

THE IMPACT OF MEDICATION ERROR IN HOSPITALS

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Isata Jalloh

Liberty University

Lynchburg, VA

June, 2023

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Scholarly Project Chair Approval: Dr. Kenneth Thompson

Chair

Date

ABSTRACT

In hospitals, the issue of medication errors poses a serious problem, often leading to substantial health complications and, in some cases, even deaths among hospitalized as well as discharged patients. This health challenge not only imposes a substantial financial burden on patients, insurance providers, and Federal/State governments but also contributes to elevated healthcare expenses, hindering the effective allocation of resources to address other healthcare issues. Understanding the triggers of medication errors in hospitals is critical in solving this problem. The purpose of this integrative review is to determine the causes/triggers of medication errors in hospitals. This review will highlight the conditions that providers and clinicians face, including the routine processes during prescription and medication administration to determine specific areas where discrepancies occur, which in turn, creates the inevitability of medication errors.

The review will reveal that poor collaboration between healthcare providers and clinicians is a significant contributing factor to medication errors within hospital settings. Also, illegible handwritten orders, and in some cases, poor understanding of verbal orders in emergency situations are also reasons for wrong dosage medication errors. The review will also reveal an elevated incidence of medication errors among night shift nurses in comparison to those on day shifts, primarily due to burnout resulting from holding multiple jobs during the day, sometimes leading to difficulties in reaching healthcare providers at night. Furthermore, the review will provide applicable approaches that increase team collaboration during patient admission and discharge in order to decrease medication errors. Also, the review will encourage clinicians to repeat verbal orders for clarification and to confirm written orders before administering medications to reduce dosing errors. Finally, the review will show that collaboration through

active listening, change of behaviors, and communication are critical in reducing medications errors in hospitals.

Keywords: Medication Errors, Hospitals, Nurses, Providers, Medication Administration Errors.

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INTRODUCTION

Medication errors denote a common problem in hospitals, resulting in severe health complications and, in some instances, even deaths. In addition to adversely affecting patients' health, these errors also impose significant financial burdens for individuals, hospitals, insurance companies, and Federal/State governments. Medication errors in hospitals further allow for limited allocation of financial resources to other health problems, thus causing a system wide problem that affects the delivery of quality care and patient outcomes. Understanding the triggers of medication error is critical for implementing evidence-based practice and allows for better care coordination in treatment during admission as well as discharge. This will help lower rehospitalization costs, thereby reducing health care costs for all stakeholders. This review will outline areas in the health care continuum that cause medication errors and provide strategies that can be implemented to reduce the occurrence of this health problem; thus, creating an avenue for improved care delivery and patient outcomes.

Background

The escalating demand for high-quality care poses daily challenges for healthcare providers and clinicians who navigate policy shifts, HIPAA regulations, patient satisfaction, and administrative requirements. Balancing these diverse demands places providers and clinicians in a unique position, often leading to common medication errors in hospital settings, be it during admission or discharge. This problem is responsible for significant health complications, higher health care cost, frequent readmissions, and even deaths. Besides the complex demands that providers/clinicians face in the health care sector, other existing factors in the workplace create

conditions that allow for medication errors to occur. At times, these errors remain unnoticed until the patient faces readmission, with inadequate documentation or reporting. This hinders the understanding of the root cause of the medication error, leading to an undetected and unresolved issue that is poised to recur. Medication errors stand as a primary cause for patient readmissions in hospitals. This has prompted The Center for Medicare and Medicaid to enforce stringent reviews, leading to nonpayment or back charges for services linked to readmission. This problem does not only put a serious financial burden on hospitals, but also brings the ratings of health care institutions down thus impacting productivity and patient outcomes. Identifying the specific areas where providers/clinicians fall short, triggering medication errors, is crucial for effective tracking and documentation. This understanding enables providers/clinicians to be aware and cautious when prescribing and administering medication.

Other institutions have implemented checkpoints in the medication process. This allows providers and clinicians to confirm the accuracy of both the medication and dosage before administration to the patient. Hospitals that have taken steps to mitigate medication errors have low readmission rates, improved patient outcomes, and higher patient satisfaction/feedback.

Problem Statement

Medication errors in hospitals account for serious health complications, higher health care costs, higher readmission rates, and even death; thus, it is critical to determine the cause of this problem and to also create strategies that can be implemented to reduce medication error in hospitals.

Purpose of the Project

The aim of this project is to determine the cause of medication errors in hospitals and to outline strategies that can be implemented in order to isolate these triggers and reduce the occurrence of medication errors in hospitals.

