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COMPARATIVE ASSESSMENT OF MEDICATION ERROR PREVALENCE, DETERMINANTS, AND REPORTING PRACTICES AMONG NURSES AT (LUH) JAMSHORO/HYDERABAD

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Abstract

Objective: This study investigates medication errors in Liaquat University Hospital (LUH) Jamshoro/Hyderabad, Pakistan. It examines the prevalence, root causes, and reporting of these errors from the perspective of nurses.

Background: Medication errors rank among the most frequent medical mistakes in healthcare systems globally. These errors can happen at any point in the medication process, such as during prescribing, transcribing, dispensing, or administering medications. Causative issues include poor communication, staffing shortages, lack of training, and system failures. These errors not only compromise patient safety but also affect healthcare professionals emotionally and professionally.

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Study design and methods: This descriptive study was conducted over four months. Using a non-probability convenience sampling method (NPCSM), a separately calculated sample of nurses was selected. Data were collected using a structured, pre-formed questionnaire. The tool comprised items across four sections: demographic data, ten ranked causes of medication errors, estimated percentage of errors reported (1%–100%), and six yes/no items on nurses' views toward error reporting analysis was carried out with the help of MS excel.

Results: Over the span of their professional careers, nurses reported a mean of 3.39 self-recalled medication errors. The study of 109 nurses revealed a low average medication error reporting rate of 23.24%. Common error causes included miscalculations, poor labeling, and illegible handwriting. Despite confidence in identifying errors, fear of blame and disciplinary action hindered reporting. These findings highlight a need for a supportive reporting culture.

Conclusion: Medication errors are a common and serious issue in healthcare that compromise patient safety and affect healthcare workers emotionally. This study at Liaquat University Hospital revealed that nurses experience multiple medication errors but report less than a quarter of them, largely due to fear of blame and disciplinary action. Common causes include miscalculations, poor labeling, and illegible handwriting. Studies have estimated that medication errors occur at an average rate of 1.9 errors per patient per day.

Implications for research, policy, and practice: Healthcare institutions should enhance nurse education on medication safety, establish clear labeling standards, and implement anonymous reporting within a blame-free culture. Supportive leadership and mandatory ongoing training must be prioritized to reduce errors and improve patient safety.

- Medication errors (omissions or commissions) occur globally at rates from 1.9%–80%, mostly during prescribing or transcription; about half are preventable, and some are fatal (1).
- Causes include poor prescriptions, incorrect dosages, calculation errors, staff shortages, and nurse fatigue or depression (2).

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- Medication errors are underreported, especially in developing countries; common ones include wrong time, dose, or route, leading to patient harm and staff burnout (3).

INTRODUCTION

The term "medical error" refers to a wide array of events, which can differ in severity and may potentially harm patients. According to the 2019 World Health Organization (WHO) Patient Safety Factsheet, Unsafe patient care ranks among the top ten causes of death and disability globally. However, it's essential to recognize that healthcare is a complex and constantly evolving field. where numerous factors come into play, and critical decisions are often made rapidly. This complexity is key to identifying the fundamental causes of adverse events (4). Commonly studied types of medical errors include errors in surgery, diagnostic mistakes, medication errors, equipment malfunctions, patient falls, infections acquired in the hospital, and failures in communication (5). Documentation errors are the most frequent type of medication error, representing 43.06% (118) of all medication errors. In hospitalized patients, a medication error is reported to happen once a day on average (6). Several factors can contribute to the under-reporting of medical errors, particularly in developing nations. A major reason is the lack of efficient reporting systems within healthcare institutions, along with the absence of clear organizational policies addressing error reporting (7). However, because medical errors include different kinds of disasters (e.g., diagnostic or medication errors) Medical errors can lead to a range of outcomes, including near-misses, patient injuries, or incidents causing no harm. However, reported rates of these errors vary widely across studies. One study estimated that approximately 400,000 hospitalized patients involvement avoidable harm each year, while another reported that preventable medical errors contribute to more than 200,000 patient deaths annually (8). Moreover, the projected economic impact of medical errors differs significantly across studies. Certain analysts estimate the total yearly cost to be roughly $20 billion, whereas others suggest that hospital-acquired infections by themselves may contribute between $35.7 billion and $45 billion to annual healthcare spending (5). Medication errors have a significant economic impact

