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REVIEW ARTICLE

RECENT ADVANCES IN PHARMACIST-LED CLINICAL SERVICES: A REVIEW OF THEIR IMPACT ON PATIENT CARE AND MEDICATION SAFETY

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ABSTRACT

Pharmacist-led clinical services have evolved considerably from traditional dispensing-oriented activities toward comprehensive, patient-centred pharmaceutical care. Clinical pharmacists and community pharmacists increasingly participate in medication review, medication reconciliation, patient counseling, chronic disease management, antimicrobial stewardship, pharmacovigilance, transitions of care, and telepharmacy. These services aim to optimize pharmacotherapy, improve medication adherence, prevent medication-related problems, and enhance medication safety. Recent evidence indicates that pharmacist-led medication reviews can be particularly beneficial when they include collaborative decision-making, individualized goal setting, action planning, and structured follow-up. Pharmacist counseling has also been associated with improved medication adherence and quality of life, although the certainty of evidence varies between studies. Pharmacist involvement during transitions of care has demonstrated potential to reduce hospital readmissions, particularly when medication reconciliation and patient counseling are combined. In specialized areas such as oncology, pharmacist-led interventions have been associated with reductions in medication-related problems and adverse drug events. Pharmacists are also increasingly involved in antimicrobial stewardship, where their participation can improve the appropriateness of antimicrobial therapy and reduce unnecessary antimicrobial use. More recently, telepharmacy has expanded access to pharmacist-led clinical services through telephone and video consultations, with emerging evidence supporting its clinical feasibility and potential cost-effectiveness. Despite these advances, challenges remain regarding standardization of services, workforce capacity, digital infrastructure, reimbursement, interprofessional collaboration, and consistent measurement of patient outcomes. This review discusses recent developments in pharmacist-led clinical services and examines their contribution to patient care, medication safety, healthcare utilization, and future pharmacy practice.

Keywords: *Clinical pharmacy services; Pharmacist-led care; Medication safety; Medication review; Patient-centered care; Telepharmacy*.

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1. INTRODUCTION

The role of the pharmacist has progressively expanded from the traditional preparation and dispensing of medicines to direct participation in patient care [1-2]. Modern pharmacy practice emphasizes the safe, effective, rational, and individualized use of medicines. Pharmacists are increasingly integrated into multidisciplinary healthcare teams where they assess medication therapy, identify drug-related problems, provide patient education, monitor therapeutic outcomes, and contribute to clinical decision-making. [3-4]

Medication-related harm remains a major patient-safety concern. The World Health Organization (WHO) identifies medication safety as a central component of patient safety and highlights polypharmacy, high-risk situations, and transitions of care as important areas requiring intervention [5-9]. Pharmacists are strategically positioned to address these problems because of their expertise in pharmacotherapy, medication-use processes, drug interactions, adverse drug reactions, and medication adherence.

Recent systematic reviews demonstrate that pharmacist-led interventions may improve several patient- and healthcare-related outcomes. For example, a systematic review of pharmacist-led medication reviews identified collaborative working, patient involvement in goal setting, action planning, additional support, and follow-up as recurring components associated with positive outcomes [1,4]. Similarly, pharmacist counseling has been associated with improved medication

adherence and quality of life [2]. The increasing complexity of healthcare has also stimulated the development of specialized pharmacist services such as antimicrobial stewardship, oncology pharmacy, chronic disease management, transitions-of-care services, and telepharmacy. Therefore, the present review summarizes recent developments in pharmacist-led clinical services and discusses their impact on patient care and medication safety.

2. Pharmacist-Led Clinical Services

Pharmacist-led clinical services encompass a broad range of activities delivered in hospitals, community pharmacies, ambulatory care settings, specialty clinics, and increasingly through digital platforms.

Major services include:

- Medication review and medication therapy management
- Medication reconciliation
- Patient counseling and adherence support
- Chronic disease management
- Transitions-of-care services
- Antimicrobial stewardship
- Pharmacovigilance and adverse drug reaction monitoring
- Oncology pharmacy services
- Therapeutic drug monitoring
- Telepharmacy and remote patient care
- Health screening and preventive-care services

These services can operate independently or as part of collaborative practice models involving physicians, nurses and other healthcare professionals.

