RESEARCH ARTICLE

Assessment of Knowledge, Attitude, and Practices about the Management of Medication Errors among Healthcare Professionals in District Sialkot, Pakistan

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Abstract:

Introduction: Medication errors are often involved in reported adverse events. Research has revealed the need for improved knowledge in drug dose, dosage form, and medication knowledge, as a whole, is poorly investigated. The purpose of this survey was to study the medication knowledge, certainty, and estimated risk of errors. **Methodology:** A cross-sectional study was conducted with a validated questionnaire in IITH, IIH Cantt, and different community pharmacies of Sialkot, Punjab, from April to May 2025. The questionnaire consists of four sections. The first contains demographic variables. The second portion assesses the knowledge of HBV infection and its vaccination. The third portion is about the attitude of healthcare workers towards the vaccination, and the last portion evaluates the practice of healthcare workers. To calculate the sample size of the study, the absolute error was estimated to be 5% and a 95% confidence level was used. **Result:** This study investigated the knowledge, attitudes, and practices regarding medication errors among 150 healthcare professionals in Sialkot, Pakistan. Most participants were aware of medication errors, with a significant proportion familiar with the five rights of medication administration and supportive of error reporting. The primary causes of errors were identified as poor communication, inadequate training, and heavy workloads. Older professionals had a better understanding of administration practices, while doctors and pharmacists showed higher confidence in reporting errors compared to nurses. Access to reporting systems varied by work setting. The study suggests that further training and better communication are essential to reduce errors and improve patient safety. Recommendations include expanding the study to other hospitals and implementing feedback systems. **Discussion:** Medication errors are a significant concern, with 76% of healthcare professionals experiencing them on a regular basis. Most agree on the importance of error reporting, and technology can help prevent errors. Targeted training and improved reporting systems are necessary to enhance patient safety. Healthcare professionals support error reporting; however, blame culture and a lack of training remain significant barriers.

Key Words: Medication Error, Drug therapy, Healthcare Professionals, Five rights of medication administration, Error reporting.

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1. INTRODUCTION

Medication error is defined as "A failure in the treatment process that leads to, or has the potential to lead to, harm to the patient." This definition implies that the treatment process has fallen below some attainable standard. A medication error happens when the wrong medication or dose is given to a patient, different from what the doctor ordered. Unfortunately, medication errors are common in hospitals[1]. The treatment process includes diagnosis, treatment, investigation, prevention, and monitoring of disease or physiological changes. This encompasses not only therapeutic drugs but also other compounds, as well as the manufacturing or compounding, prescribing, transcribing, dispensing, and administration of a drug, and the subsequent monitoring of its effects. The term "harm" in the definition implies not only physical harm but also "lack of benefit," a form of treatment failure. The definition does not specify who makes the error, as it could be a doctor, nurse, pharmacist, caregiver, or another healthcare professional. Similarly, it does not specify who is responsible for preventing errors, emphasizing the importance of a collective effort to prevent medication errors and ensure patient safety. Describing medication errors through the psychological approach is preferred as it explains why errors occur, rather than just describing them.

1.1. Types of Medication Error

Knowledge-based mistakes: errors due to lack of knowledge, Rule-based mistakes: errors due to incorrect application of rules, Action-based errors (slips): errors due to technical difficulties or accidents, Failures of skill: errors due to inadequate skill or training. Knowledge-based errors can be related to any type of knowledge, general, specific, or expert. It is general knowledge that penicillin can cause allergic reactions; knowing that your patient is allergic to penicillin is specific knowledge; knowing that co-fluampicil contains penicillin is expert knowledge. Ignorance of any of these facts could lead to a knowledge-based error[2]. Rule-based errors can further be categorized as (a) the misapplication of a good rule or the failure to apply a good rule; and (b) the application of a bad rule. Action-based errors occur when someone unintentionally performs an action, such as writing the wrong medication prescription. This can also include technical errors, such as adding the wrong amount of medication to an IV. Memory-based errors occur when someone forgets something important, like giving a patient a medication they're allergic to. These types of errors highlight the importance of accurate knowledge, following rules, and being careful when taking action. Detecting medication errors is crucial, and several methods are used, including anonymous reports, incident reports, and direct observation. Observation is the most accurate way to detect errors, and it can be done discreetly. To ensure the reliability of medication error studies, results are carefully evaluated and categorized based on their validity. Studies that use observation as the detection method are considered the most reliable[1].