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on healthcare systems, society, and patients. They lead to longer hospital stays, diminished trust in healthcare organizations, and decreased productivity for patients and healthcare workers (9). In Pakistan, medication errors like incorrect prescriptions, drug overdoses, self-medication, and adverse drug reactions lead to the deaths of up to 500,000 individuals annually, containing women and children (10). A study conducted in Karachi found that 7.5% of doses were missed, and 17% were given at incorrect times (11). Another study from Karachi highlighted that 21% of medication errors occurred. In Quetta, Pakistan, one study revealed that 74.4% of errors were related to missed doses (6).

Today's healthcare environment, patient safety is a critical measure of the quality of care, directly impacting the success and longevity of healthcare organizations (12). Present study, evoked medication errors as the medication mistakes with various number. the nurses could remember making throughout their careers. The medication error rate was determined by averaging the rates of reported errors submitted by nurses to their managers through incident reports (13). Furthermore, Healthcare authorities need to be knowledgeable about the numerous forms of medical errors to better comprehend the potential contrary events they might cause. With the recognition of the inadequacies, failures, and hazard factors which contribute to these events, the recommended actions needs to be considered to prevent analogous mistakes in the future. As a result, those involved in all areas of healthcare can play a role in applying effective preventive measures to minimize future medical errors and improve patient safety (14).

Objective

This study investigates medication errors in Liaquat University Hospital (LUH) Jamshoro/Hyderabad, Pakistan. It examines the prevalence, root causes, and reporting of these errors from the perspective of nurses.

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Background

***Rate of Medication Errors*:** The IOM defined a medical error as the failure to carry out the proposed way of action or the application of an inappropriate proposal for the achievement of desirable result. Other experts describe medical errors as deviations from established care protocols, which may or may not lead to patient harm. Furthermore, medical errors can be classified into two types: errors of omission and errors of commission. Errors of omission lead to negative outcomes by failing to take necessary actions (e.g., not securing a patient that use the wheelchair or avoid to stabilize a gurney before transmitting to a patient), while faults of commission rise due to direct actions taken by healthcare providers (e.g., giving a medicine to allergic patient or incorrectly labeling of wrong patient's name by a laboratory specimen) (15). The estimated rate of medication errors is 1.9 %patients in each day (1), with approximately 5% of these errors being fatal and nearly half being preventable (16). The occurrence of medication errors is a global concern, with reports showing that in healthcare settings, MAEs (Medication Administration Errors) range from 9.4% to 80% in countries like the UK, USA, the Middle East, and East Africa (17). Between 2018 and 2020, the sum of medication errors were recognized as 4860, with 66.9% being related to ordering, recommending, or transcribing medications (18). on the other hand, a study on 6,705 charts identified 410 medication errors, accounting for 6.11%, with common errors including transcription (44.1%), prescription (40%), and administration (14%) (19).

Medication Errors Causes: The stem from various causes of Medication errors, including poorly written orders, calculation mistakes, and issues with medication administration, insufficient documentation, and lack of patient knowledge, nursing shortages, and equipment failures, such as infusion pumps (20). Incomplete prescriptions and incorrect doses also contribute significantly to errors, as observed in studies showing that 50.2% of errors were due to incomplete prescriptions and 22.9% were due to incorrect doses (19). Saleh et al. studied at Mansoura Teaching University Hospital establish that 'wrong time' and 'wrong route' existed the commonly occurring medication

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errors (23.1% in each). It revealed important links among sleep medication usage, errors related to medication, depression, and tiredness. Linear regression showed that various number of patients underneath a nurse's care and the nurse's depression mark was independent predictors of medication errors (2). Healthcare professionals should have a clear understanding of the different types of medical errors for better identification. The potential risks and argumentative events they may lead to. By identifying the underlying causes, letdowns, and risk factors that take part in the contribution of these incidents, corrective arrangements can be taken to avoid future occurrences. In turn, those involved in all aspects of healthcare can collaborate to put in place effective strategies that reduce medical errors and enhance patient safety (5, 21).

