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Assessment of Nursing Strategies to Minimize Medication Errors in Low-Resource Healthcare Facilities

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Abstract: Medication errors continue to represent a critical challenge to patient safety worldwide, particularly in low-resource healthcare settings where systemic limitations, workforce shortages, and lack of standardized protocols increase the likelihood of such errors. This study aims to assess the underlying causes of medication errors and evaluate the effectiveness of nursing strategies in minimizing their occurrence in resource-constrained environments. A descriptive cross-sectional study was conducted among 40 registered nurses working in a hospital setting characterized by limited resources and high patient load. Data were collected through a structured questionnaire focusing on demographic characteristics, experiences with medication errors, perceived causes, and applied nursing interventions.

The findings revealed that a significant proportion of nurses had either witnessed or been involved in medication errors, highlighting the widespread nature of the issue. The primary contributing factors included heavy workload, communication breakdowns, fatigue, illegible prescriptions, and absence of standardized procedures. Nursing interventions such as adherence to the "Five Rights" of medication administration, double-checking protocols, and improved communication practices were found to be effective in reducing errors.

The study concludes that strengthening nursing competencies, promoting a culture of safety, and implementing system-level improvements can significantly reduce medication errors. These findings emphasize the need for continuous education, structured communication systems, and supportive organizational policies to enhance patient safety in low-resource healthcare environments.

Keywords: Medication Errors; Patient Safety; Nursing Interventions; Low-Resource Settings; Healthcare Quality

1. Introduction

Medication errors are widely recognized as one of the most common and preventable causes of patient harm in healthcare systems across the globe. These errors can occur at any stage of the medication process, including prescribing, transcribing, dispensing, administering, and monitoring. According to the World Health Organization (WHO), medication errors are defined as preventable events that may lead to inappropriate medication use or harm to a patient while the medication is under the control of a healthcare professional or patient.

Globally, medication errors contribute significantly to morbidity, mortality, and increased healthcare costs. The WHO has identified medication safety as a global priority under its "Medication Without Harm" initiative, aiming to reduce severe, avoidable medication-related harm by 50% worldwide. Despite advancements in healthcare systems in developed countries, medication errors remain a persistent issue. The situation is even more critical in low-resource healthcare settings where limitations in infrastructure, staffing, and technology exacerbate the problem.

Nurses play a central role in medication administration and are often the last line of defense in preventing medication errors. Their direct interaction with patients and medications places them in a unique position to detect and correct potential mistakes before they reach the patient. However, in low-resource settings, nurses often face overwhelming workloads, insufficient staffing, and lack of access to essential tools and training, which increases the likelihood of errors.

Another major issue in such settings is the lack of standardized protocols and reporting systems. In many cases, medication errors go unreported due to fear of blame or punishment, leading to underestimation of the problem and missed opportunities for improvement. A non-punitive culture that encourages reporting and learning from errors is essential for improving patient safety.

Given these challenges, there is a pressing need to explore practical, cost-effective nursing strategies that can be implemented to minimize medication errors in resource-limited environments. This study aims to assess the causes of medication errors and evaluate the effectiveness of nursing interventions in reducing such errors.

2. Objectives

The present study was designed to comprehensively examine medication safety practices within low-resource healthcare environments, with a particular focus on the role of nursing interventions in reducing medication-related risks. The specific objectives of the study are as follows:

2.1 Identification of Contributing Factors

To systematically identify and analyze the most common causes of medication errors in low-resource healthcare facilities, including both human and system-related factors. This includes evaluating issues such as excessive workload, staffing shortages, fatigue, communication breakdown among healthcare professionals, illegible prescriptions, interruptions during medication administration, and the absence of standardized clinical protocols and technological support systems.

2.2 Evaluation of Nursing Interventions

To critically evaluate the effectiveness of various nursing interventions and safety practices in minimizing medication errors. This objective focuses on assessing commonly applied strategies such as adherence to the “Five Rights” of medication administration, double-checking procedures, use of medication checklists, proper documentation, and effective communication with prescribers and multidisciplinary teams.

2.3 Assessment of Safety Culture and Reporting Practices

To explore the existing safety culture within healthcare settings, particularly examining nurses’ attitudes toward reporting medication errors. This includes identifying barriers to error reporting, such as fear of punitive actions, lack of institutional support, and absence of structured reporting systems, as well as evaluating the extent to which a non-punitive and transparent environment is promoted.

2.4 Development of Practical Recommendations

To develop evidence-based and context-specific recommendations aimed at improving medication safety in low-resource healthcare environments. This includes proposing strategies for strengthening nursing education and training, improving communication systems, implementing standardized medication administration protocols, optimizing workload management, and fostering a culture of patient safety and continuous quality improvement.

2.5 Contribution to Patient Safety and Healthcare Quality

To contribute to the broader goal of enhancing patient safety and healthcare quality by providing actionable insights that can be utilized by healthcare administrators, policymakers, and clinical practitioners in resource-limited settings.

3. Methodology

3.1 Study Design

A descriptive cross-sectional study design was used to assess medication error experiences and prevention strategies among nurses. This design was selected due to its suitability for examining current practices and identifying trends within a specific population.

3.2 Study Setting

The study was conducted in a hospital environment characterized by limited resources, including inadequate staffing levels, high patient volume, and minimal technological support systems such as electronic prescribing or automated medication dispensing.

