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DOI: 10.46903/gjms/22.4.suppl.1657

REVIEW ARTICLE

BRIDGING THE GAP: EXPLORING NURSE-PHARMACIST COLLABORATION FOR PREVENTION OF MEDICATION ERRORS

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ABSTRACT

Medication error is defined as any preventable event that may result in inappropriate use of medication leading to a negative effect on a patient's health while the patient is still under the purview of the healthcare professionals. There are several techniques to overcome this challenge and one of the most effective techniques is the collaboration between interdisciplinary health care professionals. Collaborative efforts by nurses and pharmacists have shown powerful means to mitigate preventable medication errors and enhance the healthcare system. The duo's complementary skill expertise leverages the treatment. This article explored the roles of nurses and pharmacists in preventing medication errors, improving medication reconciliation accuracy, and enhancing patient education and adherence. The article also focused on the barriers to collaboration and ways to overcome these barriers.

KEY WORDS: Nurse; Pharmacist; Collaboration; Medication error; Patient care.

Cite as: Alanazi FJ, Aldhafeeri AA, Aldhafeeri MSH, Alanazi SE, Alanzi SJ, Alanzi RJ, et al. Bridging the gap: exploring nurse-pharmacist collaboration for prevention of medication errors [review article]. Gomal J Med Sci 2024 Oct-Dec ;22(4)Suppl:451-8. https://doi.org/1046903/gjms/22.4.suppl.11657

INTRODUCTION

According to WHO, medication error can be defined as any preventable event that may result in inappropriate use of the medication or patient harm while the medication is still under the purview of health care professionals.[1] Medication-related error is one of the reasons for severe morbidity, unnecessary economic burden, prolonged hospital stays, and unnecessary further treatments and diagnostics.[2,3] One way to mitigate medication error is to compose a system of a solid and diverse team of healthcare professionals in a way that responsibility is shared in a well-knitted manner for the common objective of ensuring a healthier patient.[4] The combination of nurses and pharmacists is one of the most important pairs to decrease medication errors.[5] Moreover, in recent years a major surge has been observed in collaboration of nurses and pharmacists to address the global concern of medication error. The duo has shown tremendous improvement in reducing the healthcare cost of individuals and reduction in unnecessary side effects due to medication errors.[6] This article explored the roles of nurses and pharmacists in preventing medication errors, improving medication reconciliation accuracy, and enhancing patient education and adherence. The article also focused on the barriers to collaboration and ways to overcome these barriers.

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Date Submitted: 20-06-2024
Date Revised: 17-11-2024
Date Accepted: 25-12-2024

DISCUSSION

Pharmacist-Nurse Expertise

Pharmacist's main area of expertise lies in finding ways to increase treatment efficacy, delivering medication information, and giving lifestyle advice to patients. The pharmacist primarily ensures the treatment efficacy by having a deep, comprehensive knowledge of the patient's prescription and medication history.[7]

In case of contradictory reactions, the pharmacist can discuss alternative treatment methods for the patient with the physician. According to a recent research by Leiva et al., a multifactorial intervention consisting of pillbox use, motivational interviews, and simplification of the dosing regimen was supervised by pharmacists and they simplified the dosing regimen of the patient during a follow-up visit.[8] The pharmacists are also responsible for verifying prescriptions and providing theoretical and practical knowledge about the medication, which ensures patient self-management. Their main role is to educate patients about the aim, benefits, and risks of taking a particular medicine or treatment. They also educate the patient about any inter-medication interaction or any food medicine interaction. They also inform patients on medication schedules as to when and how the medication needs to be taken. [9] Further, the pharmacist also offers lifestyle advice to the patient for better treatment management and provides patients with alternative means in case of missed doses and adverse effects.[8] Nurses are responsible for a broad range of activities about patients' health. Nurses are also responsible for follow-ups and they are the frontline in detecting early stages of adverse effects due to medications. Further, nurses are also responsible for educating the patients. [10]

Nurses are the ones who provide complete standardized information on a particular treatment and pharmacists ensure the reinforcement for effective treatment. Nurses also educate patients to monitor and address different symptoms as the marker of the severity of the disease. For instance, nurses are primarily responsible for explaining the use of a peak flow meter to a patient. [11] Figure 1 depicts a Venn diagram of the roles of nurses and pharmacists.

