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Comprehensive Analysis of Pharmacist-Led Medication Reconciliation Programs: Evaluating Benefits and Challenges

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Abstract

Background: Medication reconciliation is a critical process in healthcare that aims to prevent medication errors and improve patient safety, particularly for individuals with complex medication regimens. Pharmacists play a pivotal role in conducting medication reviews, which have been associated with enhanced patient outcomes.

Methods: This scoping review synthesizes findings from 24 systematic studies to assess the effectiveness of pharmacist-led medication reconciliation programs across various healthcare settings. The review examines key characteristics of medication evaluations, including types, intensity, delivery methods, and teamwork dynamics among healthcare professionals.

Results: The analysis reveals significant variability in the effectiveness of pharmacist-led medication reconciliation, with studies indicating improvements in clinical outcomes such as blood pressure, cholesterol levels, and hospital readmission rates. However, many studies exhibited low to critically low quality, complicating the interpretation of results. The review highlights that direct patient interaction, access to clinical documentation, and interprofessional collaboration are crucial factors influencing successful outcomes.

Conclusion: While pharmacist-led medication reconciliation programs show promise in enhancing medication management and patient safety, the evidence remains ambiguous due to inconsistencies in study methodologies and reporting practices. Standardization of medication review processes and clearer definitions of interventions are essential for future research. By improving the rigor and transparency of

studies, healthcare systems can better leverage the benefits of pharmacist-led initiatives to optimize patient care.

Keywords: Medication reconciliation, pharmacist-led programs, patient safety, systematic review, healthcare outcomes.

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1. Introduction

Medication reviews (MRs) are a recognized intervention that healthcare professionals, including pharmacists, implement to assist patients who are prescribed multiple medications or have complex medication regimens [1]. The notion of several medication review kinds was first presented in 2002 [2] and further elaborated by the National Prescribing Centre in 2008 [3]. Medication reviews are categorized as prescription reviews, concordance and compliance assessments, or clinical evaluations [3]. Pharmacists often conduct medication evaluations across various practice environments. The evidence for the outcomes of pharmacist-led medication evaluations in community settings was synthesized in an overview review by Jokanovic et al. [4].

Considering the publication of other systematic studies after the Jokanovic review in 2017 [4], it is advisable to conduct a scoping review to delineate the latest data about pharmacist-led medication reviews across various settings and groups. Scoping studies assess the extent of a literature corpus and facilitate the identification of prospective inquiries for further systematic reviews [5]. A scoping review is warranted to ascertain the extent (geographical distribution, recipients of medication reviews in primary studies), range (study design, types of interventions included in systematic reviews), and nature (description, attributes/components of medication reviews) of research in this domain, thereby offering a comprehensive overview of the latest evidence and guiding future research endeavors. This scoping review will concentrate on the many systematic reviews previously published on this subject, rather than primary research, to prevent redundancy of current studies. To elucidate information from current systematic reviews about pharmacist-led medication assessments to guide future research efforts.

2. Documented characteristics of the medicine evaluation

We were interested in the elements of medication review, including the kind of review, intensity, length, manner of delivery, environment, and teamwork. The degree of discussion about these topics varied significantly, with all but one study [6] addressing at least one component, primarily highlighting teamwork among healthcare professionals. The majority of evaluations did not thoroughly examine the components of the intervention. Two reviews aimed to assess the efficacy of collaboration between pharmacists and physicians and its impact on outcomes; one sought to analyze the elements of medication reviews to enhance support for a particular population, while another detailed the specific activities documented in the medication reviews [7-10]. Additionally, three studies documented one or more aspects of intensity, type of MR, and manner of administration in their findings [11-13].