Reporting of Medication Errors: The significantly underreported Medication errors are especially in developing countries (22). Later reports have attributed medical errors to underlying systemic problems, while some have emphasized certain patient populations that could be more prone to experiencing such errors (23, 24). Nurses, as frontline healthcare workers, are directly involved in the administration of medications, making them particularly vulnerable to errors (25). Recently, there has been increased focus on how medical errors affect not only patients but also their families and healthcare workers, contributing to higher levels of burnout, decreased job performance, deteriorating mental health, and even thoughts of suicide (3). Saaghafi and Zargarzadeh studied at the major hospitals of Isfahan and Iran. They analyzed 8,162 records, with 8,000 being complete and used for analysis. These records came from 565 patients and were composed in four stages, each with 2,000 records (1,000 from each hospital). Administration errors were examined as 41.5% and 34% at Al-Zahra Hospital and Dr. Shariati Hospital. Error which were commonly reported as wrong time (15.6%) (Refers to occurred when a drug was given more than an hour early or late), unauthorized dose (4.7%), under-dose (4.6%), extra dose (4.5%), wrong route (3.3%) (Wrong route errors involved administering an intravenous drug subcutaneously), and wrong frequency (0.5%) respectively. Although many errors were wrong time-related, none resulted in fatalities. Additionally,

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about 1% of doses had more than one administration error (26).The psychological impact of making medication errors on nurses can be profound, often leading to anxiety, self-blame, and anger towards both their own actions and the environment in which they work (27).

Study Design and Methods

Study Design:

A cross-sectional research was carried out to assess nurses' perspectives on rate, causes, and reporting practices of medication errors.

Study Setting:

The study is conducted in the medical and surgical allied departments at Liaquat University of Medical and Health Sciences (LUH) in Jamshoro/Hyderabad.

Study Population:

The study population consisted of staff nurses working at LUH hospitals in Jamshoro and Hyderabad

Simple size:

The size of sample was calculated 109 participants, using the RaoSoft online sample size calculator, by using parameters as: confidence level was 95% with 5% of error.

Sampling Technique:

Data were collected using a non-probability convenience sampling method, which involved selecting participants on the basis of availability and willingness of participate.

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Data Collection Process:

Permission was granted by the Medical Superintendent of LUH Hospital, Jamshoro, and Hyderabad. The study's objectives, methods, potential risks, and benefits were clearly told to the Participants. Both verbal and written informed permission were gained, ensuring voluntary participation and the freedom to withdraw at any time without affecting their care.

Data Collection Tool:

The data was collected on a pre-formed questionnaire tool, same questionnaire was applied for nurses. The questionnaire divided in to four Sections 1,2,3,4 It was partially adopted by Majd t. Mrayyan et al form their research on the topic of "Rate, origins and reporting of medication errors in Jordan: nurses' Perspectives

The questionnaire section A contained the demographic data of the subjects. Section B, had Ranked marks of sources of medication errors for the entire sample had 10 items and having option of 1 to 10 ranks. Section C in your approximation, what proportions of all committed Drug errors are described to the Nurse Manager with the completion of an incident report? Had only estimation 1% to 100% and D section, Ranked nurses' opinions by reporting medication errors for entire sample had 06 items and having option of Yes and No.

Data Analysis:

The data were investigated as descriptive statistics, including frequency and percentage, stander deviation (SD) mean were used to summarize the data.