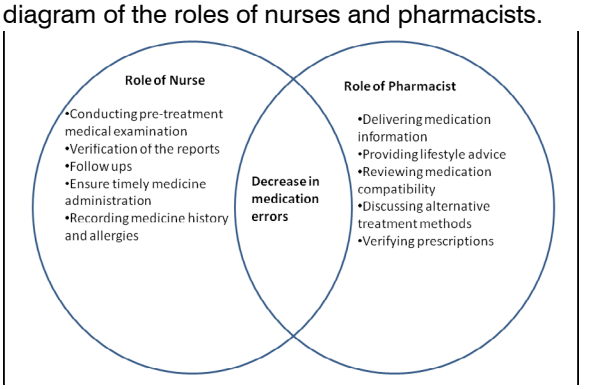

Figure 1: Venn diagram of the roles of nurse and pharmacist in decreasing medication errors

COLLABORATIVE ROLE OF NURSES AND PHARMACISTS IN DECREASING MEDICATION ERRORS

Medication Safety

In drug safety, nurses are the frontier. Their presence and monitoring provide them with a greater understanding of the patient's health, and they administer the medicine on time to avoid missed doses.[6] Critical supervision ensures the patient completes the drug course and follows the dosing plan. They also monitor physiological processes throughout the dose and detect early negative effects.[11] They also explain medicine doses and ensure patients follow the prescription, avoiding abuse. Additionally, they document any important medical histories and allergies to provide better drugs and ongoing treatment.[12] The Pharmacists are medication and pharmacology specialists in the health care team that manage patients and offer essential treatment. Besides distributing medicine, a pharmacist must evaluate its efficacy and suitability for the patient. [12] They also prescribe the right dosage to avoid unwanted effects and boost efficacy. Pharmacists must educate patients on medicine's adverse effects, optimum dosage, and safe home use.[13]

Together the duo creates a different source of expertise and works together to develop a highly resilient system. Therefore, nursing and pharmacy can be justified as the pillars of medication safety in healthcare. At the bedside, nurses look after the patients, while pharmacists are behind the scenes, ensuring everything is in order. Combined, they are a team standing hand in hand and each of them carries important obligations.[14] Only through such collaboration, nurses and pharmacists can eliminate medication errors and help patients receive the most effective therapy.

Medication Reconciliation and Adherence

Every time a patient moves to hospitals or wards, medication reconciliation is done. There are contradictions between home, OTC, and hospital pharmaceuticals, but the healthcare system employs a staff of nurses and pharmacists to enhance reconciliation.[15] Medication reconciliation services generally combine correct home medication lists and build unified reconciliation methods. The pair ensures therapy is completed on schedule and in the right environment to assist the patient in recuperating faster. Both can spot important information and prevent drug mistakes. [16] The nurses and pharmacist also make sure the patient takes medicine to hasten recuperation. Nurses can monitor patients' prescriptions and educate them about adverse effects and adherence.[17] The pharmacist consults with the patient to determine the dose and timing. Thus, collaboration improves disease management and patient drug dose regimen compliance.[18]

Early Detection of Medication Discrepancies

Doctors and healthcare teams can foresee problems including medications' adverse reactions, duplicate therapies, or incorrect orders. To ensure that mistakes do not reach the patients, nurses and pharmacists must confront these discrepancies, hence, minimizing the risk of causing harm and optimizing

the healing process. By making such a preemptive move, the team highlights the significance of collaboration in successful error prevention and provides timely actions aimed at saving a life.[17]

Chronic Disease Management

Chronic illness is the leading cause of mortality worldwide, causing worry. Adherence to a treatment regimen is crucial to chronic illness management. However, the drug's low adherence rate is related to limited clinical efficacy for numerous therapies and high healthcare expenditures.[19] The collaboration of highly trained healthcare workers has improved drug adherence and chronic illness management. This collaboration allows them to design a patient-specific integrated care plan and identify pharmaceutical barriers. For instance, a diabetic patient may receive a tailored care plan that includes frequent sugar monitoring, a nutritionist-recommended food, and an exercise routine to maintain sugar levels.[20]

Collaboration is essential for identifying and removing any drug adherence hurdles. Chronic disease patients can suffer financial issues, medicine side effects, and forgetfulness. These impediments prevent treatment adherence.[21] Healthcare workers may assist patients overcome problems by providing knowledge, support, and resources. A pharmacist may help a patient design a pharmaceutical regimen that fits their daily routine, while a social worker may help them seek financial aid to cover prescription expenses. Collaboration among healthcare providers simplifies drug adherence and chronic illness treatment.[22] Teamwork between healthcare professionals, patients, and other stakeholders may create a customized treatment plan, improve communication, and address adherence issues. Together, these interventions might assist manage bedridden people and improve their health, lowering healthcare expenditures, and improving quality of life. As chronic illnesses deteriorate, healthcare practitioners must work together to manage them and improve patient well-being. [22-23] Nurse-pharmacist partnership advantages are shown in Table 1.