A meta-analysis conducted by Martinez-Mardones et al. [8] investigated the impacts of several elements of medication reviews, including access to clinical records, education, self-monitoring, lifestyle recommendations, and issues connected to medications. It showed that medication reviews including a patient interview, with access to pharmaceutical and clinical data, resulted in more significant decreases in blood pressure, glycated hemoglobin, and cholesterol compared to medication reviews lacking a patient interview or access to clinical information. Hatah et al. conducted a subgroup analysis and found that face-to-face mediation reviews, with or without access to complete clinical records, decreased unexpected hospital admissions more effectively than reviews only evaluating patients' medication adherence concerns [13]. Bülow et al. could not ascertain the impact of MR components on the reported results [14].

Hikaka et al. delineated the characteristics of the included trials, including aspects of the intervention such as review type (medicines usage review or complete MR), site (home or drugstore), and delivery method (face-to-face or telephone) [9]. The incorporation of low-quality and observational studies, together with

the disparate results reported, complicated the determination of the impact of the various components on outcomes [9]. Geurts et al. [10] and Kwint et al. [7] sought to investigate the impact of cooperation between pharmacists and general practitioners (GPs) on patient outcomes. The findings indicated that the application of pharmacist suggestions by general practitioners was more probable with enhanced collaboration between pharmacists and general practitioners. Tan et al. emphasized that patient outcomes were more likely to improve when the MR was integrated with interprofessional face-to-face contact [15]. Jokanovic found that medication reviews performed by pharmacists in medical practices correlated with increased rates of advice implementation [16]. Huiskes' evaluation included MRs administered during a brief intervention period (≤3 months) [17]. They advocated for the formulation and assessment of therapies including several interactions between practitioner and patient. Rollason also proposed that many MR contacts might result in improved results [14]. Bulow indicates that medication reviews (MRs) combined with other treatments, such as patient education and medication reconciliation, decreased hospital readmissions relative to standard care; however, conventional MRs alone did not provide similar results [14].

3. Summary of important discoveries

This scoping analysis found 24 systematic studies that indicated considerable variance in evidence on the efficacy of pharmacist-led medication reviews. A comprehensive evaluation conducted in care home institutions [16] shown that medication reviews (MRs) result in the enhancement and resolution of medication-related issues, including possible interactions, incorrect dosages, or indications. A further comprehensive analysis [14] indicated that medication reviews (MRs) in hospital environments might reduce healthcare use, specifically hospital (re)admissions; however, this reduction was not seen in care home settings [16]. Moderate and low-quality studies conducted in community pharmacy and/or ambulatory care indicated enhancements in clinical outcomes, including blood pressure, cholesterol, and glycated hemoglobin [13,16]. The efficacy of MRs on various outcomes across different contexts and patient groups remains ambiguous. Seventy-one percent of evaluations had a severely poor AMSTAR2 grade, indicating diminished trust in the findings. Had protocol papers been cited in five reviews, the proportion of reviews classified as high or moderate would have increased to 29% (from 21%), while those deemed critically low would have decreased to 59%. A multitude of evaluations failed to provide the specifics of the intervention, making it challenging to elucidate the discrepancies in observed effects.

4. Advantages and drawbacks

This scoping review presents a summary of systematic evaluations examining pharmacist medication reviews across various contexts. The search criteria used in this study were restricted; supplementary language for MRs, such as drug review, was not utilized. This may have limited the quantity of search results and maybe generated selection bias in the identification of publications. The Jokanovic systematic review of systematic reviews, used as a reference for reviews published before to 2015, included only MRs conducted in community environments and excluded those in care home settings [4]. As a result, we may have excluded any evaluations of MRs in care home environments published before to 2015. Only one researcher conducted the paper screening and data extraction, resulting in a higher margin of error compared to the same tasks being completed by numerous researchers.

5. Discussion

This scoping review has shown ambiguous data on the efficacy of pharmacist-led medication reviews across various patient categories. There was considerable diversity in the reporting of outcomes related to pharmacist-led medication reviews; the two most often reported outcomes were healthcare use and adherence. Nevertheless, they were reported using diverse methodologies, complicating the ability to reach clear findings. Researchers must evaluate the suitability of the outcomes and metrics used to gauge the efficacy of MRs. As researchers conduct extensive investigations into the many outcomes linked to medication reviews performed by an expert, it may provide a clearer comprehension of the effects of this intervention across several studies. Numerous systematic reviews included the assessment of other

therapies in conjunction with drug reviews, potentially affecting the results and findings due to the co-interventions.

