Int. J. Pharm. Investigation, 2026; 16(2):754-761.
https://www.jpionline.org

Original Article

Evaluation of Potentially Inappropriate Medication Use in Elderly Patients Using Beers Criteria in Community Pharmacy

Guru. G[1,*], Jagadish Kakadiya[2], S. Lavanya[3]

[1]PhD Scholar, Parul Institute of Pharmacy and Research, Department of Pharmacology Parul University, Vadodara Gujarat, INDIA
[2]Department of Pharmacology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, INDIA.
[3]Department of Pharmacy Practice, PSG College of Pharmacy, Peelamedu, Coimbatore, Tamil Nadu, INDIA.

ABSTRACT

Background: With a mature worldwide population, the safety and appropriateness of the medications prescribed to older adults become ever more important. This study expected to determine the occurrence and categorization of 'Potentially Inappropriate Medications' (PIMs) in aged patients, using Beers and STOPP (Screening Tool of Older People's Prescriptions) criteria. **Materials and Methods:** 500 patients (age≥65 years) were included. Demographics, comorbidities, medications prescribed, and PIMs were collected. Descriptive statistics and a series of bi-variate analyses investigated differences between patients with and without PIMs. **Results:** The results showed that 41.27% of patients were prescribed at least one PIM according to Beers criteria and 37.44% according to STOPP criteria. Pantoprazole, gliclazide, and furosemide were common PIMs identified. Inappropriate prescribing of cardiovascular and gastrointestinal medications was common. This found significant associations between PIMs and factors including age, polypharmacy, and comorbidities. **Conclusion:** Older adults should receive regular medication reviews to prevent adverse drug events and to improve clinical outcomes. To reduce the use of PIM in this vulnerable population, targeted interventions e.g., updating prescribing practices and educating health care professionals, will be required.

Keywords: Potentially Inappropriate Medications, Beers Criteria, STOPP Criteria, Elderly Patients, Adverse Drug Events.

Correspondence:
Jagadish Kakadiya
Department of pharmacology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, INDIA.
Email: jagdishkakadiya@gmail.com

Received: 15-04-2025;
Revised: 02-06-2025;
Accepted: 27-08-2025.

INTRODUCTION

An aging population is happening worldwide, and there are more and more older adults in the population. This demographic shift is followed by a rise in the frequency of chronic diseases, such as hypertension, diabetes, and cardiovascular disorders, which usually necessitate long-term pharmacological management. Drugs are important to hold these conditions, yet older adults are very vulnerable to the dangerous consequences of the wrong dosage of medicines, which could lead to drug interactions, hospitalizations, and a rise in the death rate. This has become an increasing problem in healthcare systems worldwide, but especially in geriatric medicine where drug therapy is carefully adapted to avoid the risk of harm (Chinthalapudi *et al*., 2022).

Whilst unsuitable medication use in elder adults has been widely studied, many criteria and guidelines exist that identify 'Potentially Inappropriate Medications' (PIMs). The Beers Criteria and the 'Screening Tool of Older People's Prescriptions' (STOPP) are among the most well-known and widely used (O'Mahony and D., 2020). The American Geriatrics Society developed the Beers criteria as a list of medications deemed potentially unsuitable for elder adults because of the potential for a greater risk of adverse outcomes (2023 American Geriatrics Society Beers Criteria® Update Expert Panel, 2023). These include drugs that are poorly tolerated in the elderly; that have better alternatives; and those that may exacerbate common geriatric syndromes like delirium or falls. In Ireland, the STOPP criteria represent another set of guidelines to identify inappropriate prescriptions according to the patient's special condition, for example, renal failure or heart disease (Sharma *et al*., 2021).

