

Nurses' Attitudes towards Medication Error Reporting and Maintaining Pharmaceutical Quality Assurance: A Systematic Review

Uzma Shafiq¹, Amal Hamoud Alamrani², Afaf Hamoud Hussin Alomrani³, Heba Hamoud Alamrani⁴, Eman Abdullah Essa Al Hammaqi⁵, Zahra Abdullah Eissa Alhamagi⁶, Sara Mohammed Alabdullah⁷, Zainab Ali Al Ghirash⁸, Abdulaziz Ibrahim Alduhailan⁹, Abdulmonim Salman Alamer⁹

¹NUML (ORCID:0009-0001-2872-2676)

²Nurse, King Fahad Specialist Hospital, Tabuk

³Nurse, Haql General Hospital, Tabuk

⁴Nurse, Primary Health Care Center, Tabuk

⁵Nursing And Midwifery, Al Mubarakyah Primary Healthcare Center

⁶Emergency Nursing Specialist, Dammam Medical Complex

⁷Nursing Specialist, King Faisal General Hospital, Alhasa

⁸Nurse, Aljaber Kidneys Center, Al Hassa

⁹Pharmacy Technician, King Fahad Hospital, Hufuf

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ABSTRACT

Background: Medication administrative errors (ME) are rampant in nursing practice and cause harm to patient safety and quality of care. Campaigns to lessen occurrence of such errors have persisted over time however, they remain a major issue in health care organizations due to; insufficient training, ineffective communication, and silence. Many researchers have concentrated their efforts towards identifying factors associated with frequency, their possible strategies and ME to reduce ME with specific emphasis on nursing practice.

Aim: The purpose of this paper is to investigate factors that causes medication errors in nursing practice and to discuss the measures that should be taken to minimize medication errors according to existing literature.

Method: Ten relevant works concerning medication errors in the nursing practice were reviewed systematically. The studies employed quantitative, qualitative and mixed methods and combined cross-sectional survey, interviews, and observations conducted in different healthcare contexts in different countries.

Results: This research shows that medication errors are often caused by elements like; low training, communication and low reporting systems. Thus, tendencies suggesting that factors like nurse education, technology integration, and better organizational culture can decrease mistakes and must be followed. Nevertheless, underreporting continues to be a major problem; since many are discouraged by the adverse consequences that come with reporting their mistakes.

Conclusion: In nursing practice, the occurrence of medication errors, remains area of concern to patient safety. Preventing and correcting such mistakes entail concerted efforts that include; improving people's education, popularizing effective organizational culture that supports error correction and applying technology to the errors reporting and control processes. Further research should be conducted on how long-term treatments can be implemented and in what ways cultural differences affect error management.

Keywords: Medication errors, patient safety, nursing practice, error reporting, communication, interventions, education, healthcare systems.

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INTRODUCTION

Medication errors as a nursing problem in healthcare organizations are very alarming and have a major effect on the patient safety and clinical results. Nurses are the key people responsible for giving medications and as such assume the responsibility of recognizing and documenting medication errors^(1,11,37). Generally, the attitudes towards medication error reporting are important as a part of the context of patient safety. Although medication errors are

well acclaimed to be a safety concern globally, many go unaddressed as many are not reported mainly due to a lot of reasons such as fear of being punished^(4,35,36), lack of support or because there are no adequately, sufficient reporting system employed in various organization⁽²⁾. The present study uncovers the determinants endorsing or underlying the nurses' attitudes towards reporting of such occurrences and their engagement in enhancing medication safety. In most healthcare organizations, medication errors

are not just due to staff negligence but rather are a consequence of a failure in the health care system of the hospital⁽³⁾. Various duties of the nurses when it comes to accurate medication administration includes confirmation of prescriptions, delivery of the right drug, right amount, and right route as well as dealing with side effects⁽⁴⁾. It becomes clear that, whenever mistakes happen, nurses are met at this crossroads of several responsibilities and possible outcomes of those errors. Nevertheless, they are willing to report these errors due to personal, professional and institutional factors^(5,35). Maps collected from the literature review reveal multiple factors including cultural factors, organizational requirements, available support given to the nursing personnel etc. where all these aspects affect perception and handling of errors within the health care setting^(6,34).

Nurses' perception towards medication errors and reporting thereof remains relative to their training and experience, the perception of organizational culture on reporting medication errors. In some healthcare facilities, they foster an environment that is 'blame- oriented' which keeps nurses from reporting mistakes owing to the fear of being punished⁽⁷⁾. On the other hand, an open environment that practices nursing error disclosure and analysis encourages the nurses to report the errors willingly. When nurses learn that the safety reporting systems do not result in punitive actions being taken against those involved it becomes clear that more accurate details of how and why accidents occurred will be provided^(8,33). A useful by-product of these information snapshots, then, could be the generation of information that may be useful in the formation of preventive measures against future medication-related occurrences^(2,5,8,9).