1.2. Prevalence:

This study was carried out in different outpatient settings in Karachi, where prescriptions containing beta-blocker drugs were collected and analyzed. A total of 450 prescriptions were included in this study. In two cases, the medication forms were missing; 1627 medication errors were detected in 450 prescriptions. The most frequent medication error was that the patient's weight was not mentioned (95%), followed by missing diagnosis (79.4%) and drug-drug interaction (65.2%). Ambiguous orders, potentially leading to an overdose, were found in 1.1% of prescriptions[2, 3]. In 1999, the medication errors contributed to around 7,000 deaths annually, with clinical error being the most common cause. Various studies suggest that medication-related incidents account for 6–12% of hospital admissions and contribute to 2 out of every 1,000 hospital deaths, highlighting the significant public health concern[3]. These errors may represent up to one-third of all medical mistakes in hospitals and can lead to higher mortality rates, longer hospital stays, and increased medical costs. Medication errors can cause significant harm to patients, particularly within hospital settings. They are defined as "any preventable event that may result in inappropriate medication use or patient harm while under the control of healthcare professionals, patients, or consumers[4]. The National Patient Safety Agency reported that in the UK, medication errors occurred at every stage of the medication process, with 16% during prescribing, nearly one-fifth during dispensing, and about half of them during drug administration. Medication errors are left unrecorded in healthcare settings worldwide. This underreporting happens across all stages of the medication processprescribing, dispensing, and administration. Contributing factors include gaps in healthcare professionals' knowledge, incorrect attitudes, miscommunication, a culture of blame, fear of punishment, and concerns over potential job termination. Pharmacy staff can also make mistakes when giving out medications, which is called a dispensing error.

Enhancing patient safety is a crucial aspect of healthcare quality and a primary focus in the global healthcare landscape. Medication errors are frequently identified as a significant source of unintended harm to patients, leading to adverse events that compromise patient safety. While medication therapy is vital in healthcare, it can also pose serious and lifethreatening risks if not properly administered[5].

Nurses play a vital role in promoting patient safety. Medication administration errors and malpractice are among the most underreported issues worldwide. These errors can significantly affect a patient's healthcare costs, quality of life, and the overall delivery of nursing care. Therefore, enhancing nurses' understanding of medication errors and their potential consequences is crucial to tackling these challenges. Research has shown a strong link between the frequency of medication errors among nurses and their level of knowledge regarding medication administration. Pharmacists are essential in helping to prevent medication mistakes. They carefully check patients' medications and alert doctors and nurses if they spot any errors. This helps to keep patients safe and ensures they receive the right treatment. By having pharmacists as part of the healthcare team, hospitals can reduce the number of medication errors and provide better care for their patients[5].

Errors in dose calculation, lack of double-checking, poor adherence to protocols, and especially inadequate drug knowledge among professionals are the strongest contributors to medical error rates. Current prevention strategies primarily focus on identifying failures and redesigning systems to prevent these issues by addressing the relationship between causes (or individual factors) and the surrounding environment [6].

1.3. Objectives:

The study of medication errors is crucial for several reasons:

Medication errors can lead to serious complications, prolonged hospital stays, or even fatal outcomes. Identifying and addressing the root causes can significantly reduce harm. A thorough understanding of medication errors enables healthcare professionals to develop safer prescribing and administration practices. Preventable medication errors contribute to increased treatment costs due to additional medical interventions, extended hospital stays, and legal implications. Healthcare institutions and professionals must adhere to strict legal and ethical guidelines. Studying medication errors ensures compliance with regulatory standards. Analyzing medication errors allows healthcare providers to refine their clinical decision-making skills and improve their overall competence. A reduction in errors leads to enhanced patient recovery and safety. Identifying common errors helps in refining processes such as electronic prescribing and barcode medication administration. Addressing medication errors fosters teamwork among physicians, pharmacists, and nurses. Research findings contribute to policy development, staff training, and improved clinical guidelines. The selection of this topic is justified by its critical role in patient safety and healthcare efficiency. By studying this issue, healthcare professionals can contribute to evidence-based strategies that minimize errors, ultimately improving patient care and institutional credibility.

2. METHODOLOGY

2.1. Ethical Approval

The ethical approval number assigned to this study is **IICP/ERB/01**.

2.2. Study design, Location, and Duration

This was a cross-sectional study conducted in Imran Idrees teaching hospital and Imran Idrees Hospital cantt and different community pharmacies. The duration of the research was April to May 2025. Before beginning of this study the ethical approval has granted by the ethical committee of Imran Idrees College of Pharmacy. The official permission has granted by the medical superintendent of both hospitals.