Ethical Considerations:

Approval to conduct the study was gained from the Medical Superintendent of LUH Hospital, Jamshoro and Hyderabad. The information of study's purpose, procedures, potential risks, and benefits of this study was completely told to the participants. Both verbal and written informed

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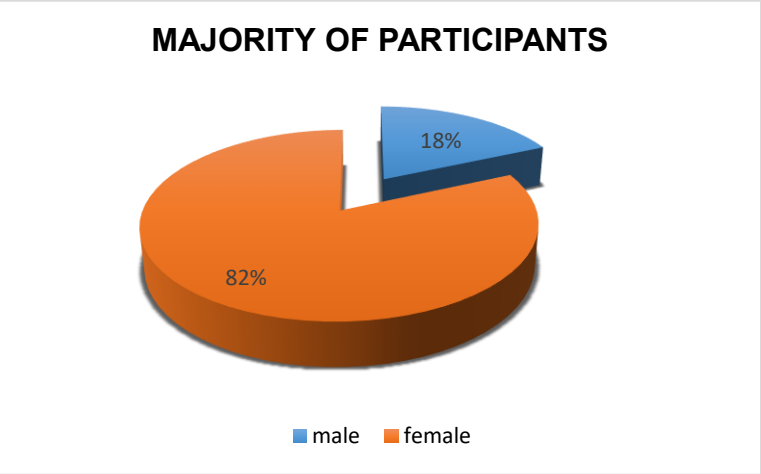
permission was obtained, ensuring that participation was voluntary and that participants has self-wish to withdraw at any time without any significances.

Results

The study included 109 participants The demographic characteristics of the sample, as shown in Table 1, reveal that the majority of participants were female (81.65%), while males accounted for 18.34%. The age distribution was fairly balanced, with 30.29% of respondents being under 25 years, another 30.29% aged between 25 and 34 years, 22.01% falling within the 35-44 age range, and only 0.91% being 45 years and older. In terms of education, 47.70% held a diploma, 38.53% had a bachelor's degree, and 4.57% possessed a master's degree or higher.



Regarding professional experience, 30.27% of nurses had administered medications for 6–12 months, 13.67% for 1–2 years, 27.52% for 3–4 years, 15.54% for 5–9 years, and 12.84% had 10 or more years of experience. Similarly, their general nursing experience followed a comparable pattern, with the highest percentage (31.19%) in the 1–2 years category, followed by 30.29% in the 6–12 months range. Those with 10 or more years of nursing experience made up 12.84% of the sample. In terms of work characteristics, 82.56% of respondents were employed full-time, while 17.43%

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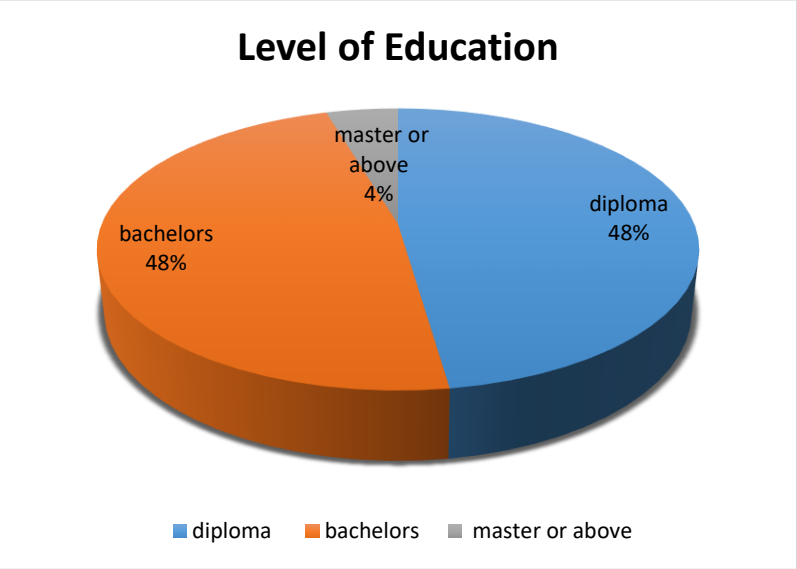
worked part-time. The majority worked day shifts (55.96%), while 25.68% worked rotating shifts, 11% worked evening shifts, and 2.33% worked night shifts. Their primary work areas included general wards (33.03%), critical care units such as ICU and emergency (27.52%), pediatric wards (6.42%), and other wards (33.03%). In the complete course of their nursing profession, the usual number of evoked dedicated medication errors per nurse was 3.39.