Table 1: Benefits of Nurse-Pharmacist Collaboration in reducing medication errors

Benefit	Description	Example
Improved Communication	Nurses and pharmacists share their unique perspectives and expertise, fostering a clearer understanding of medication use. [23]	A nurse flags a potential drug interaction based on a patient's bedside observation. The pharmacist reviews the interaction and collaboratively adjusts the medication regimen with the doctor, ensuring patient safety. [24]
Enhanced Medication Reconciliation	Working together, nurses and pharmacists can identify and rectify discrepancies in a patient's medication list across care transitions. [25]	Upon admission to a nursing home, a nurse and pharmacist jointly review the patient's medication list, identifying a medication the patient was no longer taking at home. This prevents the medication from being administered unnecessarily, avoiding potential side effects. [26]
Increased Patient Education	Nurses and pharmacists can collaborate to provide patients with comprehensive medication education tailored to their needs and learning styles. [27]	A nurse explains the proper administration technique for an inhaler, while the pharmacist clarifies potential side effects and answers the patient's questions about medication interactions.[28]
Better Medication Management	Collaboration allows for a more holistic approach to medication management, considering a patient's specific condition and adherence challenges. [29]	A nurse observes a patient struggling to remember to take their medication. The pharmacist works with the nurse to develop a medication adherence plan, including blister packs and reminder tools. [30]
Reduced Medication Errors	The combined knowledge and vigilance of nurses and pharmacists create a robust system of checks and balances, minimizing errors. [31]	A pharmacist identifies a dosing error in a physician's order during a medication review. The pharmacist promptly alerts the nurse and doctor, preventing the administration of an incorrect dose. [32]
Improved Patient Outcomes	By optimizing medication use through collaboration, nurses and pharmacists can contribute to better patient health and quality of life. [33]	A patient with chronic heart disease experiences fewer medication-related complications due to a collaborative medication management plan developed by the nurse and pharmacist, leading to improved disease control and overall well-being. [34]

Multifaceted Barriers To Smooth Collaboration Between Nurses And Pharmacists

Medication errors arise from a complex interplay of system-related and human factors (Figure 2).

Figure 2: Barriers to effective collaboration between nurse and pharmacist

System-related factors create vulnerabilities within the healthcare environment, increasing the likelihood of errors. Inefficient workflows, characterized by high patient volumes and limited time, can lead to hurried processes and missed steps.[35] Communication breakdowns between healthcare professionals, particularly between nurses and physicians, can result in misunderstandings regarding medication orders.[36] Furthermore, limitations in technology, such as outdated medication dispensing systems or poorly designed electronic health records (EHRs), can contribute to errors during order entry or documentation.[37]

Human factors also play a substantial role in medication errors. Fatigue, a common issue among healthcare professionals due to long working hours and demanding schedules, can impair cognitive function and increase the risk of mistakes. Distractions at work might cause errors in drug preparation and administration.[38] Lack of knowledge and experience with medications or protocols can make nurses vulnerable to overseeing potential interactions or side effects.[28] Table 2 summarizes potential hurdles to effective collaboration between chemists and nurses, as well as strategies to overcome them.

Table 2: Barriers to smooth collaboration between nurses and pharmacists

Barrier	Description	Strategy
Professional Boundaries	Uncertainties or anxieties regarding professional roles and scopes of practice. [38]	Develop interprofessional education programs that foster mutual respect and understanding of each other's roles. [37] Develop clear-cut guidelines outlining the roles and clear collaborative activities to ensure no confusion is there between the nurses and pharmacists. [38]
Time Constraints	Limited time due to high workloads and competing demands. [39]	Set aside time for collaborative tasks like a joint review of medications or medication reconciliation. [39] Utilize technology for streamlined communication and information sharing, promoting collaboration without sacrificing time for direct patient care. [39]
Conflicting Priorities	Nurses and pharmacists may have different priorities or focus areas within medication management. [39]	Establish clear goals and objectives for collaboration, ensuring both nurses and pharmacists understand the shared goal of medication safety. [40] Foster open communication to discuss and address any potential discrepancies in priorities. [40]
Resource Limitations	Lack of personnel, funding, or dedicated space for collaborative activities. [39]	Advocate for increased staffing and resources to support collaborative programs. [40] Explore creative solutions such as virtual collaboration tools or shared workspaces to overcome spatial limits. [40]
Lack of Leadership Support	Institutional culture or leadership that does not prioritize inter-professional collaboration. [40]	Gain leadership support by emphasizing the perks of collaboration for patient safety, better results, and cost-effectiveness. [51] Collect statistics and share success stories to demonstrate the beneficial effects of collaboration on the institution. [40]
Limited Communication	Ineffective communication channels or unclear communication protocols between nurses and pharmacists. [41]	Implement clear communication protocols for collaboration, including escalation procedures for identified medication concerns. [41] develop and use more secure online platforms or real-time communication tools to aid in seamless information exchange. [41]

