

Evaluating the Role of Pharmacist-Nurse Collaboration in Medication Reconciliation and Patient Safety during Hospital Transitions

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Abstract

Background: Medication reconciliation is critical for preventing medication discrepancies and adverse drug events (ADEs) during hospital transitions. This study aimed to evaluate the impact of pharmacist-nurse collaboration on medication reconciliation, focusing on its effect on medication discrepancies, ADEs, hospital length of stay, and 30-day readmission rates.

Methods: A prospective, interventional study was conducted at a tertiary hospital, involving 300 patients. The intervention group (n = 150) received pharmacist-nurse collaboration during medication reconciliation, while the control group (n = 150) followed standard care without interdisciplinary collaboration. Outcomes included the number of medication discrepancies, incidence of ADEs, length of hospital stay, 30-day readmission rates, and patient satisfaction.

Results: The intervention group had significantly fewer medication discrepancies at discharge (0.8 vs. 2.7, $p < 0.001$) and a lower incidence of ADEs (9% vs. 18%, $p = 0.034$). Additionally, the intervention group experienced shorter hospital stays (5.8 vs. 7.1 days, $p = 0.011$) and lower 30-day readmission rates (10% vs. 17%, $p = 0.045$). Patient satisfaction was higher in the intervention group (94% vs. 76%, $p < 0.001$).

Conclusion: Pharmacist-nurse collaboration significantly reduces medication discrepancies and ADEs, improves patient outcomes, and enhances patient satisfaction. This interdisciplinary approach should be integrated into routine hospital practices to improve the quality of care during transitions.

Keywords: Medication reconciliation, pharmacist-nurse collaboration, medication discrepancies, adverse drug events, hospital readmission, patient safety

Introduction

Medication reconciliation is a critical process in ensuring patient safety during transitions of care, particularly during hospital admission and discharge. It involves verifying and documenting a patient's complete medication history to prevent medication errors, such as omissions, duplications, dosing errors, or harmful drug interactions (Barnsteiner, 2008). Studies have shown that medication discrepancies occur in up to 70% of hospital admissions, with many of these errors posing significant risks to patient safety (Gleason et al., 2010). Effective medication reconciliation has the potential to reduce these discrepancies, particularly when performed at key transition points, such as during hospital admission and discharge.

Pharmacists and nurses play crucial roles in the medication reconciliation process. Pharmacists are responsible for reviewing medication histories, identifying potential discrepancies, and making appropriate adjustments to therapy (Manzorro et al., 2011). Nurses, as the primary point of contact for patients, are uniquely positioned to gather accurate medication information and educate patients about their prescribed medications. Collaborative efforts between pharmacists and nurses have been shown to improve the accuracy of medication reconciliation, ultimately reducing medication-related errors and improving patient outcomes (Latimer et al., 2023).

Despite the recognized importance of medication reconciliation, barriers such as time constraints, lack of communication between healthcare providers, and incomplete patient information often hinder its effectiveness (Mueller et al., 2012). Collaborative strategies that leverage the strengths of both pharmacists and nurses can overcome these challenges and ensure a more comprehensive and accurate medication review process. This study aims to evaluate the impact of pharmacist-nurse collaboration on the quality of medication reconciliation during hospital transitions, focusing on its role in reducing medication errors and enhancing patient safety.

Literature Review

1. The Importance of Medication Reconciliation

Medication reconciliation is a critical component of patient safety, particularly during hospital transitions such as admissions, transfers, and discharges. It involves systematically reviewing and verifying a patient's complete medication history to avoid discrepancies, dosing errors, or harmful interactions (Barnsteiner, 2008). The Joint Commission has emphasized the importance of medication reconciliation as a key strategy to prevent medication-related errors, highlighting its role in enhancing continuity of care and reducing adverse drug events (Gleason et al., 2010). Despite its recognized importance, medication reconciliation is often overlooked or inadequately performed, leading to preventable medication errors. Studies have shown that up to 70% of medication errors are the result of discrepancies in patient medication histories, particularly at admission and discharge (Mueller et al., 2012).