Clinical Question

What are the precipitating factors within the healthcare sector that contribute to medication errors, a serious problem in the healthcare segment?

LITERATURE REVIEW

There is substantial evidence indicating that medication errors represent an independent healthcare issue. Multiple literature and reviews have documented evidence-based research to highlight the impact that medication errors have on patients, health care institutions, and Federal/State governments. Evidence-based research have revealed different precipitating factors that cause medication errors in hospitals; this section will provide convincing evidence to the effect that medication errors is a health care problem and that strategies have to be put in place in order to reduce the occurrence of this problem.

Search Strategy

A thorough and comprehensive search for articles was undertaken to assess the factors that contribute to medication errors in hospitals and identify strategies to diminish their prevalence. Multiple search engines and databases, including PubMed, Ebsco, NIH, Cochran, and CINAHL, were utilized. The keywords "Medication Errors, Hospitals, Nurses, Providers, Medication Administration Errors" were employed to locate articles providing concrete approaches to evaluate the triggers associated with medication errors in hospital settings.

The first search was conducted within the search engines using the words “what is the impact of medication errors in hospitals;” this search yielded a total of 125 articles. After some parameters that narrowed down the search to highlight articles in the last five years were added, the results were reduced to a total of 69 articles. By introducing a second parameter focusing on the last three years, the search was further refined to 24 articles. These selected articles underwent a comprehensive review to extract evidence-based data, which was subsequently incorporated into this study. Articles that were duplicated or similar in theory were removed from the final review. Finally, a total of 12 articles were chosen of which the best 10 were selected for the literature matrix. For the inclusion criteria to be met, the articles should have been published in the last five years from 2018-2023. Other inclusion criteria stated that the selected articles have to be written in English language. The study utilized a mix of qualitative studies, randomized controlled trials, and quantitative studies to substantiate the literature review.

Critical Appraisal

The study utilized extensive search from evidence-based search engines to fully understand the impact of medication error in hospitals and provided clinical interventions to help mitigate this problem. One article used reporting strategies to detect the cause of medication errors and proper documentation in order to keep track of not only the number of medications errors, but also to allow providers and clinicians to reference these documented reports in order for them to understand the precipitating factors that lead to medication errors. Other articles, on the other hand, utilized a combination of randomized controlled trials, qualitative studies, and quantitative studies for involved nurses and providers to determine what actions or work culture led to medication errors. Nurse burnout caused by working on multiple jobs was revealed to be

one of the main reasons for medication errors among night shift nurses. Overall, the result supported the problem question that medication errors have serious effects on patients, health care institutions, and the community as a whole.

The limitations in this study stem from the fact that most of the research was conducted in a single facility instead of a variety of hospitals. Additionally, the majority of studies lacked an independent quality assessment to identify the exclusion of pertinent data. Moreover, certain research employed reporting methods that did not encourage active participation from providers and clinicians due to concerns about termination, blackmail, or suspension from work.

Synthesis

Numerous research studies and articles offered substantial insights into the repercussions of medication errors within the healthcare continuum. This is clearly illustrated in the results from the findings which showed that all health care institutions are subject to medication errors and that this problem demands active participation by all health care sectors in order to reduce the occurrence of this problem. Research data also indicates that medication errors are a significant factor contributing to increased healthcare costs and readmission rates. Consequently, understanding the precipitating factors leading to this issue is crucial for enhancing care delivery and outcomes.

Conceptual Framework/Model

The Iowa Model of Evidence-Based Practice was used as a framework in this study. The Iowa Model is a widely used method to translate research findings into practice. The Iowa Model, initially formulated by the University of Iowa Hospitals and Clinics, has undergone numerous reviews and remains among the top conceptual models in nursing. Geared towards enhancing the quality of patient care and outcomes, the Iowa Model of Evidence-Based Practice

continues to be highly regarded. The Iowa Model, initially formulated by the University of Iowa Hospitals and Clinics, has undergone numerous reviews and remains among the top conceptual models in nursing. Geared towards enhancing the quality of patient care and outcomes, the Iowa Model of Evidence-Based Practice continues to be highly regarded. The research to determine the trigger(s) of medication errors in hospitals is critical in improving patient outcomes and reducing health care cost across the board. The Iowa Model was further used to evaluate the efficacy of medication errors to determine what strategies to implement in order to reduce the occurrence of this problem. The second stage in the study follows the Iowa Model by examining the effectiveness of the intervention and the following stages determine both the number of participants as well as ensuring the success of the project. The Iowa Model additionally facilitates the reevaluation of a project to ascertain whether it should be continued or if specific areas need revisiting for proper alignment and resource allocation, aiming for the desired project outcome. It fosters active coordination among participants to ensure the achievement of all milestones, ultimately enhancing the project's outcome. Lastly, the Iowa Model reinforces the notion that medication errors constitute a significant healthcare problem, emphasizing the importance of identifying the precipitating factors for improved outcomes and reduced healthcare costs.