2.3. Study population

The study population was comprised upon healthcare workers that are working in different departments of the hospitals and before enrolling the questionnaire the official permission has granted by the Medical Superintendent of both hospitals.

2.4. Inclusion Criteria

Healthcare workers of both the hospitals were willing to participate in the study.

2.5. Exclusion criteria

Healthcare workers were not willing to participate in the study.

2.6. Study tool

The instrument used in this study was consist of four sections. The first contain demographics variables including age, gender, profession, level of education, years of experience and employment status. The second portion assess the knowledge of HBV infection and their vaccination. The third portion is about the attitude of healthcare workers towards the vaccination and the last portion evaluate the practice of healthcare workers regarding the medication error.

The selected sample include doctors, nurses, pharmacists and para medical staff. The questionnaire was reviewed and validated by face and content validation was conducted by experts in academia. These questionnaires were pre-tested on 15 health workers who were excluded from the main study to assess their language, fluency, and understanding of the questions. After the pilot study, the questionnaire was adjusted accordingly to achieve the desired goal of the study and the Cronbach alpha value is 0.6.

2.7. Sample size calculation

To calculate the sample size of the study the absolute error was estimated to be 5% and 95% confidence was used. The time period of data collection is April to May 2025.

2.8. Statistical analysis

Descriptive statistics was applied for data summarization. The relationship between the dependent variable and the independent variable was determined by the pearson chi square test.

3. RESULT

3.1. Description of descriptive statistics on demographic data

A total of 150 healthcare professionals participated in the study assessing the prevalence of knowledge, attitude, and practice regarding medication errors. Of the participants, 59 (39.3%) were male and 91 (60.7%) were female. The majority of participants (n = 92, 61.3%) were between the ages of 20 and 30 years, followed by 31–40 years (n = 35,

23.3%), 41–50 years (n = 15, 10%), 51–60 years (n = 6, 4%), and 61–70 years (n = 2, 1.3%). In terms of professional roles, the sample included 62 doctors (41.3%), 43 nurses (28.7%), and 46 pharmacists (30%). Regarding their current work setting, most participants (n = 100, 66.7%) were working in hospitals, while 18 (12%) were in hospital pharmacies, another 18 (12%) in community pharmacies, and 14 (9.3%) in clinics. With respect to professional experience, 49 participants (32.7%) had less than one year of experience, 64 (42.7%) had 1–5 years, 13 (8.7%) had 6–10 years, and 24 (16%) had more than 10 years of experience.

Table 3. 1 Description of descriptive statistics on demographic data

VARIABLES		FREQUENCIES (N)	PERCENTAGES (%)
GENDER	Male	59	39.3
	Female	91	60.7
	Total	150	100.0
AGE	20-30 year	92	61.3
	31-40 year	35	23.3
	41-50 year	15	10.0
	51-60 year	6	4.0
	61-70 year	2	1.3
	Total	150	100.0
PROFESSIONAL ROLE	Doctor	62	41.3
	Nurses	43	28.7
	Pharmacists	46	30.0
	Total	150	100.0
CURRENT WORK SETTING	Hospital	100	66.7
	Hospital Pharmacy	18	12.0
	Community Pharmacy	18	12.0
	Clinic	14	9.3
	Total	150	100.0
YEARS OF EXPERIENCE	Less than 1 year	49	32.7
	1-5 year	64	42.7
	6-10 year	13	8.7