2. Common Challenges in Medication Reconciliation

Several challenges hinder the effective implementation of medication reconciliation in healthcare settings. One of the main barriers is incomplete or inaccurate patient medication histories, which can result from fragmented communication between healthcare providers, patients, and pharmacies (Almanasreh et al., 2016). Additionally, time constraints and high patient volumes make it difficult for healthcare professionals to perform thorough medication reviews, particularly in busy hospital settings. Nurses and physicians may lack access to a patient's complete medication history or may be unaware of recent changes in outpatient prescriptions, further contributing to errors (Kwan et al., 2013). These challenges highlight the need for a more structured and collaborative approach to medication reconciliation, involving multiple healthcare professionals, such as pharmacists and nurses, to ensure accuracy and reduce medication discrepancies.

3. The Role of Pharmacists in Medication Reconciliation

Pharmacists are uniquely positioned to play a key role in the medication reconciliation process due to their expertise in pharmacotherapy and drug interactions. Pharmacist-led interventions in medication reconciliation have been shown to significantly reduce medication errors, particularly during hospital admissions and discharges (Manzorro et al., 2011). Pharmacists are trained to review medication histories comprehensively, identify potential discrepancies, and recommend appropriate changes to medication

regimens. Additionally, pharmacists can offer valuable insights into optimizing drug therapies, minimizing drug interactions, and ensuring that medication regimens are safe and effective for individual patients (Latimer et al., 2023).

Several studies have demonstrated the positive impact of pharmacist involvement in medication reconciliation. For example, a study by Abdel-Qader et al. (2010) found that pharmacist-led medication reconciliation reduced medication discrepancies by 73% during patient admissions. Other studies have reported similar improvements in medication safety when pharmacists are integrated into the reconciliation process, suggesting that their involvement is essential for improving patient outcomes and minimizing medication errors (Karapinar-Carkit et al., 2009).

4. The Role of Nurses in Medication Reconciliation

Nurses are often the first healthcare professionals to interact with patients during hospital admissions and are responsible for gathering initial medication histories. Their proximity to patients and their role as caregivers make nurses critical participants in the medication reconciliation process (Kwan et al., 2013). Nurses play a key role in verifying patient-reported medication histories, ensuring that the medication lists are accurate, and educating patients about their medications during hospital discharge (Almanasreh et al., 2016). By collaborating with pharmacists, nurses can provide a more comprehensive view of a patient's medication regimen, identifying potential discrepancies that might otherwise be missed.

Studies have shown that nurse-led medication reconciliation, when combined with pharmacist support, can lead to improved outcomes. For instance, a study by Rozich and Resar (2001) found that a collaborative approach between nurses and pharmacists reduced medication discrepancies by nearly 50% at discharge. This underscores the value of involving both nurses and pharmacists in the medication reconciliation process to ensure a holistic and patient-centered approach to medication safety.

5. Collaborative Approaches in Medication Reconciliation

The literature strongly supports the idea that collaboration between pharmacists and nurses enhances the effectiveness of medication reconciliation. Interdisciplinary teamwork allows for a more thorough and accurate review of patient medication histories, improving the detection of discrepancies and reducing the risk of adverse drug events (Mueller et al., 2012). Pharmacists bring in-depth knowledge of pharmacotherapy, while nurses contribute their direct patient care experience and communication skills. By working together, these professionals can ensure that patients receive the most accurate and comprehensive medication management possible (Latimer et al., 2023).

Several studies have evaluated the benefits of pharmacist-nurse collaboration in the medication reconciliation process. For example, a study by Karapinar-Carkit et al. (2009) demonstrated that the collaboration between pharmacists and nurses reduced medication discrepancies during hospital admissions and led to improved patient outcomes. Moreover, a systematic review by Mueller et al. (2012) found that interdisciplinary approaches to medication reconciliation were associated with fewer adverse drug events and improved continuity of care. These findings highlight the importance of leveraging the unique skills of both pharmacists and nurses in promoting medication safety during transitions of care.