Medication administration and errors were also examined. The number of reported medication errors varied, with 26.60% of nurses stating they had never made an error. Others reported having committed one (7. 33%), two (11.92%), three (9.17%), four (10.09%), five (11.00%), six (8.25%), seven (2.75%), eight (4.58%), nine (3.66%), and ten or more errors (4.58%) over their careers. The rate of errors reported to nurse managers via incident reports the results from (Table 2) show the distribution of recalled committed medication errors reported to nurse managers through incident reports. Out of 109 respondents, the majority (33.9%) reported between 1–10% of errors, followed by 21.1% who reported 11–20% of errors. Fewer respondents reported higher percentages of medication errors, with only 0.9% indicating that they reported 91–100% of errors. The calculated

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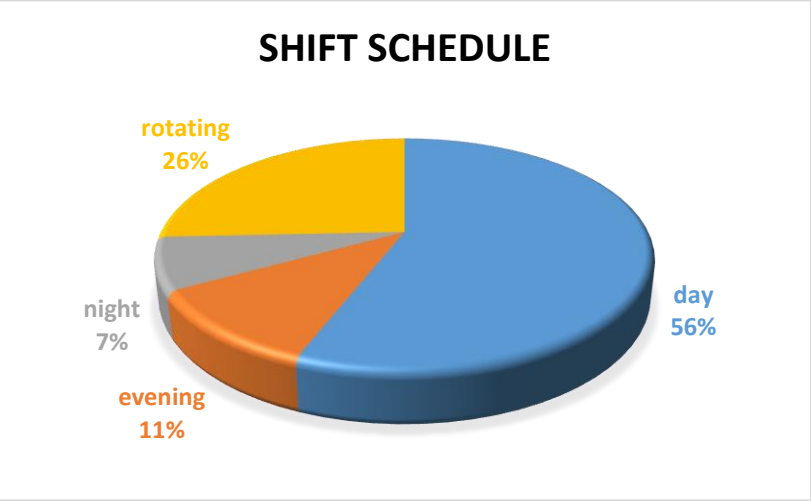
average percentage of medication errors reported was 23.24%, suggesting that, on average, nurses reported just under one-quarter of the medication errors they committed. This indicates a potential underreporting trend and highlights the need for a supportive reporting culture within healthcare settings.



The causes of medication errors (Table 3) included issues such as nurses failing to check the patient's name band against the medication administration record (mean = 9.91), illegible physician handwriting (mean = 10.1), poor-quality medication labels (mean = 10.4), drug name confusion (mean = 10.4), and incorrect dosing prescribed by physicians (mean = 10.7). Other factors included nurses miscalculating doses (mean = 10.7), incorrect setup of infusion devices (mean = 10.3), distraction by coworkers or unit events (mean = 10.4), and exhaustion (mean = 9.91).

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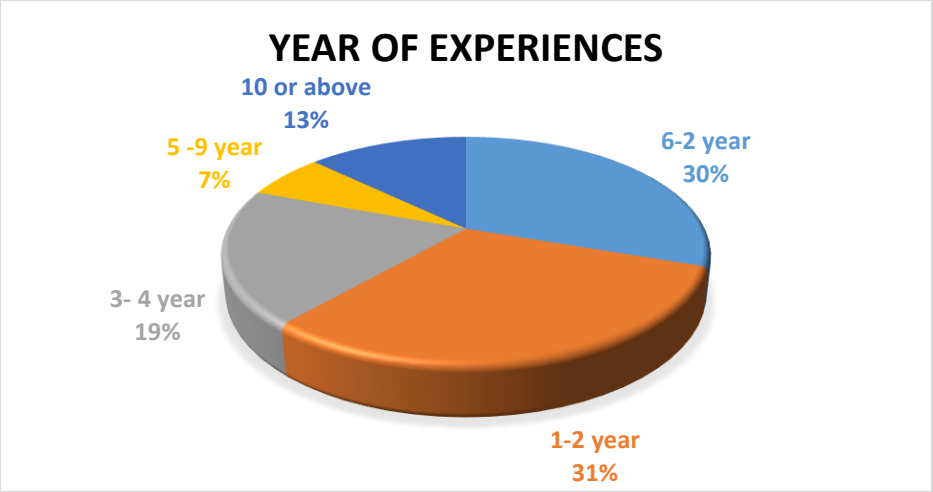