Medication safety is another vital area of nursing practice related to pharmaceutical quality assurance⁽¹⁰⁾. While nurses are responsible for the administration of medication, they also have responsibility for the quality of the medications at all stages of the medication process. It also covers matters concerning the storage of drugs and drug retrieval from ward stock, observing the complements of drugs received and checking the integrity of the drug in the stock before dispensing^(11,33). It is indispensable in the effort of protecting the quality of the drugs so that errors pertaining to the use of expired or improperly preserved medication do not have an ill effect on patient health^(3,7,12). Quality assurance of pharmaceuticals means that nurses need to pay much attention on best practices and legal requirements as to medication management in health systems⁽¹³⁾.

The nurses and pharmacists are the key players as far as the issue of maintenance of pharmaceutical quality assurance is concerned⁽¹⁴⁾. The roles of a pharmacist lie in formulating, dosage and preparing the drugs which is dispensed by him or her for use by nurses who on the other hand, give the drugs to the patients^(2,8,14). This increases medication safety responsibility between Jo and Tim and quality assurance between the two. Nurses depend on the pharmacists for advice on matters concerning medications and on the nurses' side, pharmacists expect the nurses to adhere to the laid down procedures when administering medications in

case they develop some complications^(15,35). This teamwork can improve the safer medication practices and make sure that the patients receive the best quality care ever^(16,36).

In reporting medication errors and pharmaceutical quality assurance, technology has also recorded a great role in its development⁽¹⁷⁾. Some of the technologies that have been adopted in healthcare setting with a view of minimizing the otherwise increased cases of medication mistake include electronic health records (EHR), computerized physician order entry (CPOE), barcode medication administration (BCMA)^(5,13,17,18). These systems are used in nursing practice and the attitudes toward the use of such technologies are regarded as determinants of the said interventions. If nurses regard these technologies as enabling tools to their role in medication safety then, there would be a positive change towards medication management⁽¹⁹⁾.

Although medication error reporting and pharmaceutical quality assurance are crucial, the research reveals that there is the need for further refinement of these qualities^(20,37). Some nurse- oriented research indicate that although nurses understand the necessity of error reporting, there are still issues that inhibit them from being active in error documenting processes⁽²¹⁾. Various formal structural factors like inadequate staffing and lack of time to do the reporting, and poorly defined hierarchical reporting system hinders nurses from writing their mistakes⁽²²⁾. In addition, poor training and educating information-reporting disparities probably indicates inadequate means of reporting or reduced rate of adequate training and education on the method of reporting errors^(4,11,23). Moreover, the observation done here shows that nurse' perceptions of their roles in the quality maintenance of pharmaceuticals also depends on their experience, training, and the clinical resources in their working environments⁽²⁴⁾.

It is just to lack appreciation for the nurses' attitude within the profession and about medication error reporting and their part in appreciable in pharmaceutical quality assurance for better medication safety within the healthcare system^(25,26,27). Implementing supportive organizational culture, clear procedure for reporting, proper education along with inter-professional cooperation and support among the representatives of the healthcare system enables nurses to speak up promoting the quality of pharmaceuticals^(28,29,30). All of above will improve patient safety, the quality of care, and reduce instance of medication errors and their consequences on the patient's status^(31,32,33,34).

Problem Statement

The problem of medication errors has become endemic in healthcare organizations and continuing to directly and indirectly harm patients, the healthcare system and its patients' outcomes costs of health care services go up^(2,18,36,37). One of the research questions involves the identification of resources with which nurses are involved in reporting medication errors since they are the professionals who are in the frontline in dispensing these medications. Nevertheless, it is often said that nursing personnel's attitude towards reporting medication errors and pharmaceutical quality contributes significantly about

the organization culture, perception and the availability of supportive reporting environment. Currently, a majority of healthcare facilities record low reporting or under-reporting of medication incidences owing to threats of prejudice, lack of adequate training or poorly defined processes. Therefore, work is required to identify potential antecedents, which determine the perceived importance of these practices and the potential enablers or constraints, which may affect engagement in medication safety promotion.

Significance of Study

Importance of this study rests in the possibility that it will reveal how the approbation by the nurses towards reporting of mediations error and quality assurance of pharmaceuticals has an impact on safety and quality of patient care that is offered. When investigating the factor², which facilitate health risk reporting or impair that, the study could determine sources of inefficiency in healthcare organizations. The results could then aid in the formulation of evidential policy and practice that enables the execution of more effective protocols and the creation of openness and safe patient practices. In addition, the research may be⁴ useful to improve the training of future nurses, as well as may guarantee freedoms in order for them to report mistakes made during the practice in terms of⁵ pharmaceuticals' quality, without suffering penalties. Lastly, this research might be of value for fine-tuning medication delivery, reducing human mistakes, and² increasing positive results of patients' treatment in various types of health care organizations.

Aim of Study

The objective of the present work is to explore the attitudes³ of nurses to reporting of medication errors and their contribution to the reliability of pharmaceutical⁴ management in healthcare organizations. In particular, this research aims at identifying the nature of factors that may⁵ affect the compliance of nurses to report medication errors, and the challenges they encounter while reporting such incidences, as well as their participation in practices that promote the quality of medications. Moreover, the study intends to determine the effect of organizational culture, training and support systems on nurses' perception and behavior in relation to compliance to medication safety and quality assurance of nursing care and advance knowledge in these areas to develop and design effective strategies to promote medication safety and quality assurance in nurse practice domain.

