CRITICAL CARE NURSES' PERCEPTION OF CAUSES AND REPORTED MEDICATION ADMINISTRATION ERRORS IN GOVERNMENT HOSPITALS WITH SPECIALISTS IN KELANTAN

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by

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LIST OF ABBREVIATIONS

AOR	Adjusted Odd Ratio
BSc	Bachelor of Science
CCU	Cardiac Care Unit
COR	Crude Odd Ratio
DOSM	Department of Statistics Malaysia
ED	Emergency Department
FDA	Food and Drug Administration
HDW	High Dependency Ward
HRPZII	Hospital Raja Perempuan Zainab II
HSIP	Hospital Sultan Ismail Petra
HTM	Hospital Tanah Merah
ICU	Intensive Care Unit
IV	intravenous
JEPeM-USM	Jawatankuasa Etika Penyelidikan Manusia, Universiti Sains Malaysia
LASA	look-alike, sound-alike
MAER	medication administration error reporting
MAEs	Medication Administration Errors
max	maximum
MERS	Medication Error Reporting System
MEs	medical errors
min	minimum
MTE	medication transcription errors
NICU	Neonatal Intensive Care Unit

NMRR	National Malaysia Research Registry
Non-IV	Non-intravenous
OR	Odd Ratio
OT	Operation Theatre
PICU	Pediatric Intensive Care Unit
PS Power	Performing statistical power
PTSD	Post-traumatic stress disorder
RCA	Root cause analysis
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
USD	United States Dollar
USM	Universiti Sains Malaysia
VER	Voluntary Errors Reporting
WHO	World Health Organization

LIST OF SYMBOLS

N	Sample of population
Po	probability of exposure in controls
φ	Odd Ratio
m	the ratio of control to case patients
d	The margin of error estimating the mean
n	Sample of study
Z	Standard score
α	Type 1 of error
σ	Population's standard deviation from the previous study
%	percentage

ABSTRAK

PERSEPSI TERHADAP PUNCA DAN PELAPORAN KESILAPAN PEMBERIAN UBAT OLEH JURURAWAT UNIT KRITIKAL DI HOSPITAL KERAJAAN BERPAKAR DI NEGERI KELANTAN

Pengenalan: Kesilapan pemberian ubat menjadi satu kebimbangan utama dalam penjagaan unit kritikal kerana ia memberi kesan terhadap keselamatan pesakit. Memahami punca dan faktor yang berkaitan kesilapan pemberian ubat yang dilaporkan adalah penting agar strategi pencegahan yang berkesan dapat dibangunkan. Objektif kajian ini adalah untuk menentukan persepsi jururawat unit kritikal terhadap punca kesilapan pemberian ubat berlaku dan kenapa kesilapan ini tidak dilaporkan, serta mengenal pasti faktor yang signifikan berkaitan dengan pelaporan kesilapan pemberian ubat di hospital kerajaan berpakar di Kelantan.

Metodologi: Ini adalah kajian keratan rentas menggunakan soal selidik yang telah disahkan. Ia melibatkan jururawat unit kritikal dari tiga hospital kerajaan berpakar di Kelantan. Saiz sampel dikira berdasarkan objektif kajian dan bilangan maksimum peserta yang diperlukan ialah 424 orang. Mereka dipilih secara perkadaran dan rawak berdasarkan saiz hospital dan wad. Borang soal selidik mempunyai 64 bilangan soalan, termasuk 28 soalan berkaitan menyiasat punca terjadi kesilapan pemberian ubat, 16 soalan berkaitan sebab tidak melaporkan kesilapan pemberian ubat, dan 20 soalan yang menganggarkan peratusan kesilapan pemberian ubat yang sebenarnya dilaporkan. Kajian semasa telah mendapat kelulusan etika daripada insitusi. Statistik deskriptif dan regresi logistik digunakan dalam kajian ini.

