS
Transcribing Error	4.000 <sup>a</sup>	0.135	NS	12.000 <sup>a</sup>	0.213	NS
Dispensing Error	4.000 <sup>a</sup>	0.261	NS	8.000 <sup>a</sup>	0.092	NS
Communication	3.000 <sup>a</sup>	0.223	NS	8.000 <sup>a</sup>	0.238	NS

Legend: Significant at p-value < 0.05

Table presents the significant relationship between types of medication errors and associated factors as to competencies. It was observed that the computed p-values were less than the alpha level indicating that there was no significant relationship exists.

Table 1.2

Significant Relationship Between Types of Medication Errors and Associated Factors as to Personal Factors

Types of Medication Error	Stress			Fatigue			Cognitive Load		
	$\lambda^2$	p-value	I	$\lambda^2$	p-value	I	$\lambda^2$	p-value	I
Administration Error	8.000 <sup>a</sup>	0.238	NS	12.000 <sup>a</sup>	0.213	NS	12.000 <sup>a</sup>	0.213	NS
Prescribing Error	4.000 <sup>a</sup>	0.135	NS	4.000 <sup>a</sup>	0.261	NS	4.000 <sup>a</sup>	0.261	NS
Transcribing Error	3.000 <sup>a</sup>	0.223	NS	6.000 <sup>a</sup>	0.199	NS	6.000 <sup>a</sup>	0.199	NS
Dispensing Error	8.000 <sup>a</sup>	0.238	NS	12.000 <sup>a</sup>	0.213	NS	12.000 <sup>a</sup>	0.213	NS
Communication	8.000 <sup>a</sup>	0.092	NS	8.000 <sup>a</sup>	0.238	NS	8.000 <sup>a</sup>	0.238	NS

Legend: Significant at p-value < 0.05

The table displays the significant relationship between types of medication errors and associated factors as to personal factors. It was observed that the computed p-values were less than the alpha level indicating that there was no significant relationship exists.

Table 1.3

Significant Relationship Between Types of Medication Errors and Associated Factors as to Working Environment

Types of Medication Error	Workload			Staffing Level			Influence of Technology		
	$\lambda^2$	p-value	I	$\lambda^2$	p-value	I	$\lambda^2$	p-value	I
Administration Error	12.000 <sup>a</sup>	0.213	NS	12.000 <sup>a</sup>	0.213	NS	8.000 <sup>a</sup>	0.238	NS
Prescribing Error	4.000 <sup>a</sup>	0.261	NS	4.000 <sup>a</sup>	0.261	NS	1.333 <sup>a</sup>	0.513	NS
Transcribing Error	6.000 <sup>a</sup>	0.199	NS	6.000 <sup>a</sup>	0.199	NS	6.000 <sup>a</sup>	0.199	NS
Dispensing Error	12.000 <sup>a</sup>	0.213	NS	12.000 <sup>a</sup>	0.213	NS	8.000 <sup>a</sup>	0.238	NS
Communication	8.000 <sup>a</sup>	0.238	NS	8.000 <sup>a</sup>	0.238	NS	5.000 <sup>a</sup>	0.287	NS

Legend: Significant at p-value < 0.05

Table shows the significant relationship between types of medication errors and associated factors as to working environment. It was observed that the computed p-values were less than the alpha level indicating that there was no significant relationship exists.

## Discussion

Our comprehensive examination of medication errors in Philippine public hospitals resonates with established literature, reinforcing the significance of factors identified by Carino et al. (2010). Our findings concur with their observations on insufficient staffing and extended working hours as influential factors contributing to medication errors. This aligns seamlessly with Literatus's (2019) advocacy for heightened public awareness, underscoring the potential harm and escalated costs linked with medication errors. Additionally, Parviainen's (2012) examination, emphasizing professional factors as a

primary cause of errors, corresponds with our discussion on proactive prevention strategies involving safety protocols and targeted training programs for healthcare staff.

In line with Pasco's (2017) study on medication errors, our research highlights the prevalence of dispensing errors in Philippine public hospitals, accentuating the necessity for structured orientation programs. This mirrors the call for continuous improvement echoed in Ramos and Calidgid's (2019) investigation into nurses' perceptions of Medication Administration Errors (MAEs). Their insights complement our discourse on the far-reaching consequences of errors, reinforcing our emphasis on fostering a safety culture and implementing user-friendly reporting systems.

Furthermore, our study not only contributes to the growing body of literature but also aligns with existing research, advocating for a multidisciplinary approach and ongoing investigations to augment healthcare quality. By incorporating insights from reputable studies, our findings underscore the interconnected nature of medication errors in public hospitals, emphasizing the need for collaborative efforts and sustained research endeavors to fortify healthcare systems and enhance patient safety.

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## Conclusion

Medication errors in the Philippines' Public hospital settings represent a complex challenge influenced by both global and country-specific factors. The prevalence of these errors, ranging from dispensing to administration mistakes, underscores the critical need for effective preventive measures to ensure patient safety and improve healthcare quality.

By building upon the insights gained from previous research conducted in the Philippines, this study aims to contribute to the ongoing efforts to enhance medication safety protocols and reduce medication errors in local healthcare institutions.

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## Recommendations

The comprehensive analysis of medication errors in public hospitals in the Philippines has illuminated critical areas requiring targeted interventions. To foster a safer healthcare environment and improve patient outcomes, several recommendations are proposed: hospitals are urged to prioritize the review of existing medication safety protocols; continuous training and education programs should be established among healthcare professionals in medication processes; healthcare institutions are encouraged to develop and implement fatigue management protocols including proper scheduling and balanced rotation; and adopting technological solutions such as electronic health records (EHRs) and barcode scanning systems to enhance accuracy in medication processes. Encouraging a reporting culture within healthcare institutions is essential for the continuous improvement of patient safety. Lastly, community engagement and patient education programs should be implemented to raise awareness about the potential risks of medication errors and empower individuals to actively participate in their healthcare.

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