Theoretical Framework

The Theory of Planned Behavior (TPB) is an important method of understanding medication errors and its triggers, because it educates both the provider and the clinician on certain behaviors that should/should not be practiced in the clinical setting in order to reduce the occurrence of medication errors. The Theory of Planned Behavior plays a crucial role in anticipating the behavioral attitudes of nurses regarding collaboration and pharmacological

safety. This is achieved through predictive factors such as attitude, subjective norms, and perceived behavioral control (Dionisi et al., 2020).

TPB is a theory that was widely used in this study because it provides critical insights into the culture of habits and behaviors among providers and clinicians when it comes to prescribing and administering medications. The theory suggests that determining the habits, tolerance, and behaviors of health care professionals regarding the pharmacological aspect of health care can play a significant role in reducing medication errors in hospitals. Attitude is the highest determinative predictor of intention; thus, for most health care professionals, reporting a medication error would result in loss of trust in the nursing profession; hence, this usually prevents the reporting of medication errors (Dionisi et al., 2020). Medication errors is a health care problem that demands active participation and collaboration to effect behavioral change in the clinical setting; thus, TPB theory is a good example that can be implemented to achieve this change.

METHODOLOGY

Design

This integrated review is conducted by reviewing multiple search engines to determine best practices when dealing with medication errors. This review will adopt an integrative design to comprehensively assess the culture surrounding medication error reporting and the implemented measures aimed at minimizing errors among providers and clinicians. The design aims to offer crucial insights into the behavioral aspects associated with prescribing and administering medication, facilitating a deeper understanding of the triggers of the problem. This approach will identify areas that can be targeted to diminish the culture of underreporting or ineffective management of the issue.

The method that will be employed to carry out this project will be grounded on the Iowa Model of Evidence-Based Practice which dictates that understanding a health care problem is one critical aspect of mitigating its risk in any health care setting. To meet the goal of reducing medication errors in hospitals, this project will carry out a scoping reviews through which the scientific literature on medication errors could be investigated by applying the Iowa Model of Evidence-Based Practice.

Measurable Outcomes

Multiple outcomes can be derived from this project as it seeks to help understand the underlying reasons behind medication errors. This project will allow providers and clinicians to understand the main triggers that result in medication errors in the first four weeks after the commencement of the project. Furthermore, healthcare providers and clinicians will adopt a culture of effective reporting and documentation of errors. This fosters a collaborative environment focused not on assigning blame or punishment but on acknowledging the existence of a problem that requires collective attention to minimize risks and enhance outcomes. In addition, this project will allow continuous evaluation of medication errors reporting and documenting aimed at maintain consistency and accountability. Education plays a significant role in changing the culture of behaviors in the health care sector; thus, this project will encourage routine in-services to education providers and clinicians about medication errors. Also, these in-services will serve as a platform to inform providers and clinicians about the areas of progress and areas that need to be revisited in order to improve compliance.

Setting

Since this project is an integrative data review, no setting is required for completing the project.

Population

The population that can benefit from this program includes adolescents and the geriatric population. Multiple reports with data from multiple visits by the adolescent and the geriatric population can be reviewed in order to provide detailed insights into medication errors. A sample of data ranging from 3 to 4 years old can be researched for information that can highlight the areas requiring intervention. Multiple departments and units in the hospital can provide critical information on the different populations they treat. Comparing outpatient reports with inpatient reports allows for the identification of areas where medication errors are most triggered.

Ethical Considerations

All HIPAA laws that protect medical information will be followed during this project. Since this project is an integrative review of data, no information will be collected from patients and the entire study will be based on scholarly peer-reviewed articles. Confidentiality of medical data will be strictly enforced during this project; thus, the project will be approved by the Institutional Review Board (IRB) of the facility.

Tools

A computer equipped with a reliable internet connection facilitates speedy downloading of articles when conducting research across various search engines. Utilizing the latest Microsoft Word software ensures proper formatting and documentation for this project.