Methodology

Research Question

Research Question		Systematic evidences for what are the attitudes of nurses towards medication error reporting and maintaining pharmaceutical quality assurance, and how do these attitudes influence patient safety and medication management practices?
Population	P	in medication administration and patient care nurses working in hospital settings
Intervention	I	Attitudes of nurses' towards medication error reporting and pharmaceutical quality assurance practices
Comparison	C	Nurses with varying levels of involvement in medication error reporting and pharmaceutical quality assurance (e.g., those with strong support systems vs. those with limited support)
Outcome	O	Impact of nurses' attitudes on patient safety, medication error reporting, and medication management practices.
Timeframe	T	Over the past five years (2020 to 2024).

This study questions focuses on self-generated and self-administered medication error reporting and perception about pharmaceutical quality assurance among the nurses. Employing the PICO(T) framework, the study specifies nurses (P) and their attitude regarding error reporting and quality assurance (I); a comparison between patient safety and medication practices led by nurses (C) exploring its effects on patient safety and medication practice (O) within the past five years (T). This framework assists in providing some enunciation to the aspects of the study.

Selection Criteria

Inclusion Criteria

Hospital staffed nurses in general medical; surgical; intensive care units and emergency.

Nurses prescribing any preparations as well as handling medications and administering them to patients.

Nursing researches that were conducted between the years 2020 to 2024 that specifically deals with nurses' perception about medication failure reporting and pharmaceutical product quality.

Included were articles from peer-reviewed journals, studies, and surveys capturing determinants of reporting behavior and quality assurance among registered nurses.

English-language publications that offer a quantitative or qualitative analysis of the issue.

Exclusion Criteria

Studies that do not involve medication errors and pharmaceuticals quality assurance.

Studies completed outside the hospital environment or were not related to nursing workers.

Any article published prior to 2020 or in a language other than English.

Comparison with other papers that have not involved registered nurse patients as a sample population.

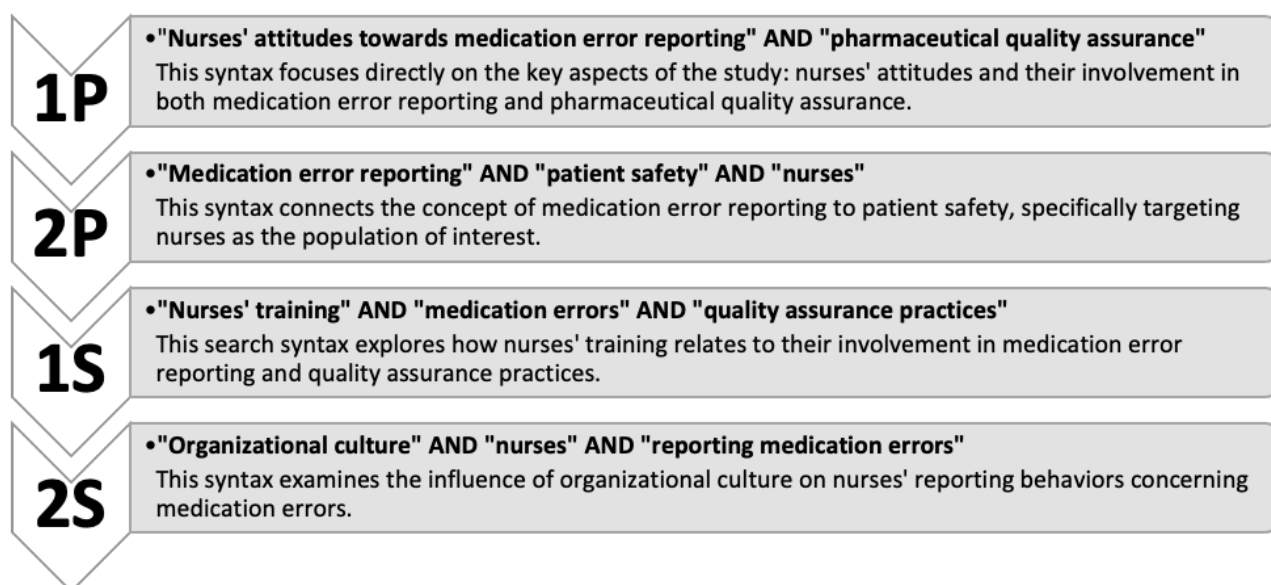
Studies lacking quantitative and/or qualitative data more profoundly about the attitudes and behaviors of the nurses.

Database Selection

For the systematic review, the study utilized four major academic databases: With PubMed, CINAHL, Scopus, and Google Scholar. These databases were chosen to capture most literature that needs to be seen because of their extensive coverage. Searching PubMed and CINAHL allowed specifically targeting healthcare and nursing research, whereas in Scopus, relatively diverse articles were included, and Google Scholar was used to find more general academic sources. Combined, it was possible to search for a myriad of peer-reviewed journal articles, research, studies and surveys published within the years 2020 to 2024, which concerned nurses' perception towards medication error reporting and pharmaceutical quality assurance.

Data Extracted

Variables of interest derived from the chosen papers were nurses' perception about medication error reporting, the rate of reporting and nurses' participation in medication quality assurance activities. Furthermore, information was collected on several antecedents of these attitudes including organizational culture, training, supportive measures and perceived impediments to reporting. The studies also included information relating to the influence of nurses' attitude regarding patient safety, medication management



and general healthcare quality. Other findings relating to hospital environments, staff ratios and technology application in medication administration were also collected to determine any relationship between these variables and the safety of medications.