6. Benefits of Improved Medication Reconciliation

Effective medication reconciliation can lead to significant improvements in patient safety and outcomes. By identifying and resolving discrepancies in medication regimens, healthcare professionals can reduce the risk

of adverse drug events, improve medication adherence, and enhance overall patient satisfaction (Barnsteiner, 2008). Moreover, improved medication reconciliation has been associated with reduced hospital readmissions and shorter lengths of stay, as patients experience fewer complications related to medication errors (Gleason et al., 2010).

The benefits of pharmacist-nurse collaboration extend beyond medication safety. Collaborative efforts in medication reconciliation can also improve communication between healthcare providers, leading to better-coordinated care and a more seamless patient experience during hospital transitions. As healthcare systems continue to prioritize patient safety and quality of care, interdisciplinary approaches to medication reconciliation will become increasingly important in achieving these goals (Latimer et al., 2023).

The literature underscores the critical role of medication reconciliation in improving patient safety during hospital transitions. Pharmacist-nurse collaboration has been shown to significantly reduce medication discrepancies, improve patient outcomes, and prevent adverse drug events. By integrating the expertise of both pharmacists and nurses, healthcare institutions can develop more effective medication reconciliation processes that enhance continuity of care and reduce medication-related risks.

Methodology

Study Design

This was a prospective, interventional study conducted at a tertiary care hospital. The study aimed to evaluate the impact of pharmacist-nurse collaboration on improving medication reconciliation and reducing medication discrepancies during hospital admissions and discharges. The study involved a comparison between an intervention group, where pharmacists and nurses worked together on medication reconciliation, and a control group that followed standard care practices without specific interdisciplinary collaboration.

Study Setting and Population

The study was conducted in the medical-surgical and internal medicine departments of a tertiary hospital. The population included adult patients (aged 18 years or older) who were admitted to the hospital with a length of stay of at least 48 hours and were on at least five chronic medications at the time of admission.

Inclusion Criteria:

- Patients aged 18 years and older.
- Patients admitted to the medical-surgical or internal medicine units.
- Patients taking at least five chronic medications at the time of admission.
- Patients expected to stay in the hospital for at least 48 hours.

Exclusion Criteria:

- Patients admitted to the ICU or critical care units.
- Patients with cognitive impairments who were unable to provide a reliable medication history.
- Patients transferred from other healthcare facilities where medication reconciliation was previously completed.

A total of 300 patients were enrolled in the study, with 150 patients in the intervention group and 150 patients in the control group.

Intervention: Pharmacist-Nurse Collaboration

The intervention group involved a structured medication reconciliation process conducted by a team of pharmacists and nurses at both admission and discharge. The process included the following steps:

1. **Medication History Collection:** Upon admission, nurses performed an initial medication history, documenting the patient's current medication regimen, including prescription drugs, over-the-counter medications, and supplements. Pharmacists then reviewed the medication history for completeness and accuracy, identifying any potential discrepancies.
2. **Medication Review and Reconciliation:** Pharmacists worked with nurses to reconcile the medications by comparing the patient's medication history with the prescribed medications during their hospital stay. Any discrepancies (e.g., omissions, duplications, incorrect dosing) were flagged, and recommendations were made to the attending physicians for adjustments.
3. **Patient Counseling:** Pharmacists provided patient counseling during hospital discharge, ensuring that patients understood their updated medication regimen, including any changes made during the hospital stay. Nurses reinforced this education by reviewing discharge instructions and answering any questions patients or caregivers had about their medications.
4. **Follow-Up Review:** Nurses followed up with patients post-discharge (by phone or follow-up visit) to ensure adherence to the discharge medication regimen and to address any concerns.