> 10 years	24	16.0
Total	150	100.0

3.2. Description of Knowledge, Attitude and Practice on medication error

The study assessed the knowledge of 150 healthcare professionals regarding medication errors. The results showed that 148 (98.7%) participants were aware of medication errors, while 2 (1.3%) were not. In terms of familiarity with the five rights of medication administration, 141 (94%) participants responded yes, and 9 (6%) responded no. Most participants, 142 (94.7%), believed that reporting medication errors improves patient safety, while 8 (5.3%) did not. However, only 116 (77.3%) participants had access to a reporting system, whereas 34 (22.6%) did not. The majority of participants, 133 (88.7%), knew the difference between a medication error and an adverse reaction, while 17 (11.3%) did not. Furthermore, 143 (95.3%) participants recognized the role of clear communication in preventing medication errors, and 7 (4.7%) did not. Similarly, 141 (94%) participants acknowledged the importance of documenting medication errors, and 9 (6%) did not. The study further explored healthcare professionals' perspectives on medication errors. When asked if taking patient history can prevent medication errors, the majority of participants, 133 (88.7%), affirmed this, while 17 (11.3%) disagreed. In terms of understanding the role of drug interactions in medication errors, 113 (75.3%) participants confirmed their understanding, whereas 37 (24.7%) indicated a lack of understanding. When questioned about awareness of strategies to reduce medication errors in high-risk areas, 94 (62.7%) participants acknowledged being aware, while 56 (37.3%) reported being unaware. The most common types of citrus medication errors reported were wrong medication, with 61 (40.7%) participants citing this, followed by wrong dosage, 50 (33.3%), wrong patient, 18 (12%), wrong route, 10 (6.7%), and wrong time, 11 (7.3%). The most common causes of medication errors in healthcare settings were identified as poor communication, with 57 (38%) participants citing this, lack of proper training, 41 (27.3%), workload, 26 (17.3%), misinterpretation of prescription, 32 (21.3%) and inadequate drug labeling, 7 (4.7%). Overall, the study highlights the complexities and challenges surrounding medication errors in healthcare settings. The study further explored healthcare professionals' perspectives on medication errors. When asked about the importance of reporting medication errors, 120 (80%) participants considered it very important, 25 (16.7%) considered it important, and 5 (3.3%) were neutral. Regarding regular reporting of medication errors in healthcare institutions, 89 (59.3%) participants strongly agreed, 39 (26%) agreed, 13 (8.7%) were neutral, 8 (5.3%) disagreed, and 1 (0.7%) strongly disagreed. When asked if the healthcare system should focus adequately on preventing medication errors, 96 (64%) participants strongly agreed, 42 (28%) agreed, 10 (6.7%) were neutral, and 2 (1.3%) disagreed. In terms of comfort level in reporting medication errors, 62 (41.3%) participants were very comfortable, 65 (43.3%) were comfortable, 10 (6.7%) were neutral, and 13 other options weren't clear but as per given data 2 (1.3%) were uncomfortable. When questioned about the role of

technological systems in preventing medication errors, 70 (46.7%) participants strongly agreed, 55 (36.7%) agreed, 15 (10%) were neutral, and 10 (6.6%) strongly agreed, he study further explored healthcare professionals' perspectives on medication errors. When asked if there is enough support to report medication errors in their institution, 44 (29.3%) participants strongly agreed, 45 (30%) agreed, 39 (26%) were neutral, 19 (12.7%) disagreed, and 3 (2%) strongly disagreed. Regarding the frequency of encountering medication errors, 26 (17.3%) participants reported very often, 50 (33.3%) occasionally, 66 (44%) rarely, and 8 (5.3%) never. When asked about regular training programs to prevent medication errors, 83 (55.3%) participants said yes, and 67 (44.6%) said no. In terms of following specific protocols to prevent medication errors, 101 (67.3%) participants said yes, and 49 (32.7%) said no. When asked about verifying patient allergies before administering medication, 111 (74%) participants said yes, and 39 (26%) said no, the study highlights the varying levels of support, training, and protocols in place to prevent medication errors. When asked if they verify patient identity before administering medication, 127 (84.7%) participants said yes, and 23 (15.3%) said no. When a medication error occurs, 80 (53.3%) participants reported it to their supervisor, 32 (21.3%) notified the patient immediately, 18 (12%) documented the error, and 20 (13.3%) reviewed the error with their team. To minimize medication errors, 49 (32.7%) participants used medication safety checklists, 22 (14.7%) used electronic prescribing, 52 (34.7%) used double - checking, and 27 (18%) used patient counseling and education. To reduce medication errors in their healthcare settings, 71 (47.3%) participants suggested enhancing training programs, 32 (21.3%) suggested improved medication labeling and packaging, 9 (6%) suggested introducing automatic systems, and 38 (25.3%) suggested adding more staff to reduce workload, the study highlights the various strategies and improvements that can be implemented to reduce medication errors.

3.3. Association of age with health-related questions

The study found a statistically significant relationship between age groups and familiarity with the Five Rights of Medication Administration (P-value: 0.034). Older age groups (4170 years) showed 100% familiarity, while younger age groups (20-30 years and 31-40 years) had lower familiarity rates (89% and 82.9%, respectively). Additionally, age groups differed significantly in perceived improvements for reducing medication errors (P-value: 0.023). Younger respondents (20-30 years) prioritized enhanced training programs (52.2%) and improved labeling (27.2%), while those aged 31-40 years emphasized reducing overload (48.6%) and training (34.3%). Older respondents (41-60 years) also highlighted training and reducing overload as key priorities. These findings suggest a need for targeted education and training in medication administration practices, particularly among younger age groups.