Syntax

In Figure 1, the search syntaxes can be identified as follows: 1P is the first primary syntax, 'Nurses' attitudes towards medication error reporting' 'pharmaceutical quality assurance', which corresponds to the main objectives of the study considering the attitude of the nurses and quality assurance. 2P is the second primary syntax, 'Medication error reporting' 'patient safety' 'nurses', which relates medication error reporting to patient safeguarding and the nurses' population of concern. 1S is the first lastly, 2S is the second secondary syntax which type in "Organizational culture," "nurses," and "reporting medication errors."

Literature Search

An extensive literature review was done using four academic databases; PubMed, CINAHL, Scopus and Google Scholar using appropriate keywords. The research was conducted only on the articles published between 2020 and 2024 looking into the attitude of nurses towards the reporting of medication errors and quality of pharmaceuticals. The first keywords used were related to medication errors reporting and nurses' engagement and patient safety factors; the second set of keywords was about the factors such as nurses' training and organizational culture. In total. Several qualitative studies were considered and included in the current study based on their relevance

and second-order search terms. and from PubMed: 145, CINAHL: 397, Scopus: 458 and Google Scholar: 18,750 showing the evidence from the year of 2020 to 2024 indicates the availability of extensive literature.

Selection of Studies

The studies were then identified to ensure that they met certain inclusion criteria and did not meet any exclusion criteria to ensure the research conducted was pertinent and of high standard for the sort of systematic review that was to be conducted. The papers included only those published in the year 2020 to 2024 to obtain information most reflecting the current attitude of nurses toward medication error reporting and pharmaceutical quality assurance. The first aspects of quality filters and the consequent criteria of inclusion imposed a selection of articles based on the nurses' knowledge, perspectives, and behaviors in relation to error reporting and quality assurance. Studies that did not meet the criteria on peer-reviewed articles, relevance of subject area and time duration were omitted. Furthermore, those papers that were not in English or where there was a doubt about the quality of the methodology reported were also omitted. When these factors have been taken into consideration, a total of papers that are relevant to this research were screened and analyzed. This process of selection helped to filter out the methodologically correct works and those that provided a direct contribution to the answers to the research question.

PRISMA Flowchart

The PRISMA flowchart also illustrates the systematic review process with selection of the studies right from the identification step to the restriction step and selection criteria in details. It shows the total records that were revealed, subsequently reviewed, and discussed, hence makes it easier to explain the rationale for study selection based on specific criteria.

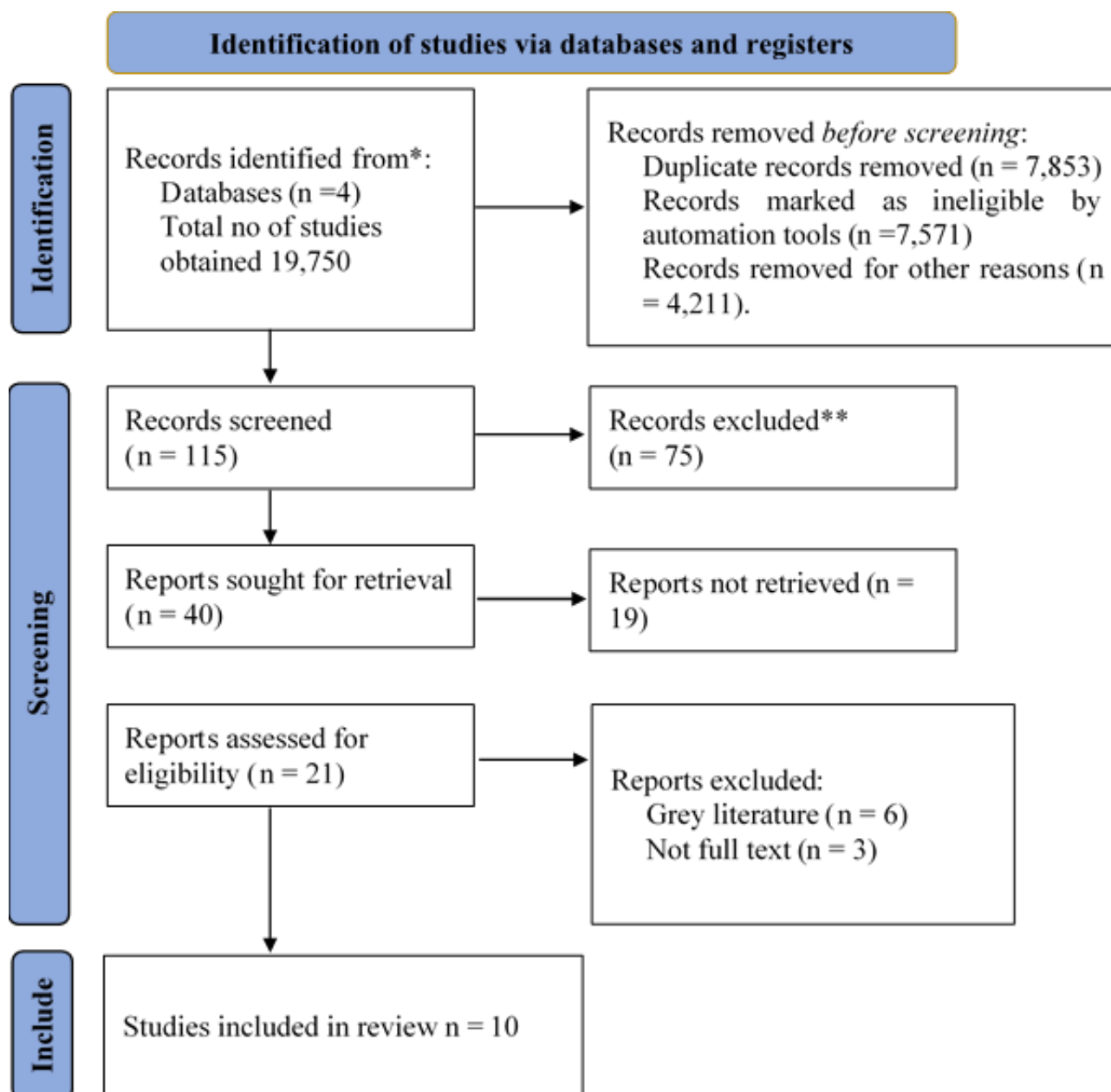
The PRISMA 2020 flow diagram for the present systematic review entails a logical and concrete representation of the study selection carried out based on the identification and screening of records from databases and registers. An initial step of identified from four databases comprised 19,750 articles in PubMed, CINAHL, Scopus and Google scholar.