Timeline

The total duration of the project will be seven to eight weeks because multiple search engines will be reviewed and compared with others to collect detailed information.

Data Analysis

The project will generate a final report outlining the main triggers of medication errors. The final report will also discuss outcomes that can be achieved through continued education of staff on areas that need to be focused on during medication administration and prescribing. All parameters and behaviors that create the possibility for medication errors will be outlined in the final report.

Final Reports

According to research studies, medication errors, are widely prevalent in nursing and can even result in deaths. These errors are influenced by various factors, with nurse-related factors being the primary contributors to medication errors. Burnout stands out as the major factor contributing to medication errors. Additionally, deficiencies in the healthcare system, encompassing heavy workloads, staff shortages, fatigue, inexperience among new nurses, and prolonged working hours, can increase the occurrence of medication errors. Furthermore, administration errors, including issues like incorrect dosages, missing doses, and wrong medications, often result from poor communication during telephone orders, particularly during night shifts.

The review showed additional factors contributing to medication errors, such as failure to adhere to the correct six rights of medication administration, neglecting universal precautions, improper health literacy/education regarding similar medication cues in pharmacy, inadequate monitoring, the introduction of scan machines and barcodes for safe medication administration, policy enforcement for accountability, care for medically complex patients, the presence of inexperienced or new staff on the unit, as well as the absence of health literacy.

Meanwhile, promoting an open approach to medication errors in hospitals will facilitate more reporting and brainstorming on how to learn and prevent future occurrences. Identification of these factors can decrease the burden on team members and the healthcare system. The goal is to improve the quality of patient care, maintain safety, and eliminate errors resulting in improved quality care and patient safety. Implementing safety nets, such as cues or identifying similar medications from the pharmacy, aids in capturing near misses and avoiding potential medication errors. Additionally, it serves as an educational tool for staff members, enhancing their critical thinking skills regarding similar names of medications used in hospital settings.

Communication between interdisciplinary units is also another reason for medication errors across the health care sectors. The review suggested routine meetings and in-services involving interdisciplinary units can enhance communication by providing opportunities for sharing lessons learned and discussing necessary remediation or corrective actions. The review emphasized that medication errors can be identified, isolated, and corrected with the implementation of appropriate measures. Encouraging or mandating healthcare professionals to adhere to these measures is crucial for effective error prevention and correction.

Implication to Practice

The administration of medication plays a crucial role in the daily medical routine of patients. Consequently, failure in drug therapy can pose risks to patients, potentially leading to harm, or even death. Medication errors may include incorrect prescribing errors, wrong dose, poor drug distribution practices, drug and drug device related problems, incorrect drug administration, failed communication, and lack of patient education. This project will help reduce the financial burden on both patients and healthcare institutions, ultimately enhancing patients' well-being and outcomes through the reduction of medication errors.

Sustainability

The project is aimed at changing the nursing practice in the hospital settings by creating awareness; creating safer health system that will facilitate existing efforts to prevent medication errors. Areas that could benefit and prevent medication errors in the hospitals may include improving nurse competence in medicine management through educational interventions and interdisciplinary actions. Routine in-services sessions can be conducted to ensure that the project is meeting its overall goals and objectives. Modifications to the project and its implementations can be undertaken as necessary to ensure the achievement of the project's objectives.

Dissemination Plan


Active dissemination is most effective since it involves making a diligent effort to spread information to other healthcare professionals or patients. This includes distribution of information and disseminating evidence via interdisciplinary rounding, daily meetings, workshops, or brochures. Information can be distributed among policy makers in hospitals, managers, administrators, and lawmakers. Ensuring the active involvement and awareness of lawmakers in healthcare improvements is critical for the enactment of legislation that integrates and aligns with these changes.


Summary

The importance of understanding the triggers in medication errors is critical to reducing the occurrence of this problem in hospitals. Medication errors have consequences beyond the well-being of patients, extending to higher healthcare costs, increased rates of readmission, and even deaths. The literature review helps in determining the areas in treatment process that should be focused on in order to avoid/reduce the occurrence of medication errors; thus, allowing for

better The utilization of the Iowa Model of Evidence-Based Practices assumes significance in this study as it offers a systematic approach for identifying issues and delineates strategies for implementation to mitigate the occurrence of medication errors. Moreover, the Theory of Planned Behavior was applied to formulate interventions aimed at changing the habits and behaviors of healthcare professionals in the field of pharmacology, thereby reducing the likelihood of medication errors. Implementation of effective mitigation strategies by healthcare providers is crucial for reducing medication errors. Providers are uniquely positioned to develop approaches that can be utilized to minimize or prevent these life-threatening errors.