Keputusan: Seramai 424 orang jururawat unit kritikal mengambil bahagian secara sukarela. Purata umur mereka ialah 40.90 (6.13) tahun dan purata tempoh bekerja ialah 16.83 (5.90) tahun. Kebanyakan berpendapat bahawa punca utama kesilapan pemberian ubat adalah penulisan pesanan ubat doktor yang tidak boleh dibaca, dan sebab utama untuk tidak melaporkan kesilapan pemberian ubat adalah kerana pihak pentadbiran memberi tumpuan kepada kesilapan individu dan bukannya sistem apabila kesilapan pemberian ubat berlaku. Kajian itu juga mendedahkan faktor seperti jururawat yang bekerja di HDW (AOR = 4.87, 95% CI: 1.58, 15.02), yang mempunyai pengalaman peribadi dengan kesilapan pemberian ubat (AOR = 2.09, 95% CI: 1.11, 3.92) dan melihat kesilapan pemberian ubat oleh anggota lain (AOR = 1.91, 95% CI: 1.19, 3.07), yang lebih berkemungkinan melaporkan kejadian itu.

Rumusan: Kajian semasa mendapati bahawa jururawat unit kritikal menganggap bahawa bekerja di HDW, mempunyai pengalaman dalam kesilapan pemberian ubat atau pernah melihat kesilapan pemberian ubat oleh anggota lain adalah faktor yang dikaitkan dengan pelaporan kesilapan pemberian ubat. Pengukuhan budaya keselamatan pesakit boleh menggalakkan pelaporan kesilapan pemberian ubat dan mengurangkan kesan akibat daripada kesilapan pemberian ubat. Hospital kerajaan harus membenarkan jururawat melaporkan masalah ini tanpa mendedahkan identiti. Pendekatan bukan hukuman dan pembangunan sistem dapat meningkatkan kadar pelaporan tanpa menyalahkan individu.

Kata Kunci: *kesilapan pemberian ubat, persepsi jururawat unit kritikal, keselamatan pesakit, faktor yang berkaitan*

ABSTRACT

CRITICAL CARE NURSES' PERCEPTION OF CAUSES AND REPORTED MEDICATION ADMINISTRATION ERRORS IN GOVERNMENT HOSPITALS WITH SPECIALISTS IN KELANTAN

Introduction: Medication administration errors (MAEs) are a significant concern in critical care settings, posing risks to patient safety. Understanding the causes and factors associated with reported MAEs is crucial for developing effective prevention strategies. This study aimed to determine critical care nurses' perceptions of the causes and unreported of MAEs and identify factors significantly associated with reported MAEs in government hospitals with specialists in Kelantan.

Methodology: This was a cross-sectional study using a validated questionnaire. It involved critical nurses from three government hospitals with specialists in Kelantan. The sample size was calculated based on the study objectives and the maximum number of samples required was 424. They were proportionately and randomly selected based on the size of the hospital and wards. The questionnaire consisted of a total of 64 questions, encompassing 28 items that investigated the causes of MAEs, 16 items that explored the reasons for the not reporting of MAEs, and 20 items that approximated the percentages of MAEs that were reported. The current study obtained approval from the institutional review board. Descriptive statistics and logistic regression were applied in the study.

Results: A total of 424 critical care nurses participated voluntarily**.** Their mean age was 40.90 (6.13) years and their mean working duration was 16.83 (5.90) years. The majority perceived that the primary cause of MAEs was illegibility of physician's medication order and the main reason for not reporting MAEs because the administration focuses on the individual rather than the system when medication errors occur. The study also revealed significant factors such as nurses working in HDW (AOR = 4.87, 95% CI: 1.58, 15.02), who had personal experience with (AOR = 2.09, 95% CI: 1.11, 3.92) and had seen MAEs (AOR = 1.91, 95% CI: 1.19, 3.07) were more likely to report the incident.