Table 2: Databases Selection

No	Database	Syntax	Year	No of Researches
1	PubMed	Syntax 1	2020 – 2024	145
2	CINAHL	(Primary)		397
3	Scopus	and 2		458
4	Google Scholar	(Secondary)		18,750

to the research question.

The identified databases for the literature search were PubMed, CINAHL, Scopus, and Google Scholar using first



In order to guarantee the quality and importance of the analyses, several exclusion steps were made.

First, there were 7,853 copies identified and deleted to decrease data duplication. Next, 7,571 records were automatically excluded according to predefined filters, which involved content irrelevance, or some methodological discrepancies. Furthermore, 4,211 records were excluded by other criteria, such as language of publication, or lack of relevance to the present study. After these removals, 115 records were identified for possible inclusion into the review. Among them 75 records were excluded either due to the non-meetings of the inclusion criteria or due to their irrelevance to the research question. After that, 40 reports were ordered following. Nonetheless, due to access challenges, 19 of these reports were missed, thus 21 remained for eligibility review. After reviewing the remaining 21 reports, six reports were omitted firstly as the papers were classified as grey literature (conference abstracts and reports lacking publication in scientific

journals) secondly three reports were excluded as the by nature of the publication were not full-text publication. Finally, 10 publications were considered to meet all the inclusion criteria and have been included in the review, which helped to investigate the factors influencing the nurses' attitudes to reporting medication errors and to pharmaceutical quality assurance. This involved rigorous procedure of selecting only relevant and quality studies to be used in subsequent reviews aiming at answering the research question.

Quality Assessment of Studies

The quality of the included studies was evaluated with a quality assessment checklist to include only research studies with methodological quality. This step was useful for assessing the credibility, dependability, transferability and pertinence of the studies to answer the question formulated in the present research regarding the attitudes of nurses toward reporting medication errors and pharmaceuticals quality. The Literature Quality Matrix

Table 3: *Assessment of the literature quality matrix*

#	Author	Are the selection of studies described and appropriate	Is the literature covered all relevant studies	Does the method section described?	Was findings clearly described?	Quality rating
1	Alrabadi et al	YES	Yes	Yes	Yes	Good
2	Jang et al	Yes	No	Yes	Yes	Fair
3	Alomari et al	Yes	Yes	Yes	Yes	Good
4	Fathallah Mostafa et al	Yes	Yes	Yes	Yes	Good
5	Afolalu et al	Yes	Yes	Yes	Yes	Good
6	Alrabadi et al	Yes	Yes	Yes	Yes	Good
7	Alsaleh et al	Yes	Yes	Yes	No	Fair
8	Giannetta et al	NO	Yes	Yes	Yes	Good
9	Ma et al	Yes	Yes	Yes	Yes	Good
10	Hutchinson et al	Yes	Yes	Yes	Yes	Good

assesses the selected studies to some of the following factors; Whether and how the selection of studies has been described appropriately, the coverage of all the studies, and how the methods section of the manuscript is written and whether or not the findings of the studies are well described. The majority of the studies in the matrix conducted including Alrabadi et al., Alomari et al., Fathallah Mostafa et al., Afolalu et al., and Ma et al., have been rated as 'Good' because most of the studies have a good selection of studies, clear methodological reporting and presentation of findings. However the works, examined in the present study and few other contributions like Jang et al and Alsaleh et al., have been qualitatively assessed as receiving a 'Fair' rating; this entails that though these works are recognized as contributing to the general findings in this area of study, they have certain weaknesses which for example includes inadequate coverage of some of the useful studies made in this area, or inadequacies referred to in clarity of In general, the usefulness of the presented matrix is to get an idea of the advantages and disadvantages of the studies under consideration concerning the quality of literature review, as well as the identification of the areas that might require additional clarification or other studies.