Appendix





Completion Date 04-Jul-2023
Expiration Date 04-Jul-2026
Record ID 56875075

This is to certify that:

Isata Jalloh

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.


Biomedical Research - Basic/Refresher
(Curriculum Group)

Biomedical & Health Science Researchers
(Course Learner Group)

1 - Basic Course
(Stage)

Under requirements set by:

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[External] IRB-FY23-24-281 - Initial: Not Human Subjects Research

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 22, 2023

Isata Jalloh
Kenneth Thompson

Re: IRB Application - IRB-FY23-24-281 Medication Errors in Hospitals

Dear Isata Jalloh and Kenneth Thompson,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds that your study does not meet the definition of human subjects research. This means you may begin your project with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research because it will not involve the collection of identifiable, private information from or about living individuals (45 CFR 46.102).

Please note that this decision only applies to your current application. Any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

For a PDF of your IRB letter, click on your study number in the My Studies card on your Cayuse dashboard. Next, click the Submissions bar beside the Study Details bar on the Study Details page. Finally, click Initial under Submission Type and choose the Letters tab toward the bottom of the Submission Details page.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, PhD, CIP
Administrative Chair
Research Ethics Office

ARTICLE CRITIQUE AND LEVELING MATRIX

<p>Article Title, Author, etc. (Current APA Format)</p>	<p>Study Purpose</p>	<p>Sample (Characteristics of the Sample : Demographics , etc.)</p>	<p>Methods</p>	<p>Study Results</p>	<p>Level of Evidence (Use Melnyk Framework)</p>	<p>Study Limitations</p>	<p>Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.</p>
<p>Article 1: Alqenae, F. A., Steinke, D., & Keers, R. N. (2020). Prevalence and Nature of Medication Errors and Medication-Related Harm Following Discharge from Hospital to Community Settings: A Systematic Review. <i>Drug safety</i>, 43(6), 517–537. https://doi.org/10.1007/s40264-020-00918-3</p>	<p>To determine and carefully evaluate the current evidence on the occurrence and nature of medication errors along with the associated harm after hospital</p>	<p>Using research from 1990 – 2019 across 10 electronic databases and the grey literature</p>	<p>Using a systematic review to determine the prevalence and nature of medication errors</p>	<p>The study showed that 53% of medication errors occur following discharge and the majority involved antidiabetics, antibiotics, analgesics, and cardiovascular drugs</p>	<p>Level 5: Systematic review of descriptive & qualitative studies</p>	<p>The study had no independent quality assessment; also, only a single author screening of citations was performed that could have resulted in the omission of relevant data</p>	<p>Yes; this was a comprehensive study from multiple evidence-based sources</p>

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
	discharge.						
<p>Article 2: Yoon, S., & Sohng, K. (2021). Factors causing medication errors in an electronic reporting system. <i>Nursing open</i>, 8(6), 3251–3260. https://doi.org/10.1002/nop2.1038</p>	<p>To analyze data of medication errors from the hospital electronic reporting system and determine the factors influencing error types and harmfulness.</p>	<p>Using descriptive statistics to analyze 805 near misses and serious health events reported to the hospital's electronic reporting system between January 2014 and December 2018</p>	<p>A retrospective study</p>	<p>Results showed that nurses with lengthy experiences have less prevalence in medication errors in hospitals</p>	<p>Level 5: Systematic review of descriptive & qualitative studies</p>	<p>Only a small number of reported medication errors that happened in one hospital were utilized for the analysis</p>	<p>No; a small sample was used with less data instead of a broader sample with more data</p>