Methods To Combat The Barriers To Smooth Collaboration: Collaboration between the nurse and pharmacist is one of the best ways to provide balance and oversight. Nurses and pharmacists can use their knowledge and skills to identify and prevent medication mistakes at various drug consumption stages.[38-40] Several methods have been explored to encourage teamwork. One model is interprofessional education and training. Under this paradigm, nurses and pharmacists may learn from one another and expand drug management skills.[39] It also improves nurse-pharmacist communication, reducing friction and medication errors. These programs can help nurses understand pharmaceutical interactions and side effects and pharmacists understand nursing workflow and bedside medicine administration.[38]

A cooperative medication reconciliation procedure is another option. The nurse and pharmacist work together to match the patient's history, current medications, allergies, and other significant factors to the current pharmaceutical prescription to avoid drug-drug interactions and other medication errors. Nurses and pharmacists can ensure continuity of care and prevent prescription list mistakes by reconciling medications'.[42]

Collaborative drug evaluations and assessments increase safety. These reviews help nurses identify medication-related issues during patient monitoring. With their broad medication knowledge, pharmacists may examine these issues and work with nurses to adjust the prescription to the patient's needs and offer other choices to improve patient care and safety.[43]

Additionally, communication and information-sharing tools are essential for efficient cooperation. Nurses and pharmacists can improve communication via secure web platforms and real-time technology. This allows prompt reaction to situations like medication interactions or new pharmacological sensitivities. Overall, this improves patient safety.[44-46]

Future Directions And Recommendations: As said, nurses and pharmacists work together to promote patient safety and care. They collaborate to reduce prescription mistakes and provide complete patient care. However, poor coordination can cause staff and patient disruption.[46] Thus, a thorough education and training program should enable smooth healthcare professional collaboration. Hospitals may teach healthcare personnel and define their duties to avoid misunderstanding. Continuing education and conferences may also assist pharmacists and nurses keep current and improving their skills, which benefits patients.[47]

Second, technology may facilitate cooperation. With the rise in drug mistakes, technology is crucial to patient safety by ensuring patients take the proper medicine at the right time. Technology has revolutionized medicine prescribing and distribution, from computerized prescribing to barcode medication delivery. The pharmacist receives electronic prescriptions directly from the prescribing system, eliminating drug errors and misunderstandings.[48] Today's computerized prescription software alerts doctors and pharmacists about drug-drug interactions and dose suggestions. Patient history is stored, making it easy for doctors to refer.[49] Another popular technique is barcode drug administration. In this, a barcode scanner scans the medicine code and the patient's wristband to ensure correct medication administration and electronically fills the time of dosage administration into the database, allowing healthcare professionals to track patient medication and medication errors. Reconciliation software may also track drug interactions and duplicates. All of these methods improve patient safety and medication accuracy.[50]

Creating established norms and guidelines for nurse-pharmacist drug management partnerships can help improve workplace clarity. The guidelines should outline roles, responsibilities, and communication methods to coordinate treatment across healthcare institutions.[51] Companies can also enhance quality by introducing management improvement initiatives to reduce drug mistakes and identify system-level causes. Allowing nurses and pharmacists to permanently enhance quality can promote safety and innovation.[52] approaches improve patient safety and medication accuracy.[50]

When adopted, these future directions and suggestions would strengthen nurse-pharmacist collaboration and enhance drug management, improving patient safety and care.

CONCLUSION

The nurses-pharmacist combination has good healthcare system leverage potential. Nurses and pharmacists can recognize, avoid, and eliminate medication errors due to their experience and viewpoint. Their partnership can enhance patient care. This teamwork has room for further development. Inter-professional education and training programs can bridge the gaps between these two professions. These programs will help nurses and pharmacists collaborate and exchange information to avoid medication errors, tackle drug safety issues, and improve direct patient care.

Acknowledgment: The authors extend their appreciation to the Deanship of Scientific Research at Northern Border University, Arar, KSA for funding this research work through the project number "NBU-FFR-2024-2042-03''.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	FJA, AAA
Acquisition, Analysis or Interpretation of Data:	FJA, AAA, MSHA, SEA, SJA, RJA
Manuscript Writing & Approval:	FJA, AAA, MSHA, SEA, SJA, A, MI

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.