Table 01: Major Pharmacist-Led Clinical Services and Their Patient-Care Roles

Clinical service	Major pharmacist activities	Potential patient benefit
Medication review	Assessment of medicines, interactions, duplication and appropriateness	Reduction of medication-related problems
Medication reconciliation	Comparison of medication lists during care transitions	Reduction of medication discrepancies
Patient counseling	Education regarding indication, dosage, adverse effects and adherence	Improved medication understanding and adherence
Chronic disease management	Monitoring and optimization of pharmacotherapy	Improved disease control
Antimicrobial stewardship	Antibiotic selection, dosing, de-escalation and monitoring	Improved antimicrobial use and reduced resistance pressure
Oncology pharmacy	Review of anticancer medicines, supportive therapy and adverse effects	Safer cancer pharmacotherapy
Pharmacovigilance	Detection and reporting of adverse drug reactions	Improved medication safety
Telepharmacy	Remote counseling, medication review and monitoring	Improved access and continuity of care

The growing evidence base suggests that the greatest benefits are generally observed when pharmacist services are structured, patient-centred, collaborative and supported by follow-up rather than being limited to a single medication-related interaction [1,8].

3. MEDICATION REVIEW AND MEDICATION THERAPY MANAGEMENT

Medication review is one of the most established pharmacist-led clinical services. It involves a structured assessment of a patient's medicines with the objective of identifying medication-related problems, improving therapeutic effectiveness and minimizing avoidable harm.

A recent systematic review by Craske et al. included 68 papers representing 50 studies of pharmacist-led medication reviews. The review identified several components associated with positive outcomes, including collaborative working, patient involvement in goal setting and action planning, additional support, and follow-up. These components may improve medication use and contribute to better control of conditions such as hypertension and diabetes.

Medication review is particularly important among older adults and patients receiving multiple medicines. Polypharmacy increases the risk of drug-drug interactions, inappropriate prescribing, therapeutic duplication, adverse drug reactions and medication non-adherence.

Community pharmacist-led medication reviews have also demonstrated potential clinical benefits, although considerable heterogeneity exists between studies in patient selection, intervention components and outcome measurement [1, 10].

Table 02: Key Components of an Effective Pharmacist-Led Medication Review

Component	Pharmacist activity	Expected outcome
Medication history	Obtain complete prescription, OTC and complementary medicine history	Accurate medication profile
Medication assessment	Evaluate indication, effectiveness, safety and adherence	Identification of medication-related problems
Interaction assessment	Identify drug-drug and drug-disease interactions	Reduced medication-related harm
Patient goal setting	Discuss treatment priorities with the patient	Patient-centred treatment planning
Action planning	Develop individualized recommendations	Improved medication use
Interprofessional collaboration	Communicate recommendations to prescribers	Optimized pharmacotherapy
Follow-up	Reassess outcomes and adherence	Sustained therapeutic benefit

The effectiveness of medication review therefore depends not only on identifying problems but also on ensuring that recommendations are implemented and followed up.

4. PHARMACIST COUNSELING AND MEDICATION ADHERENCE

Medication non-adherence is a major barrier to achieving therapeutic goals, particularly in chronic diseases requiring long-term pharmacotherapy. Pharmacist counseling can address intentional and unintentional non-adherence through patient education, identification of barriers, simplification of medication regimens, reminders, motivational approaches and follow-up.

A systematic review and meta-analysis of 62 randomized trials found that pharmacist counseling was associated with significantly greater odds of medication adherence compared with no pharmacist counseling. The analysis also reported an improvement in quality of life. However, the authors emphasized that the overall methodological certainty of the evidence was low [2].

This finding is clinically important because counseling should not be considered merely an information-delivery activity. Effective counseling requires assessment of the patient's understanding, beliefs, barriers, health literacy and ability to follow the prescribed regimen.

In cardiovascular disease, for example, community pharmacist interventions have been investigated as a strategy for improving medication adherence and clinical outcomes [11]. The pharmacist can provide repeated counseling and monitoring that may be difficult to achieve during brief physician consultations.

