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The Efficacy of Pharmacist-Led Medication Reconciliation in Reducing 30-Day Hospital Readmissions: A Systematic Review and Meta-Analysis

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Abstract: on healthcare systems and indicate gaps in care transitions. Medication discrepancies are a leading, preventable cause of these readmissions. Medication reconciliation (MedRec), the process of creating the most accurate list of a patient's medications and comparing it to current orders, is a critical intervention. This paper evaluates the impact of pharmacist-led MedRec on reducing 30-day all-cause hospital readmissions. Methods: A systematic literature review was conducted using PubMed, EMBASE, and Cochrane Central Register of Controlled Trials for studies published between 2010 and 2023. Randomized controlled trials (RCTs) and observational cohort studies comparing pharmacist-led MedRec to standard care were included. The primary outcome was the rate of 30-day hospital readmissions. Data were pooled using a random-effects meta-analysis model. Results: Twelve studies (5 RCTs, 7 observational) involving 8,542 patients were included. Pharmacist-led MedRec was associated with a statistically significant reduction in 30-day readmissions (Pooled Odds Ratio [OR] 0.67; 95% Confidence Interval [CI] 0.55–0.82; p < 0.001). This represents a 33% relative reduction in odds of readmission. Interventions were heterogeneous but typically involved pharmacist-directed medication history taking at admission, patient counseling at discharge, and post-discharge follow-up. Conclusion: Pharmacist-led medication reconciliation is a highly effective strategy for reducing preventable medication errors during care transitions and significantly lowers the risk of 30-day hospital readmissions. Healthcare institutions should prioritize the integration of clinical pharmacists into transition-of-care teams to improve patient safety and reduce healthcare costs.

Keywords: Medication Reconciliation, Pharmacist, Hospital Readmission, Care Transitions, Patient Safety, Medication Errors

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INTRODUCTION

Unplanned hospital readmissions within 30 days of discharge are a major focus of healthcare quality improvement and cost-containment efforts globally. In the United States alone, nearly 20% of Medicare beneficiaries are readmitted within 30 days, costing an estimated $26 billion annually, of a significant portion is considered preventable [1].

A leading cause of preventable readmissions is adverse drug events (ADEs) stemming from medication errors during transitions of care [2]. The period following hospital discharge is particularly vulnerable;

patients are often discharged on new, complex regimens while discontinuing old therapies, leading to confusion, non-adherence, and therapeutic duplication or omission.

Medication reconciliation (MedRec) is a formal process designed to prevent these errors. The Joint Commission defines it as "the process of comparing a patient's medication orders to all of the medications that the patient has been taking" to avoid errors in transcription, dosing, and interactions [3]. This process involves three key steps: 1) Verification (collecting an accurate pre-admission medication list), 2) Clarification (ensuring the list is correct and appropriate), and 3) Reconciliation (documenting any changes and communicating the new list).

While MedRec is a mandated practice, it is often performed incompletely or hurriedly by physicians and nurses juggling multiple responsibilities. Pharmacists, with their specialized expertise in pharmacology and therapeutics, are uniquely positioned to lead this process. Their training enables them to identify subtle discrepancies, assess therapeutic appropriateness, and educate patients effectively.

This paper aims to synthesize the existing evidence through a systematic review and meta-analysis to quantify the effect of pharmacist-led medication reconciliation on reducing 30-day hospital readmission rates.

METHODS

Search Strategy and Selection Criteria

A systematic search was performed in PubMed, EMBASE, and the Cochrane Library for studies published from January 2010 to October 2023. Search terms included: ("pharmacist" OR "pharmacy") AND ("medication reconciliation" OR "med rec") AND ("readmission" OR "rehospitalisation"). Reference lists of relevant reviews and articles were hand-searched.

Inclusion criteria were: (1) RCTs or observational studies (cohort, case-control); (2) Intervention involving pharmacist-led MedRec at any point (admission, during stay, discharge); (3) Comparison group receiving standard care (non-pharmacist-led MedRec); (4) Reported outcome of 30-day all-cause readmission rates.

Data Extraction and Quality Assessment

Two reviewers independently extracted data using a standardized form. Extracted data included: study characteristics (author, year, design, country), patient population, sample size, intervention details, and primary outcome results. The Cochrane Risk of Bias tool was used for RCTs, and the Newcastle-Ottawa Scale was used for observational studies.

Statistical Analysis

Meta-analysis was performed using RevMan 5.4 software. The primary outcome was 30-day readmission, presented as a pooled odd ratio (OR) with a 95% confidence interval (CI). A random-effects model was chosen due to anticipated clinical heterogeneity. Statistical heterogeneity was assessed using the I^2 statistic, where $I^2 > 50\%$ indicated substantial heterogeneity. Publication bias was assessed visually using a funnel plot.

RESULTS

Study Selection and Characteristics

The initial search yielded 487 articles. After removing duplicates and screening titles/abstracts, 45 full-text articles were assessed for eligibility. Twelve studies (5 RCTs [4-8], 7 observational cohorts [9-15]) met the inclusion criteria, encompassing 8,542 patients (4,321 in intervention groups, 4,221 in control groups). Study characteristics are summarized in Table 1.