Table 3. 3 Association of age with health-related questions

VARIABLES	AGE	20-30 YEAR	31-40 YEAR	41-50 YEAR	51 – 60 YEAR	61 – 70 YEAR	TOTAL	P-VALUE
FAMILIAR WITH FIVE RIGHTS OF MEDICATION ADMINISTRATION	Yes N (%)	89 (96.7)	29 (82.9)	15 (100.0)	6 (100.0)	2 (100.0)	141 (94.0)	0.034
	No N(%)	3 (3.3)	6 (17.1)	0 (0.0)	0 (0.0)	0 (0.0)	9 (6.0)	
	TotalN(%)	92(100.0)	35(100.0)	15(100.0)	6 (100.0)	2 (100.0)	150 (100.0)	
IMPROVEMENTS HELPFUL IN REDUCTION OF MEDICATION ERRORS	Training programs N(%)	48 (52.2)	12 (34.3)	8 (53.3)	2 (33.3)	1 (50.0)	71 (47.3)	0.023
	Improved labeling and	25 (27.2)	3 (8.6)	2 (13.3)	1 (16.7)	1 (50.0)	32 (21.3)	
	automated systems N (%)	6 (6.5)	3 (8.6)	0 (0.0)	0 (0.0)	0 (0.0)	9 (6.0)	
	reduce workload N (%)	13 (14.1)	17 (48.6)	5 (33.3)	3 (50.0)	0 (0.0)	38 (25.3)	
	Total N(%)	92 (100.0)	35 (100.0)	15 (100.0)	6 (100.0)	2 (100.0)	150 (100.0)	

3.4. Association of gender with health-related questions

A statistically significant relationship exists between gender and knowledge of communication rules in preventing medication errors (P-value: 0.03). All male respondents (100%) demonstrated knowledge, while 92.4% of female respondents showed awareness, with 7.6% lacking knowledge. Additionally, gender influences perceptions of

common causes of medication errors (P-value: 0.023). Male respondents attribute errors to poor communication (48.3%), lack of training (15.5%), and misinterpretation (15.5%), whereas female respondents cite lack of training (34.8%), poor communication (27.2%), and overload (19.6%). These findings suggest gender differences in awareness and perceptions, highlighting the need for targeted education and training.

Table 3. 4 Association of gender with health-related questions

VARIABLES	GENDER	MALE	FEMALE	TOTAL	P VALUE
ROLE OF CLEAR COMMUNICATION	Yes N (%)	58 (100.0)	85 (92.4)	143 (95.3)	0.031
	No N(%)	0 (0.0)	7 (7.6)	7 (4.7)	
	Total N(%)	58 (100.0)	92 (100.0)	150 (100.0)	
MOST COMMON CAUSES OF MEDICATION ERROR	Poor communication N(%)	28 (48.3)	25 (27.2)	53 (35.3)	0.026
	Lack of training N(%)	9 (15.5)	32 (34.8)	41 (27.3)	
	Workload N(%)	8 (13.8)	18 (19.6)	26 (17.3)	
	Inadequate drug labeling N(%)	4 (6.9)	3 (3.3)	7 (4.7)	
	Misinterpretation N(%)	9 (15.5)	14 (15.2)	23 (15.3)	
	Total N(%)	58 (100.0)	92 (100.0)	150 (100.0)	

3.5. Association of professional role with health related questions

Professional roles significantly influence opinions and practices related to medication safety. A statistically significant relationship exists between professional roles and beliefs about reporting medication errors (P-value: 0.012), with doctors (98.4%) and pharmacists (97.8%) showing strong agreement, and nurses (86%) slightly lower agreement. Professional roles also impact knowledge of communication's role in medication safety (Pvalue: 0.021), awareness of documenting medication errors' importance (P-value: 0.046), and adherence to specific protocols (P-value: 0.019), with varying levels of awareness and adherence among doctors (100%, 96.8%,) nurses (88.4%, 97.7%, 65.1%), and

pharmacists (95.6%, 86.7%, 53.3%). Additionally, professional roles influence beliefs about taking patient history (P-value < 0.001), understanding drug interactions (P-value: 0.014), and potential improvements to reduce medication errors (P-value: 0.013). Doctors prioritize enhanced training (59.7%) and improved labeling (16.1%), nurses suggest training (41.9%) and labeling (30.2%), and pharmacists recommend training (35.6%), staffing (28.9%), and labeling (20%). These findings highlight the need for tailored education, training, and interventions to enhance patient safety across different professional roles