5. MEDICATION RECONCILIATION AND TRANSITIONS OF CARE

Transitions between hospital, outpatient and community settings are vulnerable periods for medication errors. Changes in treatment, incomplete medication histories, communication failures and patient misunderstanding can result in discrepancies and adverse events.

Pharmacist-led medication reconciliation involves obtaining the best possible medication history, comparing medication lists, identifying discrepancies and communicating appropriate changes to the patient and healthcare team.

A systematic review of pharmacy-led interventions during transitions of care included 123 studies and reported that 110 studies showed a reduction in hospital readmission rates. Patient counseling and medication reconciliation were among the most frequently used components [3].

However, evidence is not uniformly positive. Earlier systematic reviews found that pharmacists can identify and resolve medication discrepancies after discharge, but reductions in readmissions and healthcare utilization were not consistently demonstrated [12]. This suggests that medication reconciliation may be most effective when integrated with broader transitional-care interventions rather than delivered as an isolated activity.

Table 03: Pharmacist Role During Transitions of Care

Transition stage	Pharmacist intervention	Medication-safety objective
Hospital admission	Medication history and reconciliation	Prevent admission medication discrepancies
During hospitalization	Medication review and monitoring	Optimize treatment
Discharge	Discharge medication reconciliation	Prevent unintended medication changes
Patient counseling	Explain new and discontinued medicines	Improve understanding
Post-discharge	Follow-up and medication review	Identify emerging medication problems
Community follow-up	Communication with community pharmacist/physician	Maintain continuity of care

The evidence indicates that transitions-of-care services should be designed as continuous processes rather than isolated discharge interventions.

6. PHARMACIST-LED SERVICES IN ONCOLOGY

Cancer pharmacotherapy is particularly complex because patients may receive multiple anticancer and supportive medicines, experience significant adverse effects, and undergo frequent treatment changes. Pharmacists can contribute through medication reconciliation, dosing assessment, interaction screening, adherence counseling, toxicity monitoring and supportive-care optimization.

A 2024 systematic review and meta-analysis of randomized controlled trials found that pharmacist-led interventions among patients receiving cancer treatment significantly improved medication adherence and reduced medication-related problems and adverse drug events compared with control groups [4].

These findings support the integration of pharmacists into multidisciplinary oncology teams, particularly where oral anticancer medicines are used and patients may manage complex regimens at home.

7. ANTIMICROBIAL STEWARDSHIP

Antimicrobial resistance is an important global health challenge, and pharmacists have become increasingly involved in antimicrobial stewardship programs. Their responsibilities may include antimicrobial selection, dosing, therapeutic monitoring, intravenous-to-oral conversion, de-escalation, duration optimization, audit and feedback, and education of healthcare professionals.

A systematic review examining two decades of pharmacist involvement in antimicrobial stewardship found increasing pharmacist participation across different healthcare systems. Audit and feedback were among the most frequently reported interventions, with evidence of improved antimicrobial prescribing appropriateness and reduced antimicrobial consumption [5].

Pharmacist involvement is particularly valuable because antimicrobial stewardship requires continuous assessment of microbiological results, renal function, pharmacokinetic considerations, drug interactions and treatment duration.

8. PHARMACOVIGILANCE AND MEDICATION SAFETY

Pharmacovigilance is another important area of pharmacist-led clinical practice. Pharmacists can identify suspected adverse drug reactions, medication errors, interactions and other medication-related problems during routine patient care.

The pharmacist's position across different stages of the medication-use process allows early identification of safety signals. In hospitals, clinical pharmacists can review medication orders and monitor patients for adverse effects. In community practice, pharmacists can identify problems associated with self-medication, polypharmacy, duplicate therapy and inappropriate use of over-the-counter medicines.

The WHO's Medication Without Harm initiative emphasizes high-risk situations, polypharmacy and transitions of care as major targets for reducing medication-related harm [9]. Pharmacist-led medication review and reconciliation directly address these areas.

9. POST-DISCHARGE PHARMACIST SERVICES

The period immediately following hospital discharge is associated with medication changes and increased risk of medication-related problems. Pharmacist-led post-discharge medication review can help patients understand treatment changes and identify unresolved medication problems.