3.3 Participants

A total of 40 registered nurses participated in the study. Participants were selected using convenience sampling and represented various departments, including medical, surgical, and outpatient units. The inclusion criteria required participants to have at least one year of clinical experience.

3.4 Data Collection Tool

Data were collected using a structured questionnaire divided into four sections:

Demographic information

Experience with medication errors

Perceived causes of errors

Nursing interventions and safety practices

The questionnaire included both closed-ended questions and Likert-scale responses to capture quantitative and qualitative insights.

3.5 Data Collection Procedure

The questionnaires were distributed during working hours, and participation was voluntary. Participants were assured of confidentiality and anonymity. Completed questionnaires were collected and analyzed using descriptive statistical methods.

4. Results

4.1 Demographic Characteristics

Among the participants, 60% were female and 40% were male. Approximately 50% had 5–10 years of clinical experience, while 30% had more than 10 years of experience. This indicates that the majority of participants were experienced professionals.

4.2 Occurrence of Medication Errors

The results showed that:

65% of nurses reported witnessing medication errors

40% admitted personal involvement in at least one error

These findings highlight the widespread occurrence of medication errors in clinical practice.

4.3 Causes of Medication Errors

The most common causes identified were:

Heavy workload and staff shortages (75%)

Fatigue and extended working hours (65%)

Communication breakdown (60%)

Illegible prescriptions (55%)

Lack of standardized procedures (50%)

These results indicate that both human and system-related factors contribute significantly to medication errors.

4.4 Nursing Interventions

The following interventions were commonly used:

Adherence to “Five Rights” (85%)

Double-checking medications (80%)

Verbal clarification with doctors (60%)

Use of checklists (50%)

These practices were reported to reduce the likelihood of errors.

4.5 Safety Culture

While 55% of nurses felt encouraged to report errors, 45% expressed fear of punishment, indicating the need for a more supportive reporting environment.

5. Discussion

The findings of this study are consistent with existing literature, which identifies workload and staffing shortages as major contributors to medication errors. High patient-to-nurse ratios limit the time available for careful medication administration, increasing the risk of mistakes.

Communication breakdown is another critical factor. Misinterpretation of verbal orders and unclear handwriting in prescriptions can lead to serious errors. Implementing structured communication tools such as SBAR (Situation, Background, Assessment, Recommendation) can help improve clarity and reduce misunderstandings.

Nursing interventions such as adherence to the “Five Rights” (right patient, right medication, right dose, right route, and right time) remain fundamental in ensuring medication safety. Double-checking procedures provide an additional layer of protection, particularly in high-risk situations.

Continuous education and training are essential for improving nurses’ knowledge and skills. In low-resource settings, investing in training programs can significantly enhance patient safety outcomes without requiring expensive technology.

The study also highlights the importance of a non-punitive culture. Fear of blame discourages reporting, which prevents organizations from learning from errors. Establishing a culture of safety where errors are treated as learning opportunities is crucial.

6. Implications for Practice

This study has several important implications:

Healthcare institutions should implement standardized medication protocols

Regular training programs should be conducted for nurses

Communication systems should be improved

Error reporting systems should be non-punitive

Workload management strategies should be introduced

7. Limitations of the Study

Small sample size (40 participants)

Single healthcare setting

Self-reported data may introduce bias

Future studies should include larger samples and multiple settings for more generalizable results.

8. Conclusion

Medication errors continue to represent a significant and persistent challenge within healthcare systems, particularly in low-resource settings where limitations in staffing, infrastructure, and access to standardized protocols increase the vulnerability to such errors. The findings of this study clearly demonstrate that medication errors are multifactorial in nature, arising from a complex interaction of both system-level deficiencies and human-related factors. Key contributors identified include excessive workload, staff shortages, fatigue, ineffective communication among healthcare professionals, and the absence of structured medication management systems.

The study further highlights the critical role of nurses as frontline healthcare providers in ensuring medication safety. Nursing professionals serve as the final checkpoint in the medication administration process, and their vigilance, clinical judgment, and adherence to established safety practices are

essential in preventing errors. The results indicate that evidence-based nursing strategies—such as strict adherence to the “Five Rights” of medication administration, implementation of double-checking procedures, effective communication with prescribers, and proper documentation—can substantially reduce the occurrence of medication-related incidents.

Importantly, the study underscores that while individual nursing practices are vital, sustainable improvement in medication safety requires a broader systems-based approach. Healthcare organizations must prioritize the development and implementation of standardized medication protocols, enhance communication systems through structured tools, and integrate continuous professional education and training programs for nursing staff. Investment in these areas is particularly crucial in resource-limited settings, where cost-effective interventions can yield significant improvements in patient safety outcomes.

Another key finding of this study is the influence of organizational culture on medication error reporting and prevention. A significant proportion of nurses expressed concerns regarding punitive consequences, which may discourage the reporting of errors. This highlights the urgent need to establish a non-punitive, supportive environment that encourages transparency, learning, and continuous quality improvement. Promoting a culture of safety, where errors are viewed as opportunities for system enhancement rather than individual blame, is essential for long-term progress.

In conclusion, reducing medication errors in low-resource healthcare facilities requires a comprehensive and integrated approach that combines individual accountability with organizational responsibility. Strengthening nursing competencies, improving communication and teamwork, implementing standardized systems, and fostering a culture of safety are all critical components of this strategy. By adopting these measures, healthcare institutions can significantly enhance patient outcomes, reduce preventable harm, and ensure the delivery of high-quality, safe, and effective healthcare services.

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