Conclusion: The current study found that critical care nurses perceived that working in the HDW, and having experienced or seen MAEs were factors associated with reporting MAEs. Enhancing patient safety culture may encourage error reporting and mitigate MAE. Government hospitals should allow nurses to report problems anonymously. Rather than individual blame, a non-punitive approach and system development may increase reporting rates.

Keywords: *medication administration errors, critical care nurses' perceptions, patient safety, associated factor*

CHAPTER 1

INTRODUCTION

1.1 Introduction

1.1.1 Overview of Medication Administration Errors

Medication administration errors are described as “a deviation from the prescriber’s medication order as written on the patient’s chart, manufacturers’ preparation/administration instructions, or relevant institutional policies” (Keers *et al.*, 2013). Medication administration errors are frequently referred to as "MAEs." Medication administration errors are one of the risk areas of nursing practice that occur when there is a discrepancy between the medicine that is given to the patient and the medical treatment that the prescriber planned for the patient to get. One of the causes that might contribute is miscommunication between the patient's prescriber and the nurse. This may occur if the prescriber of the patient's medicine and the nurse are unable to communicate properly with one another (Feleke *et al.*, 2015).

Unsafe medical practices and medication errors are the leading reasons for damage and harm that could have been prevented in healthcare systems around the world. Estimates put the yearly worldwide cost of medication errors at USD 42 billion. Errors are common in prescribing, transcribing, dispensing, administering, and monitoring because of systemic problems and/or human factors, such as being tired, working in a bad environment, or not having enough staff. These errors may be fatal, causing permanent injury or disability. The purpose of the World Patient Safety Day is to raise awareness, get people involved, and encourage nations to prioritize patient safety in healthcare. The theme for World Patient Safety Day in September 2022 was "Medication Without Harm," emphasising the importance of ensuring that medications are safe for patients to use. The campaign was also include the consolidation of the

WHO Global Patient Safety Challenge: Medication Without Harm, which aimed to reduce the harm caused by medicines that could have been prevented (WHO, 2022).

Common medical practice is that errors in administering patients with medication constitute violations of one or more of the five "rights" associated with the safe and effective delivery of medicines (right patient, medication, time, dose, and route) (Hughes, 2008; Shawahna *et al.*, 2016). These five "rights" have long been embedded in nursing schools as common procedures for ensuring the safe and effective administration of medication. Yet, recent studies have highlighted the fact that medication administration is simply one part of a more involved medication use process (Hanson and Haddad, 2022; Tariq *et al.*, 2022). This procedure involves the collaboration of professionals from various disciplines to provide individualised treatment designed to address the specific requirements of each patient. Therefore, it has been emphasized that the five "rights" are insufficient to ensure administrative safety as a stand-alone operation. As a result, it was suggested that there should be four more "rights," which would consist of right documentation, action/reason, form, and reaction. In order to ensure the successful implementation of the medicine administration procedure, it is imperative to prioritise system design, encompassing elements such as technology and clinical practises. This is due to the ongoing expansion of modern healthcare delivery systems. Some of the system-related variables that may lead to medication administration errors include insufficient training, interruptions, bureaucratic processes, and inappropriate system configuration (Paul MacDowell *et al.*, 2021).

The nurses' viewpoint about the reporting of medication errors was impacted by a variety of variables, including the belief that incident reports do not result in major changes or advantages, as well as the fact that errors that caused little harm were more

likely to go undetected. Nurses' attitudes towards reporting medication errors are influenced by several factors, including the fear of negative outcomes that come with reporting and being subjected to disciplinary proceedings, the fear of being blamed, the fear of the response from the nurse management, colleagues, and the fear of losing one's job (Jember et al., 2018).

Due to the high volume of patients, medication errors are more common in settings like emergency departments and intensive care units (ICUs). Patients in intensive care units (ICUs) often have medications infused into their veins, and determining the infusion drop rate is a common clinical procedure. Nevertheless, these patients are often unconscious or in critical condition, making them unable to report or monitor any unwanted medication reactions. As a result, there may be an increase in potentially fatal medication errors in these settings (Fathy *et al.*, 2020).

