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ANALYSIS THE FACTORS CONTRIBUTING MEDICATION ADMINISTRATION ERROR AMONG NURSES; A CROSS SECTIONAL STUDY

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Abstract

Introduction: *Medication administration errors (MAEs) can have severe consequences; not only put patients at risk but impact the perfection of individual for the healthcare system. In the United States alone, these errors contribute to approximately 1.3 million cases related to morbidity of patient each year. These error may result in the need for extra treatments, longer hospital stays, higher medical costs, and, in some cases, even death. Nurses are a key part of the medication delivery process, overseeing everything from preparation to administration. However, this process is intricate and vulnerable to mistakes at multiple stages.*

Objective: *To determine the frequency and contributing factors of medication administration errors among nurses in a tertiary care hospital.*

Methodology*, this is a cross sectional study, conducted at Peoples Medical College hospital, using the non-probability convenience sample technique, and 200 nurses participated in the study.*

Results: *The majority of participants, 109 (54.5%), were aged between 31 and 40 years, followed by 61 (30.5%) in the next age group. Regarding gender distribution, 116 (58%) were male, while 84 (42%) were female. Most respondents, 112 (56%), held a Diploma in Nursing. A significant portion of participants, 122 (61%), reported frequent interruptions during medication administration, and 182 (91%) reported feeling rushed both findings were statistically significant ($p = .002$ and $p = .041$, respectively). Furthermore, 120 (60%) acknowledged having experienced a near miss or medication error, which was also statistically significant ($p = .035$).*

Conclusion: *This study concluded several contributing factors to MAEs among nurses at PMCH Nawabshah. Furthermore, frequent interruptions and feelings of being rushed during medication administration were common and statistically significant, and suggesting these are major contributors to MAEs.*

INTRODUCTION

Medication Administration Errors (MAE) have serious consequences, potentially harming patients and undermining trust in the healthcare system , causing 1.3 million morbidity the USA each year.[1,]

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MAEs lead to additional treatments, prolonged hospital stays, increased costs, and even fatalities.[2,3] Nurses play a vital role in the drug delivery chain, from preparation to administration. [4, 5] However, medication administration is a complex process prone to adverse events at various stages. [6] Globally, medication errors and near misses pose significant public health concerns, resulting in severe consequences for patients and healthcare systems.[6,7] In 2017, the World Health Organization (WHO) launched an initiative to reduce harm associated with medication errors by 50% within five years.[8] The WHO's global plan (2021-2030) aims to prevent avoidable harm, emphasizing the importance of patient and healthcare provider collaboration to improve patient safety.[8,9] Nurses have a professional and ethical responsibility to report medication errors and near misses, this enables quality and safety committees to identify, analyze, and address medication errors, ultimately enhancing patient care and safety. [10,11] Patients bear the brunt of these errors, experiencing increased morbidity, mortality, and extended hospital stays. Low-income countries are disproportionately affected, with patients facing twice the risk of disability due to medication-related harm.[12] Globally, medication errors during administration are a leading cause of disability and death. MAEs significantly impact patient safety and the quality of care, leading to extended hospital stays and increased healthcare costs for patients, families, [13, 14] and healthcare providers while existing research primarily emphasizes the six rights of medication administration, there remains a knowledge gap concerning the extent of these errors and the factors contributing to MAEs.[15,16] The aim of this study was to determine the factors that influence the medication administration errors (MAEs) among nurses.

Objectives of this study: To determine the factors contributing to medication error among nurses working the various department of at Peoples Medical College Hospital Nawabshah.

Material & Methodology: Study Design & Duration**;** this is a cross sectional study, in which non-probability convenience sample technique used. Nursing working in various department in this were enrolled, and duration of this study was February to April 2025. **Sample size**; Total 380 nurses working in this hospital, which 95% of confidential interval, 5% of margin of error, 10% of risk of drop out, the sample size of this study kept 200 registered nurse for our study. **Inclusion & Exclusion criteria** ; The Nurse who have more than one year of experience , registered from concern council ,and willing to voluntarily participation in the study were enrolled. However, those nurses who have less than one year of experience, head nurses, mangers, absent while data collection, and not willing for participation in the study were excluded from study. **ERC;** this study was approved from Ethical review committee (ERC), College of Nursing Female Nawabshah SBA. The researcher explains and gets permission from the participant organization for getting data, and consent was signed from every participant to take the part of the study. The ethical principal of informed consent, beneficence, respect for anonymity and confidentiality and privacy were applied.

Data Collection Procedure

The research tool employed in this study is a structured and validated questionnaire designed to gather data on the incidence of medication administration errors. The questionnaire comprises close-ended questions that focus on key factors contributing to medication errors, including teaching methods, time management, attendance, and health factors, among nursing professionals.

Data Analysis; The collected data organized and obtained through the SPSS software. Data analysis done by SPSS version 21, SPSS is statistical computer software for data analysis. Furthermore, p value < .05 kept significant.