Control Group: Standard Care

Patients in the control group received the usual care provided by the hospital. Nurses collected a medication history at admission, and physicians performed routine medication reviews without structured pharmacist involvement. No collaborative medication reconciliation was performed at discharge.

Data Collection

Data were collected from patients' electronic medical records (EMR) at two points: upon hospital admission and discharge. The following data were extracted:

- **Demographics:** Age, gender, comorbidities (e.g., hypertension, diabetes, cardiovascular disease), and number of chronic medications.
- **Medication Discrepancies:** The number and types of discrepancies identified during admission and discharge, including omissions, duplications, incorrect dosages, and medication errors.
- **Clinical Outcomes:** Number of adverse drug events (ADEs) related to medication discrepancies, length of hospital stay, and hospital readmission rates within 30 days of discharge.
- **Patient Satisfaction:** Patient satisfaction with the discharge process and understanding of their medication regimen, as measured by a standardized patient satisfaction survey.

Outcome Measures

The primary outcome of the study was the reduction in medication discrepancies identified during the medication reconciliation process. Secondary outcomes included:

- Incidence of adverse drug events (ADEs) related to medication discrepancies.
- Length of hospital stay (LOS).
- 30-day hospital readmission rates.

- Patient satisfaction with the discharge process and medication education.

Data Analysis

Statistical analyses were performed using SPSS. Descriptive statistics were used to summarize demographic data and baseline characteristics of the study population. Comparative analyses were conducted between the intervention and control groups as follows:

- Chi-square tests were used to analyze categorical data, such as the incidence of ADEs and hospital readmission rates.
- Paired t-tests were used to compare the number of medication discrepancies identified during admission and discharge within each group.
- Independent t-tests were used to compare differences between the intervention and control groups regarding the number of discrepancies, length of stay, and patient satisfaction scores.

Ethical Considerations

The study was approved by the ethics committee. Written informed consent was obtained from all participants. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, ensuring patient confidentiality and the right to withdraw from the study at any time without affecting their care.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the study was conducted in a single tertiary hospital, which may limit the generalizability of the results to other healthcare settings. Additionally, the study focused on patients in medical-surgical and internal medicine units, excluding those in critical care units, which may affect the applicability of the findings to more complex patient populations. Finally, the study relied on the accuracy of the electronic medical records, which may have included incomplete or outdated medication information in some cases.

Findings

1. Patient Demographics and Baseline Characteristics

A total of 300 patients were enrolled in the study, with 150 patients in the intervention group and 150 patients in the control group. The average age of patients was 65.3 years (SD = 11.4), and 53% were male. The most common comorbidities were hypertension (62%), diabetes (45%), and cardiovascular disease (38%). There were no significant differences in demographic characteristics between the intervention and control groups.

Table 1: Patient Demographics and Baseline Characteristics

Characteristic	Total (n = 300)	Intervention (n = 150)	Control (n = 150)	p-value
Mean Age (years)	65.3 ±11.4	65.8 ±11.3	64.9 ±11.6	0.561
Male (%)	53%	52%	54%	0.722
Hypertension (%)	62%	63%	61%	0.798
Diabetes (%)	45%	46%	44%	0.901
Cardiovascular	38%	40%	36%	0.671

Disease (%)				
Mean Number of Chronic Medications	7.2 ±2.1	7.3 ±2.0	7.1 ±2.2	0.659

2. Reduction in Medication Discrepancies

The intervention group, where pharmacists and nurses collaborated on medication reconciliation, demonstrated a significant reduction in medication discrepancies compared to the control group. At admission, the mean number of discrepancies per patient was 3.1 in the intervention group and 3.4 in the control group. After medication reconciliation at discharge, the intervention group had a mean of 0.8 discrepancies per patient, compared to 2.7 in the control group ($p < 0.001$).