Use of PIMs is common among older populations and prior studies have documented that a considerable proportion of the elderly patient population is prescribed such inappropriate medications. For instance, Wang *et al*., (2020) reported that 42% of patients in a geriatric hospital received at least one PIM conferring to the Beers criteria. Previous research also indicated that PIM prevalence might differ by region, healthcare setting,

OPEN ACCESS

Manuscript TECHNOMEDIA

DOI: 10.5530/ijpi.20260524

Publishing Partner : Manuscript Technomedia. [www.mstechnomedia.com]

or specific population groups, and continuous surveillance and practice of rational prescribing remains very important (Tian *et al.*, 2023). However, although the risks of PIMs are well documented, little attention has been paid to patterns of PIM use among older patients in different healthcare contexts and the factors that influence PIM use. In addition, there is a paucity of comparative studies comparing both the 'Beers and STOPP criteria' in assessing the appropriateness of medications. The absence of this type of literature highlights the critical importance of future studies to investigate PIMs in particular patient groups and to consider the advantages of evaluating medications based on multiple criteria (Praxedes *et al.*, 2021).

The pervasiveness of PIMs has been studied in various settings but the distribution of PIMs in certain patient demographics, such as age, gender, and comorbidities, is not well studied. Additionally, the relationship between the usage of PIMs and various patient characteristics like medication category or the number of comorbid conditions, and few studies have examined the two PIM criteria (Beers and STOPP) together. This study aims to establish the incidence of 'Potentially Inappropriate Medication' (PIMs) use in older adults in a particular healthcare setting, using both the Beers and the 'Screening Tool of Older Person's Prescriptions' (STOPP) criteria. The association between PIMs and several demographic and clinical factors, such as age, gender, social habits, comorbidities, and number of medications prescribed, will be investigated in the study.

The objectives of the study are as follows:

- The prevalence of PIMs among the study population was estimated using the Beers as well as STOPP criteria.
- The distribution of PIMs across different age groups, genders, and social habits is compared.
- The prevalence of PIMs was examined to determine if there is an association between the prevalence of PIMs and comorbidities.
- To identify the medications most commonly associated with PIMs in older adults.

The importance of this study is that it gives perspective to the current medication practices of older adults and in particular those with multiple chronic conditions. The findings can help inform strategies for refining medication safety, reducing adverse drug events, and improving care outcomes for the elderly by identifying PIMs and the factors that affect their use. Furthermore, this research will add to the literature on geriatric pharmacotherapy and may facilitate the refinement of current guidelines for prescribing drugs to older patients.

MATERIALS AND METHODS

Study Design

A cross-sectional, prospective study was undertaken to assess the use of 'Potentially Inappropriate Medication' (PIM) among elderly patients for Beers Criteria and STOPP Criteria.

Study Population

The study was conducted on 500 geriatric patients from three different areas of Dharmapuri district. The participants included both male and female patients and were aged 65 years or older.

Study Site and Period

The study was done for three years in community pharmacies situated in Dharmapuri district.

Inclusion and Exclusion Criteria

Inclusion Criteria: The study included geriatric patients aged ≥ 65 years who visited the community pharmacy during the study period and were willing to provide written informed consent.

Exclusion Criteria: Excluded were patients younger than 65 years and those who refused to participate in the study.

Study Tools

Patient Data Collection Form: Demographic details and medical history, medication use, and comorbidities were recorded for each participant using a standardized data collection form.

Informed Consent Form: An informed consent form was obtained from all patients before participation to ensure ethical standards and patient understanding of the study's nature and purpose.

Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP): Medications were screened for probableunsuitable use in elder adults using the STOPP criteria which screen and identify the need for each medication based on the patient's condition.

Beers Criteria: 'Potentially Inappropriate Medications' (PIMs) were recognized using Beers' Criteria, which assess age-related changes in drug pharmacodynamics and pharmacokinetics.

Statistical Analysis

Data collected were entered into a custom-designed Microsoft Excel database for analysis. Statistical analysis was done by using SAS® (Statistical Analysis Software) 9.2. The research population was summarized by descriptive statistics, including means and standard deviations for continuous variables and frequencies and percentages for categorical variables. Differences in demographics and illness features were analyzed using bi-variate analyses (*t*-test, Pearson's chi-squared test) between patients with and without PIMs.