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Results:

Table No. 01. Socio-demographical variable (n= 200)

S.No	Item	Frequency	Percentage
01	**Age**		
	Up to 30 Years	30	15%
	31 to 40 Years	109	54.5%
	41 & Above	61	30.5%
02	**Gender**		
	Male	116	58 %
	Female	84	42 %
03	**Education**		
	Diploma In Nursing	112	56%
	BSN	80	40%
	MSN/MSPH	08	4%
04	**Experience**		
	01 – 3 Years	29	14.5%
	3 – 5 Years	110	55%
	Above 5 Years	61	30.5%

Table No. 01. The majority of respondents 109 (54.5%) were between 31 to 40 years, followed by 61 (30.5%) aged 41 years and above, and 15% who were 30 years or younger. In terms of gender, 116 (58% of the participants were male, while 84 (42%) were female. Regarding educational background, the majority held a Diploma in nursing 112 (56%), followed by Bachelor of Science in Nursing (BSN) holders 80 (40%), and a small proportion with postgraduate qualifications such as MSN or MSPH 08 (4%). Furthermore, more than half of the participants 110 (55%) had 3 to 5 years of experience, while 61 (30.5%) had more than 5 years, and 29 (14.5%) had 1 to 3 years of experience.

Table No. 02. Medication Administration Practice (n=200)

S.No	Item	Frequency	Percentage
	How often do you administer medications to patients?		
	Daily	197	98.5%
	Occasionally	03	1.5%
	What types of medications do you most frequently administer?		
	Oral Medication	50	25%
	Parenteral Route	150	75%
	How do you typically verify patient identity before administering medications?		
	Using patient wristbands	18	9%
	Asking patients to state their name	165	82.5%
	Checking patient chart	17	8.5%

Table No. 02. A significant majority 197(98.5%) reported administering medications to patients daily, while only 03 (1.5%) did so occasionally. The type of medications most frequently administered, parenteral

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route of medications were the most common 150 (75%), followed by other routes 50 (25%). The patient identity verification, 82.5% of participants reported asking patients to state their name before administering medications, while 18 (9%) used wristbands, and 17 (8.5%) relied on checking patient charts.

Table No.03. Error Related situations & Reporting (n=200):

S.No	Item	Frequency	Percentage	*P* value
1	**How often do you experience interruptions while administering medications?**			.002
	Frequency	122	61%	
	Occasionally	65	32.5%	
	Rarely	13	6.5%	
02	**How often do you feel rushed or pressured while administering medications?**			
	Frequency	182	91%	.041
	Occasionally	17	8.5%	
	Rarely	1	0.5%	
3	Have you ever experienced a near miss or medication error while administering medications?			
	Yes	120	60%	.035
	No	80	40%	
4	**Gender of a patient can be a contributing factor to medication administration errors?**			.61
	Yes	87	43.5%	
	No	65	32.5%	
	Not sure	48	24%	
5	**Have you received training on medication safety in the past 12 months?**			…
	Yes	107	53.5%	
	No.	83	41.5%	
6	**How likely are you to report a medication administration error?**			
	Very likely	155	77.5	.77
	Somewhat likely	35	17.5%	
	Not very likely	6	3%	
	Not at all likely	4	2%	
7	**What barriers, if any, prevent you from reporting medication administration errors?**			.003
	Fear of reprisal			
	Lack of time	5	2.5%	
		195	98.5%	

Table No.03. The majority of participants reported frequent interruptions 122 (61%) and feeling rushed 182 (91%) during medication administration, both of which were statistically significant (p = .002 and p = .041, respectively). Additionally, 120 (60%) of respondents admitted to experiencing a near miss or

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medication error, which was also statistically significant (***p*** = .035). Furthermore the gender of patients, 87 (43.5%) believed it contribute to errors, not statistically significant (***p*** = .61). Additionally, 107 (53.5%) had received training on medication safety in the last year. Error reporting, most participants 155 (77.5%) indicated they were very likely to report errors, while lack of time 195 (98.5%) reported as the main barrier to reporting, which was statistically significant (***p*** = .003).

Discussion:

Occurrence of MAEs is not preventable until sources can be identified. In our study, majority of study participants were male, there is difference in frequency but it is proven that male nurses commit more MAEs. In this study approximately 48% participants had less than five years clinical experience, slightly higher proportion was found in a study. [16,17] This study revealed a high frequency of MAEs , one potential explanation for this variation may be the different clinical settings involved many of these international studies focused solely on specific units.[18,19,] Moreover, the studies cited were conducted in more developed healthcare systems with advanced infrastructure. These settings often implement voluntary error-reporting systems, electronic medical records, and dual-verification processes for high-risk medications all of which contribute to a reduced incidence of medication errors.[20,21] In our study, most participants held a diploma in nursing, which is consistent with findings from similar research.[22] This underscores the need for enhanced in-service training, particularly for diploma-holding nurses, with a focus on safe medication administration practices. Interestingly, a separate study found that nurses with a Bachelor's degree or higher were more likely to commit medication errors.[23] Nurse staffing shortages have been identified in several studies as a significant risk factor for medication errors. Our findings align with this observation, as nurses who made errors were often responsible for administering medications to a large number of patients. [24, 25] The frequency of MAEs was significantly associated with the nurses' treating opposite gender of patient. In contrast, research has shown that nurses managing the gender related tend to report fewer errors, likely due to more favorable nurse-to-patient ratios and a more balanced workload.[26] These findings highlight the urgent need for ongoing in-service training programs, especially for younger male nurses working in high-pressure ward environments. [26,27] Special emphasis should be placed on modules related to safe medication administration and error prevention.

Conclusion:

This study concluded several contributing **factors** to MAEs errors among nurses at PMCH Nawabshah. Furthermore, frequent interruptions and feelings of being rushed during medication administration were common and statistically significant, suggesting these are major contributors to MAEs. Additionally, a significant proportion of nurses reported experiencing near misses or actual medication errors, emphasizing the urgent need for systemic improvements in workflow, staffing, and error-prevention protocols.

Recommendation: Strengthening support systems, improving work environments, and promoting continuous professional development may help reduce medication errors and enhance patient safety.

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