Table 1: Sample's Demographic characteristics (n= 109)

Variables	n*	%
1. Demographic Information		
Gender		
Male	20	18.34
Female	89	81.65
Age		
Less than 25 years	33	30.29
25-34 years	33	30.29
34-44 years	24	22.01
45-54 years and above	19	17.43
Higher level of Education		
Diploma	52	47.70
Bachelors degree	52	47.70
Master degree and above	5	4.57

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2. professional experience		
Length of period of administering medications		
6-12 months	33	30.27
1-2 years	15	13.67
3-4 years	30	27.54
5-9 years	17	15.54
10 years or more	14	12.84
Years of experience in nursing		
6–12 months	33	30.29
1–2 years	34	31.19
3–4 years	21	19.26
5–9 years	7	6.42
10 years or more	14	12.84
3. Work Characteristics		
Employment Status		
Full-time	90	82.56
Part-time	19	17.43
Shift Schedule		
Shift worked		
Day	61	55.96
Evening	12	11
Night	08	2.33
Rotating	28	25.68

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Primary Work Area		
Critical Care Units (ICU, pediatrics ICU, Emergency)	30	27.52
General Wards (medical ,surgical)	36	33.027
Pediatric ward	7	6.42
0thers wards	36	33.027
4. Medication Administration and Errors		
Number of Medication Errors Over Nursing Career		
0	29	26.60
1	08	6.422
2	13	33.027
3	10	9.17
4	11	10.09
5	12	11
6	13	8.25
7	03	2.75
8	05	4.58
9	04	3.66
10 or more	05	4.58
	109	3.39

Range (%) of reported Medication errors	Midpoint (x)	Frequency (f)	%	x × f (Midpoint × Frequency)
0	0	3	2.7	0

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1–10	5.5	37	33.9	203.5
11–20	15.5	23	21.1	356.5
21–30	25.5	16	14.6	408
31–40	35.5	10	9.1	355
41–50	45.5	8	7.3	364
51–60	55.5	3	2.7	166.5
61–70	65.5	4	3.6	262
71–80	75.5	2	1.8	151
81–90	85.5	2	1.8	171
91–100	95.5	1	0.9	95.5
Total N =109		Overall Average=23.24%		

Table 2

Recalled committed medication errors reported to the nurse managers by incident report

Finally, ranked views on reporting medication errors (Table 4) revealed that 68.81% of nurses were confident in identifying what constitutes a medication error, and 66.97% knew when to report errors via an incident report. However, barriers to reporting were evident, as 57.80% of nurses admitted to not reporting errors due to fear of the nurse manager's reaction, while 44.95% feared negative responses from coworkers. Additionally, 55.05% had failed to report errors they deemed insignificant, and 56.88% refrained from reporting due to fear of disciplinary action or job loss.

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Table 3: Ranked scores of causes of medication errors for the whole sample