Table 3. 5 Association of professional role with health-related questions

VARIABLES	PROFESSIONAL ROLE	DOCTOR	NURSE	PHARMACIST	TOTAL	P VALUE
REPORTING MEDICATION ERRORS IMPROVES PATIENT SAFETY	Yes N (%)	61 (98.4)	37 (86.0)	44 (97.8)	142 (94.7)	0.012
	No N (%)	1 (1.6)	6 (14.0)	1 (2.2)	8 (5.3)	
	Total N(%)	62 (100.0)	43 (100.0)	45 (100.0)	150 (100.0)	
ROLE OF CLEAR COMMUNICATION PREVENTING MEDICATION ERRORS	Yes N (%)	62 (100.0)	38 (88.4)	43 (95.6)	143 (95.3)	0.021
	No N(%)	0 (0.0)	5 (11.6)	2 (28.6)	7 (4.7)	

3.6. Association of current work setting with health-related questions

Current work settings significantly influence medication safety practices. Access to reporting systems varies, with hospitals having the highest rate (81%) and hospital pharmacies the lowest (61.1%) (P-value: 0.038). Belief in taking patient history is high across settings, with hospital pharmacies showing unanimous agreement (100%) and hospitals having a high rate (92%) (P-value: 0.006). Adherence to specific protocols also varies, with hospitals having the highest adherence rate (76%) and hospital pharmacies having the lowest (44.4%) (P-value: 0.013). Opinions on regular reporting differ, with hospitals showing strong agreement (62%) and community pharmacies showing lower strong agreement (44.4%) (P-value: 0.017). Support for technological systems and allergy verification rates also vary across settings, with hospitals strongly supporting technological systems and having the highest allergy verification rate (80%) (P-values: 0.042 and 0.023). Priorities for improvement include enhanced training, more staff, and improved labeling, with varying emphasis across settings (P-value: 0.050). Patient identity verification rates also differ, with hospitals

having the highest rate (90%) and clinics having the lowest (71.4%) (P-value: 0.011). These findings highlight the need for tailored solutions and standardized protocols to ensure safe medication administration across different healthcare settings.

Table 3. 6 Association of current work setting with health-related questions

VARIABLES	CURRENT WORK SETTING	HOSPITAL	COMMUNITY PHARMACY	HOSPITAL PHARMACY	CLINIC	TOTAL	P VALUE
HEALTHCARE SYSTEM SHOULD FOCUS ADEQUATELY ON PREVENTING MEDICATION ERROR	Strongly agree N(%)	65 (65.0)	8 (44.4)	8 (44.4)	8 (57.1)	89 (59.3)	0.017
	Agree N(%)	26 (26.0)	3 (16.7)	6 (33.3)	4 (28.6)	39 (26.0)	
	Neutral N(%)	6 (6.0)	4 (22.2)	2 (11.1)	1 (7.1)	13 (8.7)	
	Disagree N(%)	3 (3.0)	3 (16.7)	2 (11.1)	0 (0.0)	8 (5.3)	
	Strongly disagree N(%)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.1)	1 (0.7)	
	Total N(%)	100 (100.0)	18 (100.0)	18 (100.0)	14 (9.3)	150 (100.0)	
ACCESS TO REPORTING SYSTEM TO REPORT MEDICATION ERROR	Yes N (%)	81 (81.0)	14 (77.8)	11 (61.1)	10 (71.4)	116 (77.3)	0.038
	No N (%)	19 (19.0)	4 (22.2)	7 (38.9)	4 (28.6)	34 (22.7)	
	Total N(%)	100 (100.0)	18 (100.0)	18 (100.0)	14 (100.0)	150 (100.0)	

3.7. Association of years of experience in healthcare with health related questions

Years of experience in healthcare significantly influence opinions on reporting medication errors and the role of technological systems. For reporting errors, strong agreement rates increase with experience: 53.1% (<1 year), 57.8% (1-5 years), 69.2% (6-10 years), and
70.8% (>10 years). Regarding technological systems, opinions also vary by experience:
55.1% (<1 year) and 69.2% (6-10 years) strongly agree, while those with >10 years show 33.3% strong agreement and 54.2% agreement. The P-values (0.03 and 0.028) indicate a statistically significant relationship between experience and opinions on reporting and technology. These
findings highlight the importance of fostering a culture of transparency and safety, as well as targeted training and implementation of technological systems, to enhance patient safety across different levels of experience.