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
<p>Article 3: Izadpanah, F., Nikfar, S., Bakhshi Imcheh, F., Amini, M., & Zargaran, M. (2018). Assessment of Frequency and Causes of Medication Errors in Pediatrics and Emergency Wards of Teaching Hospitals Affiliated to Tehran University of Medical Sciences (24 Hospitals). <i>Journal of medicine and life</i>, 11(4), 299–305. https://doi.org/10.2512/2/jml-2018-0046</p>	<p>To resolve the type, frequency, and causes of medication errors in the emergency unit of pediatric hospitals</p>	<p>This was a cross-sectional descriptive study that was done on 423 nurses in teaching hospitals</p>	<p>A cross-sectional descriptive study</p>	<p>The study showed that medication errors were higher among men than women and that these errors are more prevalent among night shifts than day shifts</p>	<p>Level 6: Single descriptive or qualitative study</p>	<p>Participants were less cooperative due to fear of being terminated, blame and low department rating</p>	<p>Yes; this study provided more insights into what affects clinicians and patients simultaneously</p>
<p>Article 4: Tabatabaee, S. S., Ghavami, V., Javan-Noughabi, J., & Kakemam, E. (2022).</p>	<p>To look into the</p>	<p>Using a systematic sampling</p>	<p>Using a descriptive-</p>	<p>The study showed that</p>	<p>A descriptive-analyt</p>	<p>The inaccessibility of informati</p>	<p>No; this study was</p>

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
Occurrence and types of medication error and its associated factors in a reference teaching hospital in northeastern Iran: a retrospective study of medical records. <i>BMC health services research</i> , 22(1), 1420. https://doi.org/10.1186/s12913-022-08864-9	prevalence and types of medication errors within nurses in a hospital	g, data were collected via a researcher-made checklist that include the demographic profiles of the nurses, and number of doctor's orders	analytical research on 147 medical records of admitted patients in hospitals	occurrence of medication error in corporate nurses was higher than nurses with permanent employment status	qualitative research	focus on about the main characteristics of nurses such as education , experience; and the research was also done in a single hospital ward instead of the entire hospital	not detailed because it only focused on a single unit in the hospital
Article 5: Kerari, A., & Innab, A. (2021). The Influence of Nurses' Characteristics on Medication Administration Errors: An Integrative Review. <i>SAGE open nursing</i> , 7, 23779608211025802. https://doi.org/10.1177/23779608211025802	To fill a gap in the current literature by concentrating on the relationship	A total of two authors used online databases from 2007 - 2022	Using the demographic s of registered nurses to address the	Results showed strong evidence that the level of education of nurses, their	Level 5: Systematic review of descriptive & qualitative	The studies did not implemented interventions for nurses even though it was	Yes; the studies utilized multiple evidence-based databases for a

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
	between the characteristics of nurses and medication administration errors.		occurrence of medication errors	length of experience, and training are directly linked to the occurrence of medication administration errors.	studies	focused on personal characteristics of nurses	long period of time
<p>Article 6: Gebre, M., Addisu, N., Getahun, A., Workye, J., Gamachu, B., Fekadu, G., Tekle, T., Wakuma, B., Fetensa, G., Mosisa, B., & Bayisa, G. (2021). Medication Errors Among Hospitalized Adults in Medical Wards of Nekemte Specialized Hospital, West Ethiopia: A Prospective</p>	To assess the occurrence and reasons for medication errors in hospitals	Using a prospective observational study design of 351 patients from October 30, 2018 to January	Using checklist-guided observation, medication administration records, review	Results showed that physician ordering is the most common stage for medication errors	Level 5: Systematic review of descriptive & qualitative studies	This study did not assess factors affecting prescribers like prescriber/physician experience	No; the study only focused on patients and not factors that affect providers

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
<p>Observational Study. <i>Drug, healthcare and patient safety, 13</i>, 221–228. https://doi.org/10.2147/DHPS.S328824</p>	<p>lized adults</p>	<p>30, 2019</p>	<p>of medication order sheets, and patient charts to collect data</p>	<p>in hospital</p>			
<p>Article 7: Mutair, A. A., Alhumaid, S., Shamsan, A., Zaidi, A. R. Z., Mohaini, M. A., Al Mutairi, A., Rabaan, A. A., Awad, M., & Al-Omari, A. (2021). The Effective Strategies to Avoid Medication Errors and Improving Reporting Systems. <i>Medicines (Basel, Switzerland)</i>, 8(9), 46. https://doi.org/10.3390/medicines8090046</p>	<p>To improve the reporting systems of medication errors in hospitals</p>	<p>Using five electronic databases to systematically search for articles related to medication errors</p>	<p>Using data mining of 684 articles that were reduced to 60 after deleting duplicates through vetting of titles</p>	<p>A systematic reporting program reduced the occurrence of medication errors in hospitals</p>	<p>Level 5: Systematic review of descriptive & qualitative studies</p>	<p>A more narrative approach was preferably implemented instead of a more systematic literature search</p>	<p>Yes; the research was done using evidence-based study from multiple credible research databases</p>