CAUSES OF MEDICAL ERROR	SD	MEAN	1	2	3	4	5	6	7	8	9	10
Medication errors occur when the nurse fails to check the patient's name band with the Medication Administration Record (MAR.)	3.23	9.91	13.7	14.6	7.34	7.34	7.33	13.7	8.25	8.25	6.42	11.9
Drug errors occur when the physician's writing on the doctor's order form is difficult to read or illegible	3.59	10.1	12.8	12.8	7.33	7.34	9.17	17.4	11.9	6.42	9.17	6.42
Drug errors occur when the medication labels/packaging are of poor quality or damaged	3.79	10.4	18.3	13.7	11.9	11.9	11.0	10.1	6.42	7.33	6.42	7.34
Drug errors occur when there is confusion between two drugs with similar names	4.08	10.4	19.2	11.9	8.25	8.25	13.7	12.8	9.17	9.17	6.42	5.50
Drug errors occur when the physician prescribes the wrong dose	4.03	10.7	21.1	9.17	10.1	10.1	11.9	9.17	7.34	11.9	10.1	6.42
Drug errors occur when the nurse miscalculates the dose	2.96	10.7	15.6	8.25	12.8	12.8	11.0	12.8	11.0	5.50	9.17	8.25
Drug errors occur when the nurse sets up or adjusts an infusion device incorrectly	4.39	10.3	15.6	14.6	12.8	12.8	11.0	13.7	9.17	4.58	3.67	5.50
Drug errors occur when nurses are confused by the different types and functions of infusion devices	4.72	10.4	18.3	13.7	13.7	13.7	4.58	13.7	7.34	6.42	7.34	5.50
Drug errors occur when nurses are distracted by other patients, coworkers or events on the unit	3.15	10.4	18.3	9.17	11.0	11.0	10.0	11.0	8.25	11.0	7.34	7.33
Drug errors occur when nurses are tired and exhausted	4.38	9.91	20.2	10.1	7.34	7.34	11.0	13.7	5.50	6.42	7.34	10.`1

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Table 4

Ranked nurses' views on reporting medication errors for the whole sample

VIEWS ON REPORTING MEDICATION ERRORS	YES	%	NO	%
I am usually sure what constitutes a medication error.	75	68.8	34	31.1
I am usually sure when a medication error should be reported using an incident report	73	66.9	36	33.0
Some medication errors are not reported because nurses are afraid of the reaction they will receive from the Nurse Manager.	63	57.7	46	42.2
Some medication errors are not reported because nurses are afraid of the reaction they will receive from their coworkers.	49	44.9	60	55.0
Have you ever failed to report a drug error because you did not think the error was serious to warrant reporting?	60	55.0	49	44.9
Have you ever failed to report a medication error because you were afraid that you might be subject to disciplinary action or even lose your job?	62	56.8	47	43.1

Discussion

This study investigated nurses' perceptions, experiences, and reporting behaviors regarding medication errors at Liaquat University Hospital & Medical Sciences (LUH), Jamshoro. The findings reflect both consistencies with international literature and highlight context-specific

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challenges that may be addressed to enhance patient safety and promote a culture of accountability. The outcomes of present study provide significant perceptions into the demographic profile, professional experience, medication error incidence, and the factors influencing the reporting behavior of nurses regarding medication errors.

Demographic Profile and Experience: The study sample was predominantly female (81.65%), reflecting the general gender distribution seen in the nursing profession globally. More than half of the females organized joining nurse.

Some of the studies conducted in Jorden on the basis of population training. The age distribution was relatively balanced, with a considerable proportion of nurses (60.58%) aged between 25 and 34 years, suggesting a workforce composed largely of early-career professionals (28). Educational attainment showed that most nurses held either a diploma (47.70%) or a bachelor's degree (38.53%), with a smaller percentage having pursued postgraduate education. Medication errors are a serious health issue that put patient safety at risk and need urgent attention from healthcare workers and decision-makers. This study looked at how nurses at Wad-Medani Teaching Hospitals view the causes of medication errors and how they report them. Most of the nurses were young women with less than ten years of experience. Also, nurses with diploma qualifications were the most common. These results are similar to those found in a study done in Jordan (29).

Professional experience data revealed a concentration of nurses with 6–12 months (30.27%) or 3–4 years (27.52%) of experience in medication administration. Similarly, general nursing experience was highest among those with 6–12 months (30.29%) and 1–2 years (31.19). This suggests a relatively inexperienced cohort, which may be a contributing factor to medication errors, as inexperience is often linked to a higher incidence of clinical mistakes.