Table 3. 7 Association of years of experience in healthcare with health-related questions

VARIABLES	YEARS OF EXPERIENCE IN HEALTHCARE	LESS THAN 1 YEAR	1-5 YEAR	6-10 YEAR	MORE THAN 10 YEARS	TOTAL	P VALUE
MEDICATION ERRORS SHOULD BE REPORTED	Strongly agree	26	37	9	17	89	0.03
	N(%)	(53.1)	(57.8)	(69.2)	(70.8)	(59.3)	
	Agree	21	16	0	2	39	
	N(%)	(42.9)	(25.0)	(0.0)	(8.3)	(26.0)	
	Neutral	0	6	3	4	13 (8.7)	
	N(%)	(0.0)	(9.4)	(23.1)	(16.7)		
	Disagree	2	5	1	0	8	
	N(%)	(4.1)	(7.8)	(12.5)	(0.0)	(5.3)	
	Strongly disagree	0	0	0	1	1	
	N(%)	(0.0)	(0.0)	(0.0)	(4.2)	(0.7)	
	Total	49	64	13	24	150	
	N(%)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	
TECHNOLOGICAL SYSTEM PLAYS AN IMPORTANT ROLE IN	Strongly agree	27	26	9	8	70	0.028
	N(%)	(55.1)	(40.6)	(69.2)	(33.3)	(46.7)	
	Agree	15	26	1	13	55	
	N(%)	(30.6)	(40.6)	(7.7)	(54.2)	(36.7)	
	Neutral	3	9	0	3	15	
	N(%)	(6.1)	(14.1)	(0.0)	(12.5)	(10.0)	

PREVENTING MEDICATION ERROR	Disagree N(%)	4 (8.2)	3 (4.7)	3 (23.1)	0 (0.0)	10 (6.7)
	Total N(%)	49 (100.0)	64 (100.0)	13 (100.0)	24 (100.0)	150 (100.0)

4. Discussion

Medication errors play a significant role in influencing the safety of patients. The research focus was to investigate the triggers of medication errors if strategies that can be adapted and implemented to reduce failure occurrence of medication errors. In the current study, out of a total of 150 professional healthcare participants, 98.7% reported awareness of medication errors, with only 1.3% indicating a lack of awareness. This demonstrates a significantly higher level of awareness compared to a previous study where, among 323 healthcare professionals, only 64.6% acknowledged knowledge of medication errors. Furthermore, in the present research, 60.5% of participants reported frequently encountering medication errors, and an additional 15.5% experienced them often, indicating that 76.0% of respondents face medication errors regularly highlighting the urgency and prevalence of this issue in clinical practice. In the published study, the overall response rate was 57%, with 43% for doctors, 68% for nurses, and 64% for pharmacists. Doctors were less likely to report less-serious medication errors, with a median Likert score of 2, while nurses and pharmacists were more likely to report both serious and less-serious errors, with a median score of 5, despite fears of disciplinary action. In comparison, the study we conducted showed that 94.7% (142 out of 150 participants) believed that reporting medication errors improves patient safety, while only 5.3% (8 out of 150 participants) disagreed. This shows that while the published study reflects variation in actual reporting behavior based on role and error severity, the present study demonstrates a high level of agreement (94.7%) among participants about the importance of error reporting for patient safety[7]. The data from the international study showed that out of 16 national medication safety experts (response rate 50%), 11 countries had either a national or local medication error reporting system, while 5 countries had no such system in place. Common features of existing systems included confidentiality and feedback, with experts emphasizing that an effective system should be nonpunitive and educational. However, barriers such as blame culture, lack of time, training, and poor coordination were noted. In comparison, the present study found that out of 150 participants, 77.3% (116 individuals) reported having access to a medication error reporting system, while 22.7% (34 individuals) indicated no access. This shows that while the international study focused on system-level features and expert perceptions, the present study highlights that a significant portion of frontline participants still lack access to a proper reporting system[6]. The data from the referenced study showed that out of 3,027 emergency department patients, 9.78% (296 individuals) experienced an adverse drug reaction, of which 1.72% (52 individuals) were related to medication errors. These medication error–related ADRs included issues involving prescribed drugs, treatment discontinuation, and drug interactions. ADRs caused by medication errors were found to be significantly less severe. In comparison, the study we conducted found