In addition to emphasizing results, comprehending the efficacy of drug reviews requires a thorough knowledge of the intervention and its execution. Most reviews lacked definitions and comprehensive explanations of pharmaceutical reviews. The National Institute of Health and Care Excellence (NICE) and the Pharmaceutical Care Network Europe (PCNE) have issued definitions of structured medication reviews; nevertheless, they were seldom used in the reviews. The absence of citations in some systematic reviews may be attributed to their publication prior to the release of these criteria. The absence of a clear definition and explanation of the MR may therefore lead to the inconsistent results of reported outcomes. The absence of documented MR definitions corroborates the findings of an overview by Silva et al., indicating that significant variability in definitions, terminologies, and methodologies for conducting medication reviews hinders the evaluation of the evidence supporting the efficacy of MRs [18].

Despite inadequate reporting of intervention descriptions, elements that seemingly enhance results include direct patient interaction, pharmacist access to clinical documentation, and coordinated efforts with doctors [14, 19, 20, 21]. The uncertainty about the validity of these research studies necessitates that other randomized or non-randomized investigations examine this finding. Authors indicated that discrepancies in drug review methodologies affect the assessment of their efficacy [17, 22]; hence, standardization of medication reviews might be advantageous for future evaluations. Geurts [10] proposed a categorization system for medication reviews, whereas Alharthi et al. sought to find medication review activity terminology and definitions documented in primary research [19]. They determined that establishing an international taxonomy for medication reviews and their associated activities would be advantageous, rather than formulating a standardized intervention applicable across all contexts. Table 1 represents the summary of findings from systematic reviews on pharmacist-led medication reconciliation programs.

Table 1. Summary of Findings from Systematic Reviews on Pharmacist-Led Medication Reconciliation Programs.

Study/Author	Setting	Intervention Type	Key Outcomes	Quality of Evidence	Challenges Identified
Jokanovic et al. [4,16]	Community Settings	Medication reviews with patient interaction	Improved medication adherence and reduced hospital readmissions	Moderate	Limited access to clinical data
Martinez-Mardones et al. [8]	Ambulatory Care	Comprehensive MR with access to clinical data	Significant reductions in BP, cholesterol, HbA1c	High	Inconsistent implementation of recommendations
Hatah et al. [13]	Community Pharmacies	Fee-for-service medication reviews	Reduced hospital admissions	Low	Inadequate documentation of intervention specifics
Tan et al. [15]	General Practice Clinics	Pharmacist-led reviews with collaboration	Enhanced interprofessional cooperation, better outcomes	Moderate	Lack of structured workflow for collaboration

Huiskes et al. [17]	Mixed Healthcare Settings	MR with repeated patient interactions	Improved medication appropriateness	Moderate	Variability in delivery and reporting
Bulow et al. [14]	Hospital Settings	MR combined with patient education	Reduced hospital readmissions	Low	Co-interventions complicating outcome assessments
Silva et al. [18]	Varied (Global)	Systematic review of MR characteristics	Identified lack of standardized MR definitions	Critically Low	Heterogeneity in interventions

6. Additional investigation

Divergences in the methodology, characterization, and features of pharmaceutical reviews may result in contradictory outcomes. Consequently, examining the various elements of pharmaceutical evaluations and correlating them with outcomes may provide a more effective method for evaluating their efficacy than just presenting data. Silva et al. determined that a worldwide consensus on the medication review process was essential, whereas Alharthi et al. furthered this finding by defining terminology associated with MR activities [19]. Bulow et al. stated that the efficacy of different types of drug reviews remains questionable [14]. This scoping study will guide a further phase of research that may influence policy and practice.