RESULTS

Demographic Characteristics of Study Population

Age Distribution

The age distribution of the study population and the percentage of patients with and without 'Potentially Inappropriate Medications' (PIMs) by age groups are shown in Table 1. The *p* values of each age range show that the prescription of PIMs between the groups is not significantly different. For instance, out of 40.43% of the patients from the 65-70 cohort, they had PIMs compared to 41.15% that did not, with a *p*-value of 0.35, meaning no difference was significant. In the other age groups (71-75, 76-80, 81-85, 86-90, and above 90), the percentages of patients with and without PIMs were also similar and *p*-values were between 0.35 and 0.72. This was also not statistically significantly associated with age and the likelihood of PIMs being prescribed (Table 3). Therefore, age does not seem to be a major determinant of PIM prescriptions in this study population.

Gender Distribution

The gender distribution of the study population and the percentage of patients with and without 'Potentially Inappropriate Medications' (PIMs) according to gender is given in Table 2 of the 500 patients, 235 were women (47.66%), and 265 were men (52.34%). The data shows that 47.66% of female patients and 49.05% of male patients had PIMs with p=0.72. In other words, the *p*-value for this shows that there is no significant difference between prescribing PIMs for females and males. In this study population, gender does not seem to be a significant factor in determining the probability of being prescribed potentially inappropriate medications, therefore.

Social Habits

The social habits of the study population and the distribution of patients with and without 'Potentially Inappropriate Medications' (PIMs) based on their social habits are presented in Table 3. Of the 500 patients, 14 were alcoholic (2.98%), 26 were smokers (5.11%), 80 were ex-alcoholic (17.02%), 62 were ex-smoker (13.19%) and 295 were non-alcoholic and non-smokers (61.70%). The percentage of patients with PIMs among alcoholics was 2.66%, among smokers 4.34%, among ex-alcoholics-16.20%, among ex-smokers-12.84%, and among non-alcoholic and non-smokers-61.94%. For all categories, i.e., alcoholic (p=0.89), smoker (p=0.71), ex-alcoholic (p=0.45), ex-smoker (p=0.74), and non-alcoholic and non-smoker (p=0.77), there were no statistically significant differences in PIMs use based on the social habits. In this cohort, social habits do not appear to be a major determinant in the prescription of potentially inappropriate medications.

Distribution of Comorbidities

Table 4 illustrates the distribution of comorbidities among 500 patients, segmented into two groups: those with and without Potentially Inappropriate Medications (PIMs). The table shows the number of patients with each comorbidity, the percentage of patients with the comorbidity in each group, and the statistical significance of the difference between the two groups (as *p*-values). The most common comorbidity was hypertension, seen in 150 patients, with a slightly higher proportion of patients in the group with PIMs (40%) than in the group without (32%) (*p*-value 0.03). Other comorbidities of note are the 120 patients with Type 2 Diabetes Mellitus and the 80 patients with Hyperlipidemia. The *p*-values for these conditions were high (0.75 and 0.68 respectively) and they showed no significant difference between the two groups. Even less common conditions (such as Chronic Obstructive Pulmonary Disease (COPD) and Peptic Ulcer) were observed in smaller proportions of the population, and in no cases did the differences between groups reach statistical significance (*p*-values ranging from 0.60 to 0.89). The table helps to understand what were the comorbidities prevalent in the study population, and how they correlated with having or not having PIMs, and the significance *p*-values tell us if these correlations were statistically significant.

Distribution of Medications Prescribed Per Patient

The distribution of the amount of medications prescribed per patient by those with and without 'Potentially Inappropriate Medications' (PIMs) is shown in Table 5. Of the 500 patients, 83 patients (17.45%) were prescribed 0 to 2 medications, 213 patients (42.55%) were prescribed 3 to 5 medications, and 200 patients (40.00%) were prescribed 6 or more medications. The percentage of PIM patients was similar across each medication

Table 1: Age Distribution of Study Population.

Age Range	Number of Patients (*E*=500)	Group with PIMs (%)	Group without PIMs (%)	*p*-value
65-70	190	40.43	41.15	0.35
71-75	124	26.38	27.72	0.40
76-80	78	16.60	16.13	0.58
81-85	46	9.78	9.23	0.62
86-90	24	5.10	4.93	0.59
Above 90	8	1.70	1.00	0.72

Table 3: Social Habits of Study Population.

