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The Role of Pharmacists in Antimicrobial Stewardship and Medication Reconciliation: A Dual Approach to Enhancing Patient Safety and Clinical Outcomes

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ABSTRACT

Antimicrobial resistance and medication-related problems remain two of the most critical challenges in healthcare today. Antimicrobial Stewardship (AMS) programs aim to optimize antimicrobial use and combat resistance, while Medication Reconciliation (MedRec) ensures accuracy of medication histories during care transitions. Pharmacists play a vital role in both domains due to their expertise in medication therapy management. This review explores how pharmacists contribute to AMS and MedRec and emphasizes the importance of integrating these services to strengthen patient safety. Evidence shows that pharmacist involvement significantly reduces inappropriate antimicrobial use, improves patient outcomes, prevents medication errors, and enhances continuity of care. The combined implementation of AMS and MedRec forms a comprehensive strategy to advance healthcare quality and minimize preventable harm.

Keywords: Antimicrobial stewardship, medication reconciliation, pharmacists, antibiotic resistance, clinical pharmacy.

INTRODUCTION

The healthcare system is currently challenged by the dual threats of antimicrobial resistance (AMR) and medication-related problems. The World Health Organization has identified AMR as one of the top global public health issues, responsible for increasing morbidity and mortality worldwide [1]. Inappropriate and excessive antibiotic use has been identified as a major driver of resistance, leading to treatment failures and prolonged hospitalizations [2]. At the same time, medication errors especially during transitions of care remain one of the leading causes of preventable patient harm [11]. Pharmacists, as medication experts, are uniquely positioned to address both issues through Antimicrobial Stewardship (AMS) and Medication Reconciliation (MedRec). AMS ensures rational antibiotic use to control resistance, while MedRec ensures accurate medication information across transitions, reducing discrepancies and improving patient safety [12].

ANTIMICROBIAL STEWARDSHIP (AMS)

Antimicrobial Stewardship is defined as a coordinated set of interventions designed to improve and measure appropriate use of antimicrobials through optimized drug selection, dosing, route, and duration of therapy [3,4]. AMS programs are essential for reducing resistance, minimizing toxicity, and improving clinical outcomes. Pharmacists play a central role in stewardship activities, participating in guideline development, performing prospective audits and feedback, reviewing antimicrobial prescriptions, and ensuring appropriate selection based on local resistance patterns and clinical guidelines [5].

Pharmacist-led AMS interventions have demonstrated strong effectiveness. Studies show significant reductions in inappropriate antibiotic use, improved patient survival, and decreased rates of Clostridioides difficile infections when pharmacists are involved in stewardship programs [7]. Pharmacists also initiate IV-to-oral conversion protocols, optimize pharmacokinetic and pharmacodynamic dosing, and support de-escalation of broad-spectrum antibiotics once culture results are available [6]. Evidence from large hospitals shows that antibiotic stewardship interventions guided by pharmacists substantially reduce healthcare costs without compromising patient outcomes [8].

The contribution of clinical pharmacists in AMS is reinforced by decades of research showing improved treatment outcomes and reduced adverse drug events when pharmacists are actively involved in patient care [9,10]. Their collaboration with microbiologists and infectious disease physicians enhances the accuracy and timeliness of antibiotic optimization.

MEDICATION RECONCILIATION (MEDREC)

Medication reconciliation is a structured process intended to prevent medication errors by ensuring accurate and complete medication information during transitions of care. Errors frequently occur during admission, transfer, and discharge, contributing to preventable adverse drug events [11]. Pharmacists are recognized as the most qualified healthcare professionals to perform MedRec due to their specialized knowledge and ability to detect discrepancies [12,13].

The MedRec process involves collecting the best possible medication history, comparing it with current orders, identifying discrepancies, and communicating necessary adjustments to prescribers [14]. Studies demonstrate that pharmacist-led MedRec significantly reduces medication discrepancies—by as much as 70%—and prevents clinically important drug-related problems [15]. Pharmacist involvement in reconciliation also reduces hospital readmissions and improves adherence and understanding of therapy upon discharge [16].

Research indicates that emergency departments, where care is often fast-paced, benefit greatly from pharmacist-led MedRec. Pharmacists' interventions in such settings have been shown to improve accuracy of medication histories and prevent medication errors that could lead to complications during hospitalization [15]. Systematic reviews support that pharmacist involvement improves safety during transitions, especially for patients with chronic diseases or polypharmacy [16].

INTEGRATING AMS AND MEDREC: A SYNERGISTIC STRATEGY

Although AMS and MedRec are often implemented separately, integrating both services creates a more comprehensive medication safety framework. Antibiotics are among the most frequently prescribed and error-prone medications; therefore, accurate medication histories obtained through MedRec significantly enhance stewardship activities. For instance, understanding a patient's previous antimicrobial exposures, history of allergies, and past treatment failures is essential for appropriate antibiotic selection and dosing [17].

Medication reconciliation strengthens AMS by ensuring that patients are not unintentionally continued on unnecessary antibiotics or deprived of essential prophylactic therapy during hospitalization. Many discrepancies involve antibiotics that were started in outpatient settings and either duplicated or unintentionally discontinued upon admission. Pharmacist-led reconciliation ensures these issues are promptly corrected, preventing therapeutic duplication or omission [18].

Integrating AMS at discharge is equally important. Pharmacists ensure that antibiotic durations are appropriate, instructions are clear, and patients understand how to take their medications correctly. This reduces readmission rates, improves adherence, and prevents resistance caused by unnecessary continuation of therapy [19]. Combined AMS and MedRec programs have been associated with lower resistance rates, fewer medication errors, reduced hospital stay durations, and improved patient outcomes [20].

CHALLENGES IN IMPLEMENTING AMS AND MEDREC

Despite strong evidence supporting pharmacist involvement, several challenges exist. Many hospitals lack adequate staffing, limiting pharmacists' ability to participate fully in AMS and MedRec activities. Some prescribers may be resistant to pharmacist recommendations due to traditional hierarchical structures. Incomplete electronic health records and reliance on patients' memory can compromise medication history accuracy [11,14].

Additionally, hospitals may lack standardized protocols for AMS or MedRec, which affects consistency and effectiveness. Time constraints, especially in high-volume clinical environments, further hinder comprehensive implementation.

FUTURE DIRECTIONS

Strengthening pharmacist leadership in AMS and MedRec will require investment in workforce expansion, technology, and interdisciplinary collaboration. Electronic health records and clinical decision support tools can improve accuracy during reconciliation and help identify inappropriate antibiotic prescribing in real time. Artificial intelligence–based tools for stewardship are emerging, offering predictive analytics to guide antibiotic therapy.

Education and training programs for physicians, nurses, and pharmacists can also enhance teamwork and support wider acceptance of pharmacist-led interventions. Policies mandating AMS and MedRec processes in hospitals may further standardize practices and improve patient outcomes at national and global levels.

CONCLUSION

Pharmacists are crucial in promoting safe and effective medication use through active participation in Antimicrobial Stewardship and Medication Reconciliation. AMS reduces antimicrobial resistance, optimizes therapy, and prevents adverse outcomes, while MedRec ensures accurate medication

information and prevents harmful discrepancies. Integrating both practices creates a powerful, patient-centered approach that enhances clinical outcomes, reduces healthcare costs, and strengthens overall medication safety. Expanding pharmacist roles, improving institutional support, and leveraging technology will further strengthen these essential healthcare services.

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