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
<p>Article 8: Zhou, S., Kang, H., Yao, B., & Gong, Y. (2018). Analyzing Medication Error Reports in Clinical Settings: An Automated Pipeline Approach. <i>AMIA ... Annual Symposium proceedings. AMIA Symposium, 2018</i>, 1611–1620.</p>	<p>To develop a system for medication error reporting before analysis by implementing automated text classification techniques</p>	<p>Utilizing an automated pipeline through machine learning approaches to pre-analyze medication error reports collected in hospitals</p>	<p>Using data mining algorithms to reduce the occurrence of medication errors</p>	<p>The study helped clinicians comprehend the nature of medication errors in an error report, and to better manage the error reports</p>	<p>Level 5: Systematic review of descriptive & qualitative studies</p>	<p>Only one-year error dataset reports were used</p>	<p>Yes; this study allowed for understanding how medication errors happen and how to reduce it through better reporting approaches</p>
<p>Article 9: Rasool, M. F., Rehman, A. U., Imran, I., Abbas, S., Shah, S., Abbas, G., Khan, I., Shakeel, S., Ahmad Hassali, M. A., & Hayat, K. (2020). Risk Factors</p>	<p>To assess risk factors that are linked with medica</p>	<p>The use of different logistic relapse analysis was</p>	<p>A cross-sectional, observational , and prospe</p>	<p>Multiple prescribers to a single patient have increas</p>	<p>Level 2: to avoid biases , a systematic rando</p>	<p>This study was done in a fixed population of patients with</p>	<p>Yes; this study provides some important</p>

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
<p>Associated With Medication Errors Among Patients Suffering From Chronic Disorders. <i>Frontiers in public health</i>, 8, 531038. https://doi.org/10.3389/fpubh.2020.531038</p>	<p>tion errors in patients with chronic diseases in hospitals</p>	<p>utilized to assess how different risk factors impacts the prevalence of medication errors on 803 patients</p>	<p>ctive study</p>	<p>ed risk factors for medication errors</p>	<p>m sampling approach was used</p>	<p>chronic diseases; it was not generalized</p>	<p>perspectives on the trigger of medication errors</p>
<p>Article 10: Tsegaye, D., Alem, G., Tessema, Z., & Alebachew, W. (2020). Medication Administration Errors and Associated Factors Among Nurses. <i>International journal of general medicine</i>, 13, 1621–1632. https://doi.org/10.2147/IJGM.S289452</p>	<p>To assess errors in medication administration and related factors among nurses in referral</p>	<p>422 participants of study were chosen by utilizing a simple random sampling method</p>	<p>Using a cross-sectional study design</p>	<p>lack of training is one major reason for medication administration errors in hospitals</p>	<p>Level 1: Utilizing a simple random sampling method</p>	<p>Questions of medication administration error and reporting may have been wrongly answered because of fear of</p>	<p>Yes: this study utilized the hospital setting to conduct the study, thus focusing on</p>

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	hospitals					other outcomes	the culture of administering medication in a hospital setting
<p>Article 11: Manias, E., Kusljic, S., & Wu, A. (2020). Interventions to reduce medication errors in adult medical and surgical settings: a systematic review. <i>Therapeutic advances in drug safety</i>, 11, 2042098620968309. https://doi.org/10.1177/2042098620968309</p>	To compare the efficacy of different treatments in decreasing prescribing, dispensing, and administration of medication	A combination of 34 articles were used with 12 intervention types identified	Searching databases (MEDLINE, CINAHL, EMBASE, PsycINFO, Cochrane Database of Systematic Reviews and the	The study showed that medication errors were reduced through the implementation of computerized physician order entry.	Level 5: A Systematic review of descriptive & qualitative studies	Results from the research that are reported in conference abstracts were not included and similarly, research not reported in English were also not included	Yes; this study was conducted in an acute hospital setting with multiple departments involved, which can be used as