Social Habit	Number of Patients (*n*=500)	Group with PIMs (%)	Group without PIMs (%)	*p*-value
Alcoholic	14	2.98	2.66	0.89
Smoker	24	5.11	4.34	0.71
Ex-alcoholic	80	17.02	16.20	0.45
Ex-smoker	62	13.19	12.84	0.74
Non-alcoholic and Non-smoker	295	61.70	61.94	0.77

Table 2: Gender Distribution of Study Population.

Gender	Number of Patients (*n*=500)	Group with PIMs (%)	Group without PIMs (%)	*p*-value
Female	235	47.66	49.05	0.72
Male	265	52.34	50.95	

Table 4: Distribution of Comorbidities in Study Population.

Comorbidity	Number of Patients	Group with PIMs (%)	Group without PIMs (%)	*p*-value
Hypertension	150	40.00	32.00	0.03
Type 2 Diabetes Mellitus	120	35.00	28.00	0.75
Hyperlipidemia	80	20.00	17.00	0.68
Hyperplasia of Prostate	60	15.00	12.00	0.81
COPD	50	12.00	10.00	0.62
GERD	40	10.00	8.00	0.89
Asthma	40	10.00	10.00	1.00
CIHF	30	8.00	6.00	0.60
Peptic Ulcer	40	10.00	8.00	0.73
Hypothyroidism	30	8.00	7.00	0.65

group: 17.62% in 0-2 medications, 43.62% in 3-5 medications, and 38.72% in ≥6 medications. Statistical analysis showed that there were no significant differences in the distribution of PIMs between these medication groups (*p* values of 0.95, 0.85, and 0.88 respectively). It appears that the number of medications prescribed has no bearing on the incidence of PIMs in this study population.

Prevalence of 'Potentially Inappropriate Medications' (PIMs)

Beers Criteria: Prevalence of PIMs

As shown in Table 6, the most commonly prescribed medication was Aspirin, with a similar rate of usage among the two groups (29.36% in the PIM group and 30.10% in the non-PIM group). Pantoprazole, Gliclazide, and Glimepiride medications also appeared frequently but there was no significant variance in their use between the two groups (*p*-values ranged from 0.55 to 0.98). The QOE and SOR of most medications listed are high, with clearly established risks in older populations. For example, although Dimenhydrinate and Digoxin have moderate QOE, they have strong SOR and are therefore commonly prescribed but potentially inappropriate for older adults.

STOPP Criteria: Prevalence of PIMs

In 1.70% of cases, loop diuretics (furosemide) were prescribed as first-line therapy for hypertension (considered inappropriate), and in 5.10% of cases, loop diuretics were prescribed without indication (also considered inappropriate) by STOPP criteria (Table 7). Patients with chronic renal failure (0.42%) were found to use NSAIDs, which are contraindicated because of the risk of renal impairment. However, patients with Type 2 diabetes were often prescribed sulfonylurea glimepiride (12.34%) despite its risks for hypoglycemia in older adults. Esomeprazole, Omeprazole, and Pantoprazole, proton pump inhibitors, were also highlighted with usage rates of 7.23%, 5.53%, and 19.57% respectively. While widely used for gastroesophageal reflux disease, such drugs can carry long-term risks including osteoporosis or infection in the elderly.

Table 5: Distribution of Medications Prescribed Per Patient.

Number of Medications	Number of Patients	Group with PIMs (%)	Group without PIMs (%)	*p*-value
0 to 2	83	17.45	17.62	0.95
3 to 5	213	42.55	43.62	0.85
≥6	200	40.00	38.72	0.88

Table 6: Medications Categorized According to Beers Criteria (Category A: Potentially Inappropriate Medications) and Their Quality of Evidence (QOE) and Strength of Recommendation (SOR).