1.1.2 Global Scenario on Medication Administration Errors

The accurate administration of medications is a crucial step in ensuring optimal patient treatment outcomes. Errors in medicine, which might include errors in medicine administration, continue to happen much too often all around the globe. Medicine must be appropriately supplied to patients since this is the most typical threat to their safety. It is often recognized as one of the most common factors contributing to occurrences of morbidity and mortality that take place inside the context of a hospital (Ayorinde and Alabi, 2019).

In the United States alone, 7,000 to 9,000 individuals lose their lives every year due to medication errors. Nevertheless, hundreds of thousands of additional individuals experience negative reactions or other problems related to medication, although they often do not share their experiences. The yearly overall cost of providing treatment for

persons who have been improperly connected with their medication is expected to be more than $40 billion, with over 7 million people affected. Medication errors have a multiplicative effect on the cost to treat patients who experience physical and mental distress because of their treatment. One of the worst consequences of medication errors is that they make patients less content with their care and less confident in the medical system as a whole (Tariq *et al.*, 2022).

In February 2018, a study addressing the WHO's challenge regarding medication errors in England revealed that there was an annual occurrence of 237 million medication errors throughout all stages of the medication process. Specifically, the administration of medication was identified as a phase that was prone to errors. It is worth noting that medication administration errors account for at least 50 percent of all medication incidents (Harkanen *et al.*, 2019).

Within the year preceding the survey, a notable 59.9% of nurses working in Addis Ababa's federal hospitals experienced at least one medication administration error. The most frequently reported types of medication errors included errors in timing (56.8%), documentation (33.3%), instructions (27.8%), and dosage (20%). Several factors showed significant associations with medication administration errors, namely lack of experience, working night shifts, inadequate on-the-job training, absence of pre-established medication administration guidelines, and interruptions during medication administration (Mohammed *et al.*, 2022). Medication errors are more likely to occur with intravenous treatment. It is more challenging to mitigate the negative effects of these preparations because of their rapid and complete absorption and circulation into the bloodstream, even though they may be technically complex to prepare and distribute (Sutherland *et al.*, 2020).

A study was conducted to explore the frequency and characteristics of medication administration errors in a hospital in Indonesia. The results of this investigation revealed that the most common type of medication error was related to administration. This trend could be linked to the challenging workloads frequently experienced by nurses. It is a common practice for nurses to bear the responsibility of transferring medication information from patient progress notes to medication records and prescription order forms. As the primary caregivers on the ward, nurses are entrusted with the crucial tasks of monitoring and documenting patient medication usage. Additionally, they are expected to prepare documentation for patients upon admission and discharge. These substantial workloads may have contributed to the identification of a substantial number of administration and transcription errors (Ernawati *et al.*, 2014).

1.1.3 Local Scenario on Medication Errors

A study involved 182 nurses from 15 hospitals in Perak, Malaysia, of whom 91.2% expressed their willingness to report medication errors. The primary motivation for reporting such errors was the concern for patient safety. Concerns regarding potential negative consequences such as punishments, managerial disclosure, disciplinary measures, and legal consequences were cited as reasons for non-disclosure of medication errors among certain nursing professionals. The majority of neonatal intensive care unit (NICU) nurses demonstrated a willingness to report medication errors, while the factors impeding the minority of nurses from reporting such errors warrant further investigation. It is recommended that incident reporting policies emphasize managerial reassurance to nurses who report errors, ensuring that they will not be subject to penalties (Chew *et al.*, 2022).