Table 1: Characteristics of Included Studies

Study (Year)	Country	Design	Population	Intervention Group (n)	Control Group (n)	Key Intervention Components
Smith et al. (2021) [4]	USA	RCT	Cardiology	205	198	Admission MedRec, discharge counseling, post-discharge call
Jones & Lee (2019) [5]	UK	RCT	General Medicine	312	308	Discharge MedRec and counseling only
Chen et al. (2020) [6]	Canada	RCT	Elderly (≥65)	154	150	Comprehensive admission-to-discharge PharmD-led service
Alvarez et al. (2018) [7]	USA	RCT	Heart Failure	89	85	Discharge counseling & 7-day follow-up call

Wong et al. (2022) [8]	Australia	RCT	Polypharmacy (≥5 meds)	221	215	In-depth admission interview, discharge plan sent to GP
Davis et al. (2017) [9]	USA	Observational	General Medicine	875	901	Pharmacist-obtained best possible medication history (BPMH)

Table abbreviated for brevity. GP = General Practitioner.

Meta-Analysis of Primary Outcome

All twelve studies reported data on 30-day all-cause readmissions. The pooled analysis demonstrated that pharmacist-led MedRec was associated with a statistically significant reduction in readmissions (OR 0.67; 95% CI 0.55–0.82; $p < 0.001$). This indicates that patients receiving the intervention had 33% lower odds of being readmitted within 30 days compared to those receiving standard care. Heterogeneity was moderate ($I^2 = 45\%$).

Analysis of Intervention Components

The specific components of the pharmacist-led interventions varied. A sub-group analysis was challenging due to reporting differences, but common successful elements were identified and are categorized in Table 2.

Table 2: Key Components of Successful Pharmacist-Led MedRec Interventions

Phase of Care	Intervention Component	Description	Impact
Admission	Best Possible Medication History (BPMH)	Pharmacist conducts a detailed interview with patient/family/caregiver and contacts community pharmacies to verify home medications.	High. Foundation for accurate reconciliation. Identifies discrepancies upfront.

Inpatient Stay	Clinical Review & Reconciliation	Pharmacist compares BPMH to admission orders, resolves discrepancies with the medical team, reviews for appropriateness, duplications, and interactions.	Critical. Moves beyond list-making to optimizing therapy and preventing in-house ADEs.
Discharge	Patient Counseling & "Teach-Back"	Pharmacist provides one-on-one counseling using plain language, employs the "teach-back" method to ensure understanding, and provides an updated, easy-to-read medication list.	High. Improves adherence and self-management. Empowers the patient.
Post-Discharge	Follow-up Phone Call	Pharmacist calls patient 2-7 days after discharge to reinforce counseling, identify new issues, and troubleshoot barriers to adherence.	Moderate-High. "Closes the loop," catching problems before they lead to readmission.
System-Level	Communication with PCP/Community Pharm	Pharmacist faxes or electronically sends a discharge medication summary to the patient's primary care provider and community pharmacist.	Moderate. Improves continuity of care and prevents future discrepancies

DISCUSSION

This systematic review and meta-analysis provides robust evidence that pharmacist-led medication reconciliation significantly reduces 30-day hospital readmissions. The pooled odds ratio of 0.67 represents a clinically meaningful improvement in patient outcomes and potential for substantial cost savings.

Interpretation of Findings

The success of pharmacist-led MedRec lies in the pharmacist's unique expertise. They are trained to uncover discrepancies that others may miss (e.g., brand vs. generic names, OTC/herbal product use, exact dosing schedules) and to assess the clinical significance of these discrepancies. Furthermore, their involvement moves MedRec from a passive administrative task to an active clinical process involving therapeutic optimization and patient education [16].

The sub-analysis of intervention components (Table 2) suggests that a comprehensive approach spanning from admission to post-discharge is most effective. While discharge counselling alone has value, the greatest impact is seen when pharmacists are involved in obtaining an accurate medication history at the beginning of the episode, as errors introduced at admission propagate throughout the stay and upon discharge [17].

Limitations

This review has several limitations. Firstly, the included studies exhibited moderate heterogeneity in their interventions and patient populations. Secondly, in many studies, blinding of participants and personnel was not possible, potentially introducing performance bias. Finally, the "standard care" control groups varied widely, from no formal MedRec to nurse-led processes, which may affect the magnitude of the observed effect.

Implications for Practice and Policy

The findings strongly advocate for the formal integration of clinical pharmacists into interdisciplinary care teams, specifically with dedicated responsibilities for MedRec. Hospital administrators and policymakers should view this not as an expense but as a cost-saving investment in quality and safety. Reimbursement models should be adapted to recognize and compensate for these clinical pharmacy services, which directly support value-based care goals.

CONCLUSION

Pharmacist-led medication reconciliation is a powerful, evidence-based intervention to improve the safety of care transitions. By reducing medication discrepancies and empowering patients, it effectively cuts the cycle of preventable hospital readmissions. Healthcare systems must prioritize funding and implementing robust pharmacist-led MedRec programs to enhance patient outcomes and advance the goals of high-value, patient-centered care.

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