A systematic review of hospital-based post-discharge pharmacist medication reviews included 57 studies and identified outcomes including hospital readmission, adverse events and disease-specific measures. The authors noted that pharmacist activities and interventions were heterogeneous, making it difficult to attribute particular outcomes to individual pharmacist activities [13].

Nevertheless, post-discharge services provide an opportunity for pharmacists to connect hospital-based medication decisions with medication use in the community.

10. TELEPHARMACY AND DIGITAL CLINICAL SERVICES

Telepharmacy represents an important recent development in pharmacist-led clinical care. Telephone and video consultations can provide medication counseling, medication-history collection, adherence monitoring, chronic disease follow-up and medication management to patients who may have difficulty accessing face-to-face services.

A systematic review of synchronous telepharmacy models identified 103 eligible studies. Most services used telephone consultations, while a smaller proportion used video consultations. Services included counseling, medication-history assessment and ongoing support for chronic conditions. Patients generally reported that telepharmacy provided care comparable with or superior to conventional services in several settings [6].

Economic evidence is also emerging. A systematic review of telepharmacy services in non-cancer settings included six economic evaluations; four reported telepharmacy as less costly than usual care, while two reported it as cost-effective according to specified thresholds [7].

Table 04: Emerging Digital Pharmacist Services

Digital service	Example activity	Potential advantage
Telephone counseling	Medication education and adherence assessment	Convenient patient access
Video consultation	Comprehensive medication review	More interactive assessment
Remote monitoring	Monitoring blood pressure, glucose or other parameters	Continuous follow-up
Digital adherence support	Reminders and follow-up communication	Improved adherence
Electronic medication reconciliation	Remote review of medication lists	Improved continuity
Telepharmacy follow-up	Post-discharge medication monitoring	Early detection of medication problems

However, digital services also present challenges, including technology access, digital literacy, privacy, cybersecurity, technical problems and the need for appropriate documentation and professional standards [6,7].

11. IMPACT ON PATIENT CARE

The impact of pharmacist-led clinical services can be considered across several dimensions: clinical outcomes, medication-related outcomes, patient-reported outcomes and healthcare utilization.

11.1 Clinical outcomes

Pharmacist interventions may improve disease-specific outcomes by optimizing pharmacotherapy and supporting adherence. Medication review interventions have been associated with improvements in measures such as blood pressure and glycemic control in selected populations.

11.2 Medication-related outcomes

One of the strongest rationales for pharmacist involvement is the prevention and resolution of medication-related problems. These include inappropriate drug selection, incorrect dosing, interactions, adverse drug reactions, duplication and non-adherence.

Evidence from oncology and medication-review studies supports a beneficial role for pharmacists in reducing medication-related problems.

11.3 Patient-reported outcomes

Patient counseling has demonstrated an association with improved medication adherence and quality of life. Patient participation in goal setting and action planning may further improve the relevance and acceptability of pharmacist recommendations.

11.4 Healthcare utilization

Pharmacy-led transitions-of-care programs have demonstrated potential to reduce hospital readmissions [1-4, 14] However, variation between studies means that the magnitude of benefit depends on patient population, intervention intensity, follow-up duration and integration with other healthcare services.

12. BARRIERS TO IMPLEMENTATION

Despite the growing evidence supporting pharmacist-led clinical services, several barriers limit widespread implementation.

Major barriers include:

- Insufficient staffing and workload
- Limited reimbursement for cognitive clinical services
- Lack of standardized service models
- Inadequate access to patient health information
- Limited interprofessional communication
- Variability in pharmacist clinical training
- Lack of standardized outcome measures
- Technology and infrastructure limitations
- Patient awareness and acceptance
- Regulatory restrictions in some healthcare systems

The heterogeneity of pharmacist-led medication review studies is particularly important. Differences in intervention design, patient selection and outcome measurement make it difficult to compare studies and determine which components produce the greatest benefit.

Economic evaluation is another important consideration. Although evidence increasingly suggests that clinical pharmacy services may provide economic value, more rigorous evaluations are required to establish sustainable reimbursement and implementation models [10, 14].