Data Synthesis

The synthesis of data is the summarization of results that are found in different studies in order to deduce commonalities, correlations, and general trends of a broad array of studies. It enables the researchers to determine the consistent or inconsistent finding of studies, which give

Results

Several studies were reviewed in the development of this paper, after which 10 notable and varied studies were identified to represent all the threats nursing students face regarding medication errors and their causes explained as

overall picture of a particular subject. Synthesizing the data is useful when researchers want to make broader conclusions or give stronger insight, more importantly, where the issues that are of interest have not been covered well or systematically in the set of studies. This involves comparing methods of carrying out research, analyzing the quality of the data and combining these conclusions in order to make a cohesive account in order to increase the reliability and validity of the conclusions that are made by the researchers. Data synthesis helps in formulating evidential recommendations and knowledge in the subject area as well.

An analysis of the research matrix of the 10 studies shows that the studies center on medication errors in the practice of nursing across different health care facilities. These papers look at what influences the reporting of medication errors, the impact of interventions in the reporting and preventing of such mistakes, as well as the difficulties that nurses experience when reporting or handling medication errors. They also include international comparisons and stress on the promising intervention approaches such as audit feedback and process management toward enhancing medication safety. Altogether, the studies demonstrate that in order to reduce the risks of adverse effects in practice, it is necessary to focus on aspects of system safety and culture, as well as to achieve further develop the qualifications of nursing staffs.

due to factors such as workload pressure, communication breakdown, and lack of knowledge. One of the most prominent findings of the studies is that many medication errors remain undocumented because of concerns about reprisals, doubts about their ability to file a report, and

Table 4: Research Matrix

Author, Year	Aim	Research Design	Data Collection Tool	Result	Conclusion	Study Supports Present Study
Alrabadi et al. (2021) ³⁷	Explore medication errors in nursing practice	Review article	PubMed, Google Scholar	Summarizes types, outcomes, and strategies to avoid medication errors	Medication errors are critical and need standardized recommendations; nurses must be educated and empowered to prevent errors	Yes, Supports the study by addressing medication errors and nursing practices in healthcare
Jang et al. (2021) ³⁸	Investigate differences in medication error reporting among early and mid-career nurses	Cross-sectional, secondary data analysis	Korean Hospital Survey, self-report measure	Early-career nurses report more errors; positive perception of safety culture increases error reporting	Safety culture influences error reporting among nurses; further studies needed	Yes, Relevant to the study as it discusses medication error reporting and patient safety culture among nurses.
Alomari et al. (2020) ³⁹	Evaluate nurse-led interventions to reduce medication errors	Action Research (AR), three-phase quantitative study	Incident data, policy audits, Safety Attitudes Questionnaire	Medication error rates reduced by 56.9%; increased policy compliance	Nurse-led interventions reduce medication errors and improve practice	Yes, Supports the current research by focusing on clinical interventions to reduce medication errors in a pediatric setting.
Fathallah Mostafa et al. (2023) ⁴⁰	Explore causes and barriers to reporting medication errors from critical care nurses' perspective	Descriptive research design	Self-administered questionnaire	Heavy workload is the primary cause; fear is the biggest barrier to reporting	Fear of consequences hinders reporting; education programs needed	Yes, Relevant to the study, focusing on barriers to medication error reporting from critical care nurses' perspectives.
Afolalu et al. (2021) ⁴¹	Compare doctors' and nurses' perceptions of factors influencing error reporting	Cross-sectional survey	Self-administered questionnaire	Suboptimal reporting, lack of awareness of reporting systems	Suboptimal error reporting and inconsistent practice between doctors and nurses	Yes, relates to the study by exploring medical error reporting practices among doctors and nurses in a Nigerian hospital.
Alrabadi et al. (2020) ⁴²	Explore nurses' understanding and prevalence of medication errors in Jordan	Descriptive study	Self-reported questionnaires	Medication errors are common and underreported, especially among less experienced nurses	Medication errors are underreported due to fear; national policies needed to encourage reporting	Yes, directly supports the study with a focus on medication errors among registered nurses in Jordan.
Alsaleh et al. (2021) ⁴³	To determine types of MEs and their causes, and identify reporting barriers in secondary care hospitals in Kuwait.	Descriptive cross-sectional study	Self-administered questionnaire	MEs are common, and reporting barriers need to be addressed through better communication and simplified reporting systems.	Supports the present study by emphasizing the need for addressing systemic barriers in error reporting.	Yes, Relevant to the study by examining medication errors in secondary care hospitals from healthcare professionals' perspectives
Giannetta et al. (2020) ⁴⁴	To examine knowledge, attitudes, and behaviors related to MEs among Italian and Maltese nurses.	Cross-sectional survey	Adapted online questionnaire	Knowledge, attitudes, and behaviors towards MEs were similar across Italy and Malta, where nurse training is harmonized.	Provides insights into the similarities in nurse behavior regarding medication management, supporting cross-cultural comparisons	Yes, Supports the study through cross-cultural comparisons of nurse knowledge and behaviors in medication management
Ma, H., Cao, J., & Li, M. (2022) ⁴⁵	To assess the application of PDCA process management in day operation wards and its impact on nursing quality and safety.	Comparative study	Control vs. experimental group (PDCA management)	PDCA management improves nursing quality, reduces adverse events, and enhances patient satisfaction.	Provides a framework for improving nursing practices that could support error reduction strategies in the present study.	Yes, Discusses process management strategies in healthcare, relevant to medication safety and nursing quality.
Hutchinson et al. (2020) ⁴⁶	To assess the effect of an audit with feedback strategy to promote medication error reporting by nurses.	Quasi-experimental implementation study	Audit with feedback	The audit with feedback strategy did not significantly influence error reporting, but an increase in reporting was observed over time.	Highlights the importance of ongoing strategies for improving medication error reporting, contributing to the discussion on enhancing reporting systems.	Yes, Supports the study by focusing on strategies to promote medication error reporting by nurses using audits and feedback.
Alsaleh et al. (2021) ⁴⁷	To determine types of MEs and their causes, and identify reporting barriers in secondary care hospitals in Kuwait.	Descriptive cross-sectional study	Self-administered questionnaire	MEs are common, and reporting barriers need to be addressed through better communication and simplified reporting systems.	Supports the present study by emphasizing the need for addressing systemic barriers in error reporting.	Yes