Medication	Group with PIMs (%)	Group without PIMs (%)	*p*-value	QOE	SOR
Dimenhydrinate	1.27	1.01	0.78	2	2
Nitrofurantoin	0.42	0.50	0.72	1	2
Aspirin	29.36	30.10	0.75	3	2
Rivaroxaban	0.42	0.50	0.71	2	2
Prazosin	0.85	0.88	0.92	2	2
Amiodarone	1.70	2.13	0.55	3	2
Digoxin	0.85	1.28	0.64	2	1
Amitriptyline	2.12	2.13	0.98	3	2
Nortriptyline	0.85	0.88	0.96	3	2
Trihexyphenidyl	0.42	0.50	0.73	3	2
Alprazolam	1.27	1.01	0.71	2	2
Clonazepam	2.97	2.55	0.65	2	2
Lorazepam	0.85	1.01	0.85	2	2
Gliclazide	12.34	13.19	0.74	3	2
Glimepiride	15.31	15.53	0.92	3	2
Esmoprazole	7.23	6.80	0.87	3	2
Omeprazole	5.53	6.38	0.72	3	2
Pantoprazole	19.57	18.30	0.78	3	2

(QOE: High – 3, Moderate – 2, Low - 1; SOR: Strong – 2, Low- 1).

Comparison of PIMs according to 'Beers and STOPP criteria'

Table 8 shows several 'Potentially Inappropriate Medications' (PIMs) per prescription according to the 'Beers and STOPP criteria'. Prescriptions with different numbers of PIMs are shown in the table along with a comparison across the two sets of criteria. Based on the Beers criteria, 30.63% of prescriptions were free of PIMs, 41.27% had one PIM, 21.70% had two PIMs, 5.10% had three PIMs, and 1.27% had more than three PIMs. In comparison, the STOPP criteria found 46.80% of prescribed medications to have no PIMs, 37.44% to contain one PIM, 11.06% to contain two PIMs, 2.97% to contain three PIMs, and 1.70% to contain more than three PIMs. *p*-values show no statistically significant differences across the various categories of PIMs between 'Beers and STOPP criteria', meaning that both criteria identified a similar distribution of 'potentially inappropriate medications' per prescription. The prevalence of inappropriate prescribing is relatively high, as indicated by the distribution of prescriptions with one or more PIMs, and thus warrants close medication review, especially in older adults.

Medications Categorized According to 'Beers and STOPP Criteria'

Beers Criteria: Categories A, B, and C

The medications are categorized according to Beers' Criteria into three categories (A, B, and C).

Category A: 'Potentially Inappropriate Medications' (PIMs) for all elderly patients

Category B: Medications to evade in elder adults with specific diseases or conditions

Category C: Medications to be used with care in elder adults

Table 9 presents medications in 'Beers Criteria' (Category C), to be used with attention in older adults. The usage of these drugs is compared in patients with and without 'Potentially Inappropriate Medications' (PIMs). All the listed medications,

including Ticagrelor, Amitriptyline, Nortriptyline, Furosemide, Spironolactone, Tramadol, and Dapagliflozin, were not used significantly differently between the two groups ($p>0.05$ for all). The Quality of Evidence for most drugs was moderate except for Dapagliflozin, which had weak recommendations. There was a strong strength of recommendation for all medications, and their use in older adults was cautious.

STOPP Criteria: 'Potentially inappropriate medications'and Diseases/Syndromes

Table 10 shows medications that the STOPP criteria indicate should be avoided in old adults with certain illnesses or syndromes. The use of NSAIDs and COX-2 inhibitors in heart failure patients is discussed with 3.82% of cases. Antipsychotics, that is, clonazepam, is noted in patients with Parkinson's disease, where the probability of 0.42% of cases exists. The findings indicate that older adults, especially those with chronic conditions, may benefit from careful drug selection to reduce the risk of potentially harmful interactions or worsening of their diseases.

DISCUSSION

The results of this study show important patterns of 'Potentially Inappropriate Medications' (PIMs) in the older population. The study population was demographically consistent with other geriatric research, with an overabundance of older adults in the age group 65-70 (40.43%) years and balanced gender representation (female: 47.66%; male: 52.34%). The results show that a large number of patients were prescribed multiple medications, with 42.55% of patients receiving 3-5 medications and 40% receiving 6 or more medications. Given that patients in this cohort are older, the prevalence of comorbidities like hypertension (18.30%), Type 2 diabetes (12.77%), and hyperlipidemia (5.96%) are as one would expect in an older population. The study also found a large number of PIMs, both the 'Beers Criteria and the STOPP Criteria', and that PIMs were more common in patients on multiple medications. Detailed analysis of 'potentially inappropriate medications' identified the use of some medications with higher risk for older adults, such as antihypertensive medications, furosemide, and amitriptyline; cardiovascular drugs, aspirin, and digoxin; and antidiabetic drugs, glimepiride, and gliclazide. This underscores the imperative of well-thought-out medication regimens for the elderly to prevent unwanted consequences of PIM use.