that 88.7% (133 out of 150 participants) were able to differentiate between medication errors and ADRs, while 11.3% (17 participants) could not. This suggests that although medication errors contribute to a smaller portion of overall ADRs, the ability to distinguish between the two is well recognized by most participants in the present study, which is important for ensuring patient safety and improving error prevention strategies. Medication errors can stem from inadequate education in pharmacology during undergraduate programs. Fortunately, targeted training courses have proven effective, reducing errors by 54%. However, a recent study of 53 participants revealed disparities in training gaps, with 15% of male participants and 4.8% of female participants reporting a lack of training, underscoring the need for improved education and training initiatives. Hospital pharmacists generally hold a positive opinion towards reporting Adverse Drug Reactions (ADRs), despite the relatively low reporting rate[8]. This finding is consistent with other studies. In a recent survey of 150 healthcare professionals, a significant majority (65%) strongly agreed on the importance of reporting medication errors in healthcare institutes, highlighting a favorable attitude towards error reporting and patient safety. A study was conducted on the sample population, 133 patients (39%) reported allergies to at least one drug. Allergies to β-lactams, sulfonamides, and opioid narcotics were reported in 12.6% (43 patients), 9.1% (31), and 14.4% (49) of the sample population, respectively. Most agents involved in medication errors were β-lactam antibiotics, with an overwhelming number of these errors due to piperacillin-tazobactam (51.4%, 36 errors). Other drugs involved were ampicillin (10%, 7 errors), other β-lactams (24.3%, 17 errors), opioid narcotics (10%, 7 errors), and sulfonamides (4.3%, 3 errors). Most contributing factors were classified as the MD i.e. the prescribing physician was not aware of the patients allergy before the drug administration. The results of our study conducted within the time duration of 4 months, revealed that about 80% of healthcare professionals working in hospital setting do check for allergies in patients before drug administration and 20% of participants do not verify patients allergies. In addition to hospital settings, we conducted a study on 18 participants working in community setups in district Sialkot, out of which 13 participants (72.2%) showed their interest in checking for allergies in patients prior to drug administration and the remaining 5 participants (27.8%) do not encounter. In Hospital pharmacy, out of 18 pharmacists, 10 participants (55.6%) verify the allergies and remaining 8 (44.4%) showed no interest towards verification of allergies. At last in clinical setups, 14 participants were targeted, from which 8 (57.1) healthcare professionals check for patient allergy history, prior to drug administration and remaining 6 participants (42.9%) do not verify[9]. Physicians and other providers may feel a variety of adverse emotions after medical error, including guilt, shame, anxiety, fear, and depression. It is thought that the pervasive culture of perfectionism and individual blame in medicine plays a considerable role toward these negative effects. In addition, studies have found that despite physicians' desire for support after medical error, many physicians feel a lack of personal and administrative support. This may further contribute to poor emotional well-being. Potential solutions in the literature are proposed, including provider counseling, learning from mistakes without fear of punishment, discussing mistakes with others, focusing on the system versus the individual, and emphasizing provider wellness. Much of the reviewed literature is limited in terms of an emergency medicine focus or even regarding physicians in general. In addition, most studies are survey-

or interview-based, which limits objectivity. While additional, more objective research is needed in terms of mitigating the effects of error on physicians, this review may help provide insight and support for those who feel alone in their attempt to heal after being involved in an adverse medical event[9].

5. Conclusion

The study demonstrates valuable prevalence of knowledge, attitudes and practices regarding medication errors among healthcare professionals. The findings include that most of healthcare professionals have a good knowledge and understanding of medication errors. However, there is still a need of improvement.

5.1. Study strength and limitations:

Studying medication errors among healthcare professionals has limitations, including reliance on self-reported data and potential biases. The cross-sectional design may not capture changes over time. Limited sample sizes or specific settings can affect generalizability. Additionally, underlying factors contributing to errors may not be fully explored. Future research should consider longitudinal designs and objective measures to improve validity. This can provide a more comprehensive understanding of medication errors.

5.2. Future Recommendations:

To expand the scope to include major hospitals across Pakistan to compare a more accurate data. We should setup a feedback system in which it would be more clear to the hospital staff about their ratio of medication errors and it will also help in the growth of hospital. It will be more welcoming and satisfactory for the patients. This attitude will build a trustworthy relation among hospital and patients.

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