inadequate encouragement to do so. The methods that have been found to have a positive effect include instructional measures, reporting systems, for example, audit and feedback, and organizational methods, for instance, PDCA. Further, a well-established safety culture, and the workers' work environment in general, which includes staffing and fatigue, should be taken into consideration for reducing mistakes. Cu-sha also contributes differences in the nurses' attitudes and practices in regards to error management.

DISCUSSION

All the chosen studies focus on the theoretical problem of medication errors in the context of nursing practice, differing in the primary concern with the causes, the presentation of the reporting behavior and the identified/introduced measures towards containing medication errors. Medication errors are recognizable as an international problem that has implications for patient safety and healthcare. According to Alrabadi et al. (2021) and Fathallah Mostafa et al. (2023) the causes of medication errors are lack of required training, poor collaboration among the health care teams and the ambiguity of medication administration. These factors are consistent with Alsaleh et al., (2021), who find out that negligence of medication errors is associated with system deficiencies like lack of adequate staffing which consequently makes the nurses Exhausted.

It was confirmed that the problem if underreporting of medication errors is prevalent in many healthcare facilities and was identified as a trend among the studies. Jang et al. (2021) and Afolalu et al. (2021) confirm that nurses and healthcare providers do not undertake reporting of medication errors because they are punished for errors. These findings are paralleled with the conclusion made by Hutchinson et al., 2020, about organizational culture being a key determinant of reporting or non-reporting of medication errors. Altogether these investigations imply that the original fear for reprisal coupled with absence of

adequate support mechanisms discourages staff from revealing mistakes made, a trend that hampers the maintenance of safety for patients.

Based on this problem, several strategies have been proposed in the context of the included studies. Alomari et al. (2020) emphasize on the impact of clinical nursing intervention on minimizing medication adverse. This study showed that achieving specific policies and procedures and improving the nurse-patient communication were effective in reducing medication errors. Likewise, Giannetta et al. (2020) pay much attention to the awareness and perception of nurses about medication administration, and they recommended increasing the knowledge base of nursing education and providing ongoing training without which patient harm can be ill afforded. Hutchinson et al. (2020) conducted that audits and reviews improve reporting credibility and minimize mistakes supports these findings. Moreover, other researchers have pointed out the need to provide adequate organizational culture with regards to the nursing profession. Afolalu et al. (2021) resolves that work culture have a direct importance to the protocol of error report and minimization. This work establishes that when nurses receive organizational support, it increases chances of reporting errors and the likelihood of participating in error prevention. Similarly, Alrabadi et al. (2021), include that understanding that within healthcare organizations, writing the medication errors is more of a learning exercise devoid of implications for reprimand, is the right approach when it comes to the practice of avoiding the medication mistakes in the long run. According to Ma et al., (2022), evidence in NGO suggests that successfully inculcating the PDCA (Plan-Do-Check-Act) process supplemented superior quality of nursing practice and safety thus advocating for minimized medicinal mistakes.

Another identified category is the cross-cultural perspectives as a relevant trend in the presented studies. Giannetta et al. (2020), use comparative knowledge-behavior assessment between Italy and Malta to indicate

that culture plays a vital role in medication management. This research realized that cultural differences shape the perception that nurses have toward patient safety, and how they address such things as medication errors. The trend is evidenced by the study by Alsaleh et al. (2021), who point out how healthcare practitioners in Kuwait have varying understanding about medications, errors, which may not be similar to other nations. These studies highlight the importance of culturally safe strategies in designs and interventions directed to medication errors and advancement in nursing education across the world.

Lastly, some of the articles discuss technology and the systematic approach to error minimization. Hutchinson et al., (2020) opine that incorporating the use of technology into medication errors can promote efficiency in reporting of the errors. Use of real time reporting tools and safety audits every now and then is very effective in developing trend analysis that may be useful in enhancing safety. This is the case, as Alrabadi et al. (2020) state that integrating EHR in the reduction of ME aims to offer more accurate and timely information to the nurses dispensing the medications. The studies of such technologies can contribute to a minimization of medication errors hence enhancing the safety of patients.