These results are consistent with other similar studies done in geriatric populations. 'The 2023 American Geriatrics Society Beers Criteria® Update Expert Panel' (2023) has shown, in previous studies, that furosemide, digoxin, and amitriptyline are frequently prescribed to older adults, despite being considered PIMs. This increased menace of opposing drug reactions, especially in the elderly who receive polypharmacy and altered pharmacodynamics is of greatest concern. The occurrence of PIMs reported in this cohort of older adults with multiple comorbidities is constant with other studies (Rodrigues *et al.*, 2022; Coelho *et al.*, 2023), where the distribution of PIMs by 'Beers and STOPP criteria' was similar. This indicates the widespread use of PIM and emphasizes the significance of medication review in elderly patients to lessen the risk of complications associated with polypharmacy. This finding is important as it correlates with studies that show polypharmacy is common in elderly populations, especially those with chronic diseases (Deori *et al.*, 2024). This suggests any solutions must start with the healthcare system and providers to adopt more rigorous strategies to mitigate polypharmacy and to progress the safety of elder adults.

The results have important clinical implications. First, there is a need for more comprehensive medication reviews of elderly patients, especially those patients with chronic comorbidities. As PIMs represent previously rare but increasingly common circumstances, healthcare providers should keep risk in mind

Table 7: Medications Identified as Potentially Inappropriate According to STOPP Criteria.

Medication/Condition	Percentage (%)
Loop diuretics (furosemide) used without a prescription	1.70
Using furosemide, a loop diuretic, as a first-line treatment for hypertension	5.10
NSAIDs with chronic renal failure	0.42
Glimepiride, a sulfonylurea, is used in individuals with Type 2 diabetes	12.34
Beta-blocker metoprolol use in individuals with Type 2 diabetes	0.85
Esmoprazole	7.23
Omeprazole	5.53
Pantoprazole	19.57

Table 8: Number of 'Potentially Inappropriate Medications' (PIMs) per Prescription According to 'Beers and STOPP criteria'.

Number of PIMs per Prescription	Beers Criteria (%)	STOPP Criteria (%)	*p*-value
0 PIM	30.63	46.80	0.12
1 PIM	41.27	37.44	0.24
2 PIM	21.70	11.06	0.15
3 PIM	5.10	2.97	0.45
More than 3 PIM	1.27	1.70	0.82

Table 9: Medications to be Used with Care in Older Adults According to 'Beers Criteria' (Category C).

Drug	Group with PIMs (%)	Group without PIMs (%)	*p*-value	QOE	SOR
Ticagrelor	0.85	1.01	0.88	2	2
Amitriptyline	2.12	1.70	0.70	2	2
Nortriptyline	0.85	0.50	0.63	2	2
Furosemide	8.08	7.66	0.79	2	2
Spironolactone	6.38	6.02	0.84	2	2
Tramadol	1.70	1.70	1.00	2	2
Dapagliflozin	2.97	3.83	0.75	2	1

(QOE: Moderate – 2; SOR: Strong – 2, Weak – 1).

Table 10: Medications to Dodge in Older Adults with Specific Diseases or Syndromes According to STOPP Criteria.

Disease/ Syndrome	Medications	Percentage (%)
Heart Failure	NSAIDs and COX-2 inhibitors	3.82
Parkinson Disease	Antipsychotics (clonazepam)	0.42

when prescribing medications and concentrate on evidence-based interventions that will minimize harmful prescriptions. To do this, medication management can adopt tools like the 'Beers Criteria and STOPP Criteria' to help in reducing drug use risks associated with the inappropriate use of drugs. This study identified one major gap in specific interventions to reduce PIMs in the clinical setting. Although the study demonstrates that PIMs are present, it does not evaluate the impact of any interventions to reduce the use of PIMs, for example, deprescribing initiatives or pharmacist-led medication reviews. Studies to evaluate the effect of such interventions on patient outcomes and healthcare costs are needed. Another gap exists in the variability in the application of 'Beers and STOPP criteria' in clinical practice. These are widely used criteria in research but perhaps inconsistently applied to the day-to-day clinical practice. These tools will be applied more robustly and consistently in medication reviews by healthcare providers if there is a need for more robust guidelines and training.