Table 2: Medication Discrepancies at Admission and Discharge

Group	Discrepancies at Admission (Mean ± SD)	Discrepancies at Discharge (Mean ± SD)	p-value (discharge)
Intervention	3.1 ±1.2	0.8 ±0.9	< 0.001
Control	3.4 ±1.3	2.7 ±1.1	

3. Incidence of Adverse Drug Events (ADEs)

The intervention group had a lower incidence of adverse drug events (ADEs) during the hospital stay compared to the control group. Only 9% of patients in the intervention group experienced an ADE, compared to 18% in the control group ($p = 0.034$).

Table 3: Incidence of Adverse Drug Events (ADEs)

Group	ADEs (%)	p-value
Intervention	9%	0.034
Control	18%	

4. Length of Hospital Stay

Patients in the intervention group had a shorter length of hospital stay (LOS) compared to the control group. The mean LOS for the intervention group was 5.8 days, compared to 7.1 days for the control group ($p = 0.011$).

Table 4: Length of Hospital Stay (LOS)

Group	LOS (Mean ±SD)	p-value
Intervention	5.8 ±1.4	0.011
Control	7.1 ±1.6	

5. 30-Day Hospital Readmission Rates

The 30-day hospital readmission rate was lower in the intervention group, with 10% of patients readmitted within 30 days of discharge, compared to 17% in the control group ($p = 0.045$).

Table 5: 30-Day Readmission Rates

Group	Readmission Rate (%)	p-value
Intervention	10%	0.045
Control	17%	

6. Patient Satisfaction

Patients in the intervention group reported higher satisfaction with the medication reconciliation process at discharge, particularly regarding their understanding of medication changes and the education provided. In the intervention group, 94% of patients were "satisfied" or "very satisfied," compared to 76% in the control group ($p < 0.001$).

Table 6: Patient Satisfaction with Medication Reconciliation

Group	Satisfied/Very Satisfied (%)	p-value
Intervention	94%	< 0.001
Control	76%	

Summary of Findings

The results of this study indicate that pharmacist-nurse collaboration in medication reconciliation significantly reduces medication discrepancies, lowers the incidence of adverse drug events, shortens the length of hospital stay, and improves patient satisfaction. The intervention group also had lower 30-day readmission rates, demonstrating the positive impact of structured interdisciplinary collaboration on patient outcomes during hospital transitions.

Discussion

This study sought to evaluate the impact of pharmacist-nurse collaboration on medication reconciliation during hospital transitions and its role in reducing medication discrepancies, adverse drug events (ADEs), length of hospital stay, and hospital readmission rates. The findings demonstrate that this collaborative approach significantly improved patient outcomes compared to standard care, which did not involve structured interdisciplinary collaboration.

Reduction in Medication Discrepancies

One of the key findings of this study was the significant reduction in medication discrepancies in the intervention group. Patients in the intervention group, where pharmacists and nurses worked together on medication reconciliation, had far fewer discrepancies at discharge compared to the control group. These results are consistent with previous research showing that involving pharmacists in the medication reconciliation process improves the accuracy of medication histories and prevents errors such as omissions, duplications, and incorrect dosing (Manzorro et al., 2011; Mueller et al., 2012).

The intervention group's substantial reduction in discrepancies (from 3.1 at admission to 0.8 at discharge) highlights the critical role that pharmacist-nurse collaboration plays in ensuring medication safety. In contrast, the control group, which followed standard care practices, still had a significant number of unresolved discrepancies at discharge. This finding underscores the need for more structured medication reconciliation processes in hospital settings, particularly during transitions of care when patients are most vulnerable to medication errors.

Reduction in Adverse Drug Events (ADEs)

The study also found that the intervention group experienced a significantly lower incidence of adverse drug events (ADEs) compared to the control group (9% vs. 18%). This reduction is likely attributable to the pharmacist-led review of medication regimens, which helped to identify potential drug-drug interactions and other risks that may have gone unnoticed without their expertise. Previous studies have shown that pharmacist involvement in patient care, particularly in the management of complex medication regimens, can significantly reduce the occurrence of ADEs (Gleason et al., 2010).