The studies reviewed combined endorse the complexity of medication errors in nursing practice and argue for the inclusiveness of strategies for addressing the problem. Such approaches include increasing the knowledge of the nurses, promoting supportive organizational environment that enables reporting of injuries and incidents, coming up with organized methods of reporting of the injuries and use of technology. Since medication errors are occurring worldwide, the intervention strategies must be followed

acculturation and work context to develop person-suited strategies for different countries.

Future Direction

Subsequent studies to this will seek to examine how to implement policies on medication errors in nursing practice and identify new approaches of preserving medication error reportage including the use of mobile applications and alerts. First of all, there is a lack of longitudinal research that measures the sustainability of interventions, including nurse education programs, the culture change, and the systematic use of such cyclical approaches as PDCA. Future research on cross-cultural factors as well as how varying context influences error management in understanding how best to proceed into different contexts, would be required. Moreover, understanding leadership engagement in relation to safety culture vis-à-vis its approach to error disclosure will offer more than just preventing medication errors among a few patients.

Limitations

A major weakness most of the reviewed studies is that they are based on self-reported data, a possibility that leads to exaggeration or underreporting of medication errors due to fear of being punished or facing other organizational consequences. Secondly, many of the studies included have a cross-sectional research design restricting their ability to provide longitudinal data about various interventions' effectiveness. Furthermore, the cultural comparison of the studies may pose some weighted constraints because of the places' dissimilarities in conducting their health services. Moreover, all the above-mentioned studies offer the perceptions of nurses about the problem; however, patients and their families could be more informative on the subject.

Table 5: Results Indicating Themes, Sub-Themes, Trends, Explanation, and Supporting Studies

Theme	Sub-Theme	Trends	Explanation	Supporting Studies
Medication Errors in Nursing Reporting Medication Errors	Prevalence and Causes	Common and frequent occurrences in nursing practice	Nurses frequently encounter medication errors, influenced by workload, communication, and knowledge gaps.	Alrabadi et al. (2021), Jang et al. (2021), Alomari et al. (2020)
	Barriers to Reporting	Underreporting and lack of confidence	Nurses often fail to report errors due to fear of punishment, lack of awareness, or insufficient support systems.	Fathallah Mostafa et al. (2023), Afolalu et al. (2021), Alsaleh et al. (2021)
Interventions and Solutions	Educational and Training Programs	Positive impact on reducing errors	Training interventions and educational programs for nurses can effectively reduce medication errors.	Alomari et al. (2020), Giannetta et al. (2020), Hutchinson et al. (2020)
Culture of Safety	Patient Safety Culture	Emphasis on creating a safe reporting environment	A supportive organizational culture promotes openness and encourages error reporting among nurses.	Jang et al. (2021), Giannetta et al. (2020), Hutchinson et al. (2020)
Error Prevention Strategies Work Environment Factors Cultural Differences in Error Management Healthcare Professionals' Perspectives Effectiveness of Interventions	PDCA Process, Feedback Mechanisms	Positive outcomes in error reduction	Strategies like PDCA (Plan-Do-Check-Act) and audit feedback have shown to improve error reporting and reduce medication errors.	Ma et al. (2022), Hutchinson et al. (2020), Fathallah Mostafa et al. (2023)
	Staffing, Workload, and Fatigue	Increased errors with high workloads	High workload and fatigue among nurses contribute significantly to the occurrence of medication errors.	Alrabadi et al. (2020), Afolalu et al. (2021), Alsaleh et al. (2021)
Cultural Differences in Error Management Healthcare Professionals' Perspectives Effectiveness of Interventions	Cross-Cultural Comparisons	Varied attitudes and practices across countries	Cultural differences affect nurses' attitudes toward medication management and error reporting.	Giannetta et al. (2020), Alrabadi et al. (2021)
	Nurses vs. Doctors	Differences in reporting practices	Doctors and nurses exhibit varying perceptions and practices when it comes to medication error reporting.	Afolalu et al. (2021), Alsaleh et al. (2021)
Error Reporting Mechanisms	Impact of Clinical Interventions	Reduction in medication errors post-intervention	Clinical nursing interventions, such as audits and feedback, significantly reduce medication errors.	Alomari et al. (2020), Hutchinson et al. (2020)
	Audit Feedback and Monitoring	Monitoring systems encourage error reporting	Audit feedback mechanisms improve error reporting rates and promote a culture of safety among nurses.	Hutchinson et al. (2020), Fathallah Mostafa et al. (2023)

CONCLUSION

Medication errors ongoing to pose a major challenge in nursing practice even if they are preceded by diverse factors such as poor education, communication breakdown, and systemic practicable hurdles to reporting. The analyzed research underscores the need for integrated multi-component strategies regarding the described factors; including increased nurse training, organization commitment, and technology for the purpose of increasing reporting and safety measures. Nevertheless, there are increased efforts to claim advocacy for suitable international strategies for minimizing medication errors in particular healthcare contexts. The evaluation of this research implies several suggestions for future research: considering long-term potentialities, culture, and leadership.

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