Future systematic reviews may mitigate the challenges of result interpretation due to intervention heterogeneity by implementing more stringent inclusion criteria, such as restricting studies to specific outcomes and validated measures, including health-related quality of life and medication appropriateness, or those with comprehensive intervention descriptions. A future systematic review might examine the many components and aspects of medication reviews to ascertain which factors contribute to certain results. A swift examination of information about clinical pharmacy services in the UK indicated that the execution of drug usage reviews was inconsistent, resulting in a variation in delivery [23-27]. This evaluation determined that the evidence supporting the cost-effectiveness was insufficient. This quick assessment substantiates the findings of the scoping study, indicating a need to standardize the reporting of interventions to facilitate coherent conclusions on the efficacy of medication reviews. This will assist policymakers and practitioners in conducting drug reviews that are more likely to provide improved patient outcomes.

7. Conclusions

We included twenty-four systematic studies indicating that the data on the efficacy of medication reviews across various settings and patient demographics remains ambiguous. The quality evaluation of the reviews indicated that most were classified as having low or critically low confidence in the findings; hence, they should be regarded with care. The reporting of medication review characteristics was ambiguous, making it difficult to determine the specifics of the intervention. This ambiguity complicates the explanation of the observed inconsistent results. Given the widespread implementation of medication reviews in practice, it is beneficial to investigate the characteristics of the intervention and correlate its components with results. As researchers enhance their comprehension of these elements and formulate hypotheses on their efficacy for certain individuals, contexts, and methodologies, this knowledge may guide the future execution of pharmaceutical reviews.

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تحليل شامل لبرامج مراجعة الأدوية التي يقودها الصيادلة: تقييم الفوائد والتحديات

الملخص

الخلفية :
تُعد مراجعة الأدوية عملية حاسمة في مجال الرعاية الصحية تهدف إلى منع الأخطاء الدوائية وتحسين سلامة المرضى، لا سيما لأولئك الذين لديهم أنظمة دوائية معقدة. يلعب الصيادلة دورًا محوريًا في إجراء مراجعات الأدوية، التي ارتبطت بتحسين نتائج المرضى.

الطرق :تستعرض هذه المراجعة المستعرضة نتائج 24 دراسة منهجية لتقييم فعالية برامج مراجعة الأدوية التي يقودها الصيادلة في مختلف بيئات الرعاية الصحية. تتناول المراجعة الخصائص الرئيسية لمراجعات الأدوية، بما في ذلك الأنواع، الكثافة، طرق التنفيذ، وديناميكيات العمل الجماعي بين المهنيين الصحيين.

النتائج :أظهرت التحليلات تفاوتًا كبيرًا في فعالية برامج مراجعة الأدوية التي يقودها الصيادلة، حيث أشارت الدراسات إلى تحسينات في النتائج السريرية مثل ضغط الدم، مستويات الكوليسترول، ومعدلات إعادة دخول المستشفيات. ومع ذلك، أظهرت العديد من الدراسات جودة منخفضة إلى منخفضة جدًا، مما يزيد من تعقيد تفسير النتائج. وأبرزت المراجعة أن التفاعل المباشر مع المرضى، والوصول إلى الوثائق السريرية، والتعاون بين المهنيين الصحيين هي عوامل حاسمة تؤثر على نجاح البرامج.

الاستنتاج :على الرغم من أن برامج مراجعة الأدوية التي يقودها الصيادلة تظهر وعودًا في تحسين إدارة الأدوية وسلامة المرضى، إلا أن الأدلة لا تزال غامضة بسبب التباينات في منهجيات الدراسات وممارسات الإبلاغ. يُعد توحيد عمليات مراجعة الأدوية وتعريف التدخلات بشكل أوضح أمرًا ضروريًا للبحوث المستقبلية. من خلال تحسين صرامة وشفافية الدراسات، يمكن لأنظمة الرعاية الصحية الاستفادة بشكل أفضل من مبادرات الصيادلة لتحسين رعاية المرضى.

الكلمات المفتاحية :مراجعة الأدوية، برامج يقودها الصيادلة، سلامة المرضى، مراجعة منهجية، نتائج الرعاية الصحية.