The reduction in ADEs is an important finding, as ADEs can lead to prolonged hospital stays, increased healthcare costs, and, in some cases, serious patient harm. By preventing these events, the collaboration between pharmacists and nurses not only improves patient safety but also contributes to more efficient use of hospital resources.

Shorter Length of Hospital Stay

Patients in the intervention group had a significantly shorter length of hospital stay (LOS) compared to the control group (5.8 days vs. 7.1 days). This reduction in LOS is a critical outcome, as longer hospital stays are often associated with higher risks of complications, including hospital-acquired infections, and increased healthcare costs. The reduction in LOS in the intervention group can be attributed to more effective medication management, which likely contributed to faster recovery and fewer complications related to medication errors.

Previous research has shown that effective medication reconciliation can prevent complications that would otherwise extend a patient's hospital stay, such as untreated drug interactions or incorrect medication dosing (Barnsteiner, 2008). By ensuring that patients were on the correct medications throughout their hospital stay, the pharmacist-nurse collaboration contributed to faster recovery times and more efficient discharge processes.

Lower 30-Day Readmission Rates

The 30-day hospital readmission rate was also significantly lower in the intervention group (10%) compared to the control group (17%). Readmissions are often related to poor medication management at discharge, including patients not fully understanding their medication changes or experiencing adverse effects from improperly managed medication regimens. The pharmacist-nurse collaboration ensured that patients received thorough counseling on their medications, reducing the likelihood of medication-related issues after discharge.

This finding aligns with previous studies that highlight the role of effective discharge planning and medication reconciliation in reducing readmissions (Mueller et al., 2012). By addressing potential medication issues before patients leave the hospital, the collaborative approach likely prevented adverse events that would have otherwise led to readmission.

Improved Patient Satisfaction

Patient satisfaction was significantly higher in the intervention group, with 94% of patients reporting satisfaction with the medication reconciliation process, compared to 76% in the control group. This higher satisfaction likely reflects the additional time spent by pharmacists and nurses educating patients about their medications and addressing any concerns. Previous research has shown that patient satisfaction is closely linked to their understanding of their treatment plan, including their medications (Latimer et al., 2023).

The improved satisfaction in the intervention group suggests that patients value the pharmacist-nurse collaboration and the additional support they receive during transitions of care. This is particularly important as higher patient satisfaction has been associated with better adherence to medication regimens and improved overall health outcomes.

Clinical Implications

The results of this study have important clinical implications for hospitals and healthcare systems. First, they underscore the value of pharmacist-nurse collaboration in improving the accuracy of medication reconciliation and preventing medication errors. Given the significant reductions in ADEs, hospital length of stay, and readmissions, integrating pharmacists into the medication reconciliation process should be considered a best practice in hospital settings.

Second, this study highlights the importance of comprehensive patient education during hospital discharge. By ensuring that patients fully understand their medication regimens, hospitals can improve patient satisfaction and reduce the likelihood of post-discharge complications. The findings suggest that a structured interdisciplinary approach, involving both pharmacists and nurses, can significantly enhance the quality of care provided to patients during hospital transitions.

Limitations

While the study provides valuable insights, there are several limitations to consider. First, the study was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other healthcare settings. Future studies should consider multi-center designs to validate these results in different hospital environments. Additionally, while the study focused on medication reconciliation at admission and discharge, it did not account for other factors that could influence patient outcomes, such as underlying health conditions or socioeconomic factors that may affect medication adherence post-discharge.

Conclusion

In conclusion, this study demonstrates that pharmacist-nurse collaboration in medication reconciliation significantly improves patient safety by reducing medication discrepancies, adverse drug events, and hospital readmission rates. Patients in the intervention group experienced shorter hospital stays and reported higher satisfaction with their care, indicating the effectiveness of this interdisciplinary approach. These findings support the integration of pharmacists into the medication reconciliation process as a means of enhancing patient outcomes and improving overall hospital efficiency.

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