Medication Errors and Causes: Medication errors were prevalent among participants, with only 26.60% reporting never having made an error during their career. The remaining 73.40% reported

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at least one incident, with error frequency spread across the sample. Notably, 52.29% had reported between 1 and 10 errors to nurse supervisors on the basis of incident reports, indicating a moderate level of transparency in reporting but also possibly pointing to underreporting. Throughout their nursing careers, approximately two-thirds of the nurses recalled being involved in medication errors. These findings are consistent with studies conducted in Southern California and Iran (30, 31).

The most commonly cited causes of medication errors included informed about the medication errors occur because physician's handwriting is challenging to read so the nurses are confused and exhausted, the current study is based on the medication errors reported by nurses. It occurs due to poor quality of damaged packaging or medication labeling (32). Similarly, Medication errors can occur due to a variety of preventable factors within the clinical environment. One common cause is when nurses fail to properly verify the patient's identity by checking the name band beside the Medication Administration Record (MAR), leading to potential mismatches. Additionally, nurse fatigue and exhaustion significantly impair judgment and focus, increasing the likelihood of drug errors. Dosage miscalculations are another frequent source of error, often resulting from lapses in attention or mathematical mistakes. Unsatisfactory quality or broken medication labels and packaging can also contribute to confusion during administration. Furthermore, distractions caused by other patients, coworkers, or events occurring on the unit can disrupt a nurse's concentration, further elevating the hazard of medication errors. The issues highlight the need for systematic safeguards and supportive working conditions to ensure patient safety. These findings underscore the multi factorial nature of medication errors, implicating not only individual competency but also systemic flaws in healthcare delivery.

Barriers to Incidence Reporting: Reporting medication errors is a critical challenge in modern healthcare settings. The prevention of these errors is closely tied to the accurate documentation and reporting of such incidents (31). The most commonly perceived barrier to reporting medication errors (MEs) among nurses was uncertainty about who holds responsibility

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for reporting them (66.6%). This was closely followed by fear of being blamed (65.4%), fear of facing disciplinary action (64.9%), and a lack of understanding regarding the value or purpose of reporting MEs (63.7%). In contrast, the belief that reporting errors not linked to patient harm is unnecessary was the least cited barrier, reported by 55.4% of nurses (33). Correspondingly, Despite relatively high awareness, with 68.81% of nurses stating they were sure what constituted a medication error and 66.97% indicating they knew when to report one, significant barriers to reporting were identified. More than half of the respondents admitted to not reporting errors due to fear of the nurse manager's reaction (57.80%) or fear of disciplinary action or job loss (56.88%). Additionally, many nurses (55.05%) failed to report errors they deemed insignificant, and 44.95% were concerned about coworkers' reactions.

Furthermore, the implications of these findings extend beyond LUH Jamshoro/ Hyderabad They underscore systemic challenges within the healthcare system, including inadequate staffing, poor communication practices, and a lack of structured policies regarding error reporting. Addressing these issues will require institutional commitment to building

a culture of safety, encouraging transparency, and providing accessible, anonymous, and non-punitive reporting systems.

Conclusion

Medication errors continue to pose a significant global threat to patient safety, with an estimated 1.9 errors occurring per patient per day. Studies have shown that nearly 66.9% of errors are linked to the ordering, prescribing, or transcribing stages, while transcription (44.1%), prescription (40%), and administration (14%) errors are among the most frequent. Contributing factors include incomplete prescriptions (50.2%), incorrect dosages (22.9%), and system failures such as equipment malfunctions and inadequate staffing. Errors such as wrong time and wrong route account for 23.1% each in some hospital settings, highlighting a widespread need for process improvement.

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Implications for research, policy, and practice

The data suggests that enhancing nurse education on medication safety, particularly for early-career nurses, could be beneficial. Interventions to address systemic contributors such as poor labeling and confusing drug names are also necessary. Importantly, healthcare institutions must work toward establishing a blame-free culture that encourages reporting and prioritizes learning from errors over punishment. Leadership training for nurse managers should emphasize supportive and constructive responses to error reporting to mitigate fear among staff.

Moreover, regular training on identifying, preventing, and reporting medication errors should be integrated into continuing professional development. Establishing anonymous reporting mechanisms may further alleviate fear-related barriers.

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