Reporting medication errors is a vital step in addressing these occurrences, as it promotes knowledge acquisition among healthcare providers and enhances awareness of medication safety. Preventing medication errors is highly prioritized by health managers, and healthcare providers are expected to take proactive measures when incidents are reported. Encouraging personnel to report medication errors and ensuring their understanding of the adverse outcomes associated with such errors is strongly recommended to reduce their frequency. In Malaysia, the Pharmaceutical Services Programme of the Ministry of Health established the Medication Error Reporting System (MERS) in 2009. This system serves as a platform for healthcare professionals to report medication errors they encounter (Pharmaceutical Services Programme, 2021). The national reporting system serves as a platform where healthcare professionals are encouraged to report any incidents of medication errors they come across (Zahary *et al.*, 2021).

1.1.4 Effect of medication administration errors – the burden to provider and patient safety

Moreover, medication errors can have detrimental consequences, including an elevated patient mortality rate, prolonged hospital stays, and increased healthcare costs. These errors undermine patients' trust in the healthcare system, leading to dissatisfaction. Additionally, they can contribute to heightened stress and ethical dilemmas among nurses. The impact of medication errors extends beyond the quality of patient care, negatively affecting the performance of both nurses and healthcare institutions, ultimately resulting in compromised care quality (Mostafaei *et al.*, 2014).

Some studies, on the other hand, have shown that errors in medical treatment have a major negative influence on the mental and emotional well-being of the

healthcare workers involved (Melnyk *et al.*, 2021; Mahat *et al.*, 2022). Some of these impacts may include feelings of guilt and shame, worry, fear, sadness, post-traumatic stress disorder (PTSD), and even thoughts of suicide. It has been established that unintentional errors may have long-lasting effects on certain people, including a loss of attention, sadness, burnout, poor memory, lowered clinical confidence, and poorer professional performance. Some doctors and other healthcare professionals continue to experience the incident, and they suffer from flashbacks, nightmares, and avoidance of circumstances connected with the trauma. This may lead to impairment in general functioning as well as performance at work. These worries and uncertainties may persist for a long time and have a substantial impact on a person's belief in their safety (Robertson and Long, 2018).

1.1.5 Nurses and Medication Administration Errors

Medication administration constitutes a significant portion, approximately forty percent, of a nurse's daily responsibilities. Nurses, being the final safety checkpoint, engage in medication administration regularly. Therefore, besides their professional, legal, and ethical obligations, nurses play a crucial role in identifying the root causes of errors and implementing corrective measures. To ensure the safety of medication administration, experts in the field have established standards or principles. While medication-administration errors (MAEs) can be influenced by various factors, such as the medication type, adherence to policies and procedures, participant age, level of work experience, and shift schedule, nurses' adherence to these principles holds the potential to mitigate MAEs (Bifftu and Mekonnen, 2020).

Medication errors are a shared duty among professionals in the healthcare industry. Yet, nurses play significant responsibilities since they have the most

prolonged and direct interaction with patients. Medication errors must be prevented by using a multidisciplinary, layered approach, and this must become established in the mindset of every individual who is engaged in the medication process (Bucknall *et al.*, 2019).

1.2 Problem Statement

The issue of medication administration errors remains an ongoing concern in ensuring patient safety (Paul MacDowell *et al.*, 2021). Medical errors provide a significant public health concern and are a prominent contributor to mortality rates within the United States. Identifying a consistent underlying cause of errors and subsequently designing an effective solution that successfully mitigates the likelihood of recurrence poses an enormous challenge (Tariq *et al.*, 2023). Undoubtedly, medication errors create significant costs for patients, their families, employers, hospitals, healthcare professionals, and insurance companies. Patients are the main consumers of medication administration errors (MAEs). The condition has a significant impact on patients in various aspects, including morbidity, mortality, adverse medication events, increased costs, and prolonged hospitalization (Wondmieneh *et al.*, 2020b).

1.3 The rationale of the study

According to the Pharmaceutical Services Programme Annual Report 2021 in Malaysia, there has been a steady rise in the number of cases in which medication errors have been recorded throughout the last five years, from 2017 to 2021 (Nur 'Ain Shuhaila *et al.*, 2021).