INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

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Review Article

Clinical Pharmacist Interventions and Management of Potentially Inappropriate Medications in Older Adults: A Narrative Review

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ARTICLE INFO

Published: 12 Nov 2026

Keywords:

Older adults, potentially inappropriate medications, polypharmacy, clinical pharmacist, medication review, deprescribing, medication safety, prescribing appropriateness

DOI:

10.5281/zenodo.24152508

ABSTRACT

Older adults frequently experience multimorbidity and complex medication regimens, increasing the risk of polypharmacy, potentially inappropriate medication (PIM) use, adverse drug reactions, drug–drug interactions, non-adherence and medication-related harm. Clinical pharmacists can contribute to medication optimisation through comprehensive medication review, medication reconciliation, identification of PIMs, assessment of drug–disease interactions, deprescribing recommendations, patient and caregiver education, monitoring and communication with prescribers. This narrative review synthesises recent evidence on the role and effectiveness of clinical pharmacist interventions in reducing PIM use among older adults. The evidence indicates that pharmacist-led and multidisciplinary medication reviews can reduce medication burden, PIM exposure and medication-related problems, although effects on hospitalisation, mortality, falls and quality of life are less consistent. The 2023 American Geriatrics Society Beers Criteria and the third version of STOPP/START provide complementary frameworks for identifying potentially inappropriate prescribing and prescribing omissions, while tools such as the Medication Appropriateness Index and STOPPFrail support patient-centred assessment. Effective interventions generally combine structured medication review with clinical assessment, communication with prescribers, shared decision-making, follow-up and monitoring rather than relying on a medication-count threshold alone. Barriers include limited pharmacist integration, short follow-up, incomplete medication histories, prescriber acceptance and heterogeneity of intervention design. Future studies should use standardised outcomes, longer follow-up and context-specific models that evaluate both prescribing quality and patient-centred outcomes. Clinical pharmacists therefore represent an important component of multidisciplinary strategies for safer and more appropriate medication use in older adults.

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

INTRODUCTION

Population ageing is accompanied by an increasing burden of multimorbidity and long-term medication use. Older adults often require medicines for cardiovascular diseases, diabetes, pain, respiratory disorders, psychiatric conditions and other chronic illnesses. As a result, they may receive treatment from multiple prescribers and across different healthcare settings, increasing the complexity of medication management. Polypharmacy is commonly defined as the concurrent use of five or more medicines, although its definition varies considerably across studies. A 2024 systematic review reported substantial variation in the prevalence of polypharmacy among older adults, largely due to differences in study populations, healthcare settings and definitions used. Similarly, a global meta-analysis of 122 observational studies involving more than 57 million older adults estimated the pooled prevalence of polypharmacy at approximately 39%, while hyperpolypharmacy, commonly defined as the use of ten or more medicines, affected around 13% of participants.

However, polypharmacy itself should not be considered inappropriate. The use of several medicines may be clinically necessary for older adults with multiple chronic conditions, and withholding effective treatment can also lead to adverse outcomes. The major concern is inappropriate or unnecessarily burdensome medication use, which may involve medicines without a current indication, therapeutic duplication, inappropriate doses or treatment durations, clinically significant drug–drug or drug–disease interactions, or medicines for which the potential risks outweigh the expected benefits. Recognising these challenges, the World Health Organization has promoted a person-centred approach to medication safety in patients with polypharmacy. This approach includes systematic medication review and active involvement of patients, caregivers and healthcare professionals in treatment decisions.

Older adults are particularly susceptible to medication-related harm because physiological changes associated with ageing can alter pharmacokinetics and pharmacodynamics. Declining renal and hepatic function, frailty, cognitive impairment, sensory limitations and reduced homeostatic reserve can further increase vulnerability to adverse effects. Inappropriate medication use may contribute to a range of clinical problems, including falls, delirium, bleeding, hypotension, hypoglycaemia, renal injury, constipation, sedation and hospitalisation. A systematic review and meta-analysis of hospitalised patients aged 65 years and older estimated that adverse drug reactions occurred in approximately 16% of patients, with diuretics, antibacterials, antithrombotic agents and analgesics among the drug classes frequently implicated.

Potentially inappropriate medications (PIMs) refer to medicines for which the potential risks may outweigh the expected benefits in older adults under specific clinical circumstances. Identifying PIMs should therefore be viewed as a process of clinical risk assessment rather than as an automatic indication to discontinue treatment. The 2023 American Geriatrics Society Beers Criteria provide an established framework for identifying medicines that are generally recommended to be avoided or used with caution in older adults under specified conditions. Importantly, these criteria are intended to support clinical decision-making rather than replace individual clinical judgement and shared decision-making.