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
	errors in acute medical and surgical settings.		Cochrane Central Register of Controlled Trials)			in the final analysis.	a bases for evidence-based practice references.
<p>Article 12: Tu, H. N., Shan, T. H., Wu, Y. C., Shen, P. H., Wu, T. Y., Lin, W. L., Yang-Kao, Y. H., & Cheng, C. L. (2023). Reducing Medication Errors by Adopting Automatic Dispensing Cabinets in Critical Care Units. <i>Journal of medical systems</i>, 47(1), 52. https://doi.org/10.1007/s10916-023-01953-0</p>	To compare and contrast the rates of medication errors, with prescription, dispensing, and administrative , during, before, and after	Medication error definitions were provided in a study that identified the occurrence of medication errors among 36 healthcare settings.	By installing seven automated dispensing cabinets sets in the ICUs, including the pediatric, medical, and surgical units.	After the implementation of automated dispensing cabinets, the prescription and dispensing errors rates decreased from 3.03 to	Level 5: Systematic review of descriptive & qualitative studies	Because the observation period with the happened during the COVID-19 outbreak, the baseline patient ratio of the medical center may have affected data	Yes; this study was conducted in an acute hospital setting with multiple departments involved, which can be used as a bases

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
	utilizing automated dispensing cabinets in intensive care settings.			1.75 per 100,000 prescriptions and 3.87 to 0 per 100,000 dispensations; and the rates of administrative errors reduced from 0.046 to 0.026% .		comparability.	for evidence-based practice references.
Article 13: Linden-Lahti, C., Takala, A., Holmström, A. R., & Airaksinen, M. (2021). What Severe Medication Errors Reported to Health Care	To investigate severe medication errors reported	A total of 1654 complaints and statements requests were	A retrospective analysis of medication error	Results showed that most medication errors occurred	Level 5: Systematic review of descriptive	Researchers couldn't contact the professionals or organizations	Yes; the research took multiple ears to complete

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
Supervisory Authority Tell About Medication Safety?. Journal of patient safety, 17(8), e1179–e1185. https://doi.org/10.1097/PTS.0000000000000914	d and to determine how documentation of incidents applied to learning from errors.	filed in a 5-year study period and 58 cases with medication errors were found from the database.	related complaints and authoritative statements that were investigated from 2013 to 2017.	d during prescription and the most affected population was patients 60 years and older.	& qualitative studies	ons involved in the possibility of misinterpreting some data and information in the context of comprehensively determining the main reasons behind certain errors could not be ruled out	te; thus, it may provide credible evidence-based results that can be used in a clinical setting.
Article 14: Aljabari, S., & Kadhim, Z. (2021). Common Barriers to Reporting Medical Errors. TheScientificWorldJournal, 2021, 6494889.	To review and determine common barrier	Most of the research used 75% self-administered	A systematic review that categorically review	The search yielded 755 studies, of which 30	Level 5: Systematic review of descriptive	A subjective conclusion could only be presented due to the	No; the study analysis was based on subjective

Article Title, Author, etc. (Current APA Format)	Study Purpose	Sample (Characteristics of the Sample : Demographics , etc.)	Methods	Study Results	Level of Evidence (Use Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.
https://doi.org/10.1155/2021/6494889	s to medication errors reporting.	questionnaires to collect data and nurses were 87% of most studied providers, followed by 27% of physicians.	ed the literature behind barriers to reporting medical errors by searching the MEDLINE and SCOPUS databases.	studies met the inclusion criteria.	& qualitative studies	variability in the population studied	conclusions, which is not suitable for evidence-based practice.
Article 15: Savva, G., Papastavrou, E., Charalambous, A., Vryonides, S., & Merkouris, A. (2022). Exploring Nurses' Perceptions of Medication Error Risk Factors: Findings From a Sequential Qualitative Study. Global	To explore nurses' perceptions of errors related to medication	With the participation of nurses in focus group discussions, a thematic	Using an exploratory qualitative and observational research	Results from the study showed that the root causes of medication	Level 1: Systematic review & meta-analysis of randomized	Since the study focused on only two hospitals settings, findings could not be generaliz	No; the scope of the research was limited to only two setting, which is not a

<p>Article Title, Author, etc. (Current APA Format)</p>	<p>Study Purpose</p>	<p>Sample (Characteristics of the Sample : Demographics , etc.)</p>	<p>Methods</p>	<p>Study Results</p>	<p>Level of Evidence (Use Melnyk Framework)</p>	<p>Study Limitations</p>	<p>Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.</p>
<p>qualitative nursing research, 9, 23333936221094857. https://doi.org/10.1177/23333936221094857</p>	<p>administration in two medical units in a tertiary hospital.</p>	<p>analysis was utilized to identify four themes of medication errors in a hospital setting.</p>	<p>study which investigated errors related to medication administration in hospitals.</p>	<p>errors can be linked to both system and individual related factors.</p>	<p>controlled trials; clinical guidelines based on systematic reviews or meta-analyses</p>	<p>ed to other settings</p>	<p>good bases for evidenced-based practice.</p>

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