13. Future Perspectives

The future of pharmacy practice is likely to involve greater integration of pharmacists into multidisciplinary and patient-centred care. Several developments are particularly promising.

First, pharmacist-led services should move toward standardized, measurable care pathways. Core outcome sets could facilitate comparison between services and improve the quality of evidence. [10]

Second, digital technologies are likely to expand the reach of pharmacists. Telepharmacy can support patients in rural areas, patients with mobility limitations and those requiring frequent follow-up. [6,7]

Third, pharmacists are likely to have increasing responsibilities in precision and personalized pharmacotherapy. Pharmacogenomics, clinical decision-support systems and electronic health records may assist pharmacists in selecting and monitoring individualized therapy.

Fourth, pharmacists may increasingly contribute to population health through vaccination, chronic disease screening, preventive care and public-health programs.

Finally, future research should focus not only on whether pharmacist services work but also on which components work, for which patients, in which settings, and at what cost.

14. CONCLUSION

Pharmacist-led clinical services have become an important component of modern patient-centred healthcare. Evidence from recent systematic reviews indicates that pharmacists can contribute substantially to medication optimization, adherence, medication safety, transitions of care, antimicrobial stewardship, oncology care and remote clinical services. Medication review appears to be particularly effective when combined with patient involvement, collaborative decision-making, goal setting and follow-up. Pharmacist counseling can improve medication adherence and quality of life, while pharmacy-led transitions-of-care interventions have demonstrated potential to reduce hospital readmissions. In specialized areas such as oncology and antimicrobial stewardship, pharmacists can address complex medication-related problems and promote rational medicine use. Telepharmacy further expands opportunities for accessible and continuous pharmacist-led care. Nevertheless, variation in service models and outcome measures remains a significant limitation. Future implementation should emphasize standardized clinical pathways, interprofessional collaboration, appropriate workforce development, digital integration, economic evaluation and meaningful patient-centred outcomes. Pharmacist-led clinical services should therefore be viewed not simply as an extension of traditional pharmacy practice but as an essential component of safe, effective and coordinated healthcare.

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16. INFORM CONSENT AND ETHICAL CONSIDERATION

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17. REFERENCES

1. Anvari Y, Afrashteh A, Pourkaveh S, Salek SB, Al-Numan L, Khademnezhad S. Emerging role of mesenchymal stem cell-derived extracellular vesicles in periodontal regeneration. J Taibah Univ Med Sci. 2024;19(2):390-402. doi:10.1016/j.jtumed.2024.01.006.
2. Jing L, Wang HY, Zhang N, Zhang WJ, Chen Y, Deng DK, et al. Critical roles of extracellular vesicles in periodontal disease and regeneration. Stem Cells Transl Med. 2025;14(3):szae092. doi:10.1093/stcltm/szae092.
3. Kannan G, Kumar G, Ravishankar PL, Solomon G, Varatharajan K, Paneerselvan VE. Exosome-based strategies for periodontal regeneration: Current insights and future prospects (Review). Med Int (Lond). 2026;6(5):50. doi:10.3892/mi.2026.334.
4. Chen M, Huang B, Su X. Mesenchymal stem cell-derived extracellular vesicles in periodontal bone repair. J Mol Med (Berl). 2025;103(2):137-156. doi:10.1007/s00109-025-02513-4.
5. Zhou L, Cai W, Zhang Y, Zhong W, He P, Ren J, et al. Therapeutic effect of mesenchymal stem cell-derived exosome therapy for periodontal regeneration: a systematic review and meta-analysis of preclinical trials. J Orthop Surg Res. 2025;20(1):27. doi:10.1186/s13018-024-05403-6.
6. Théry C, Witwer KW, Aikawa E, Alcaraz MJ, Anderson JD, Andriantsitohaina R, et al. Minimal information for studies of extracellular vesicles 2018 (MISEV2018): a position statement of the International Society for Extracellular Vesicles and update of the MISEV2014 guidelines. J Extracell Vesicles. 2018;7(1):1535750. doi:10.1080/20013078.2018.1535750.