Another commonly used approach is the Screening Tool of Older Person's Prescriptions (STOPP) and Screening Tool to Alert to Right Treatment (START). STOPP criteria help identify potentially inappropriate prescribing, whereas START criteria focus on medicines that may be clinically appropriate but have been omitted. The third version, published in 2023, expanded and updated the criteria based on available evidence and expert review. The combined use of STOPP and START is particularly useful because appropriate medication optimisation requires attention to both potentially excessive treatment and undertreatment.

Clinical pharmacists have an important role in identifying and addressing medication-related problems throughout the medication-use process. Their responsibilities may include obtaining accurate medication histories, performing medication reconciliation during transitions of care, assessing the indication and effectiveness of therapy, identifying inappropriate doses and drug interactions, applying explicit and implicit

prescribing criteria, recommending deprescribing when appropriate, educating patients and caregivers, monitoring treatment and communicating recommendations to prescribers. Evidence from intervention studies indicates that pharmacist-led interventions can improve several medication-related outcomes, although their effects on major clinical outcomes have been less consistent.

Therefore, this narrative review aims to examine the contribution of clinical pharmacist interventions in identifying and reducing potentially inappropriate medication use among older adults. It also discusses commonly used medication assessment tools, major components of pharmacist-led interventions, the current evidence supporting these interventions, barriers to their implementation and potential priorities for future research in clinical pharmacy practice.

DISCUSSION

Polypharmacy in older adults should not be assessed solely by medication count, as multiple medicines may be clinically justified in multimorbidity. The primary goal of clinical pharmacist interventions should therefore be medication optimisation, ensuring appropriate indications, doses, treatment duration, benefit–risk balance and monitoring. Beers and STOPP/START criteria provide structured approaches for identifying potentially inappropriate medications (PIMs), but clinical judgement remains essential because individual treatment goals, disease severity and patient preferences may not be fully captured by these tools.

Clinical pharmacists can support medication optimisation across hospitals, primary care, community pharmacies and long-term-care settings through medication reconciliation, comprehensive medication review, identification of drug-related problems, interaction screening, dose assessment, deprescribing and patient education. Evidence suggests that pharmacist-led interventions more consistently improve medication-related outcomes, particularly medication appropriateness, PIM exposure and medication burden, than major clinical outcomes such as mortality and hospitalisation.

Deprescribing should be viewed as a planned clinical intervention rather than simply reducing medication numbers. Decisions should consider treatment indication, expected benefit, potential harm, treatment burden, prognosis and patient preferences. Particular attention is required for high-risk medicines, including anticholinergics, sedatives, NSAIDs, antithrombotic agents, glucose-lowering medicines, proton pump inhibitors and opioids.

Implementation may be limited by inadequate pharmacist integration, incomplete medication histories, limited time, prescriber concerns, patient reluctance and insufficient follow-up. Future research should use standardised definitions, longer follow-up and assessment of clinical, patient-centred, economic and implementation outcomes. Overall, combining structured prescribing criteria with clinical judgement and shared decision-making can support safer and more individualised medication use in older adults.

CONCLUSION

Potentially inappropriate medication use is an important medication-safety concern in older adults, especially among those experiencing polypharmacy, multimorbidity, frailty, or transitions between healthcare settings. Clinical pharmacists can play an important role in addressing these concerns through medication reconciliation, comprehensive medication review, PIM screening, identification of prescribing omissions, deprescribing recommendations, patient and caregiver education, communication with prescribers, and follow-up.

Current evidence generally shows improvements in medication-related outcomes, particularly reductions in PIM exposure and improvements in medication appropriateness. However, the evidence for broader patient-centred outcomes, including hospitalisation, mortality, and falls, remains less consistent. Overall, pharmacist-led medication optimisation appears to improve the quality and safety of pharmacotherapy, although its impact on broader clinical outcomes may vary depending on the intervention, patient characteristics, implementation, and duration of follow-up.

Future research should focus on standardised outcome measures, longer follow-up periods, and patient-centred outcomes, while also assessing implementation and cost-effectiveness. A collaborative approach in

which explicit prescribing criteria are used alongside pharmacist clinical judgement and shared decision-making may provide a practical and clinically relevant strategy for reducing inappropriate medication use among older adults.

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HOW TO CITE: Dr. Vinuth Chikkamath, J. S. Venkatesh, Linda Joy Sreejith S., Sahana H. M., Devika K. S., Clinical Pharmacist Interventions and Management of Potentially Inappropriate Medications in Older Adults: A Narrative Review, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 11, 1766-1769. https://doi.org/10.5281/zenodo.24152508