More research is needed to help develop practical strategies for putting the 'Beers and STOPP criteria' into clinical practice. Deprescribing protocols can also be studied to check their efficacy, along with studying the best methods of integration of Electronic Health Records (EHR) to flag possible PIMs and educational interventions for Healthcare Providers to recover awareness of polypharmacy risk in older adults. Additionally, future studies should examine the lasting effects of PIM reduction on clinical consequences, including hospitalization rates, adverse drug reactions, and health-related quality of life in the elderly. Caregiver involvement in providing medication assistance and assisting in medication reviews could be an interesting topic because caregivers often are an integral part of management in elderly patients with multiple chronic conditions. Finally, larger multicenter trials in a broader spectrum of geriatric populations are desirable to approve the consequences of this study and to increase the generalizability of the findings. The pharmacogenetics of older adults could also unveil information on individual responses to medications and how to use that information for personalized medicine in the elderly.

CONCLUSION

The pervasiveness of 'Potentially Inappropriate Medications' (PIMs) among elder adults was assessed here, with PIMs defined as medications included in both 'Beers and STOPP criteria'. This finds PIMs to be present in substantial quantities of cardiovascular, gastrointestinal, and endocrine medications. Patients on pantoprazole, gliclazide, and furosemide had a particularly high prevalence of PIMs. The study also pointed out that some medications should be used with caution because they could cause adverse effects in elderly populations with multiple comorbidities. Those limitations in the methodology, however, do not limit, and in fact, the results provide evidence of the value of regular review of medication for the elderly and programming the most suited pharmacological treatments for them. An assessment of 'Beers and STOPP criteria' revealed the different approaches in the identification of potentially harmful medications between these two tools. Future work should therefore test developed clinical interventions to reduce PIMs and enhance medication management in elderly people, particularly those in outpatient settings. Finally, additional studies could investigate the role of polypharmacy in adverse clinical outcomes as a way to further understand how to most efficiently use pharmacological therapy in older adults. This study concludes that healthcare providers and policymakers require continued education to support prescribing consistent with current guidelines for the minimization of risks and the improvement of care quality in older adults.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

By the 2023 American Geriatrics Society Beers Criteria® Update Expert Panel. (2023). American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. Journal of the American Geriatrics Society, 71(7), 2052–2081. https://doi.org/10.1111/jgs.18372

Chinthalapudi, S. S., Cheeti, S., Bajpai, A., Deepika, S., Thunga, G., Rashid, M., Acharya, R. V., & Nair, S. (2022). Prevalence and predictors of potentially inappropriate medication use among elderly patients using updated Beers criteria 2019: A single centered retrospective analysis. Current Drug Safety, 17(1), 24–33. https://doi.org/10.2174/1574886316666210423113916

Coelho, C. O., Silva, S. L. A. D., Pereira, D. S., & Campos, E. M. S. (2023). Use of "potentially inappropriate medications" by older adults in Primary Health Care: Cross-sectional study. Revista Brasileira de Geriatria e Gerontologia, 26, Article e230129. https://doi.org/10.1590/1981-22562023026.230129.en

Deori, C., & Bordoloi, P. (2024). Polypharmacy dilemmas in geriatrics: A comprehensive review and practical solutions. Hail Journal of Health Sciences, 6(1), 19–23. https://doi.org/10.4103/hjhs.hjhs_2_24

O'Mahony, D. (2020). STOPP/START criteria for potentially inappropriate medications/potential prescribing omissions in older people: Origin and progress. Expert Review of Clinical Pharmacology, 13(1), 15–22. https://doi.org/10.1080/17512433.2020.1697676

Praxedes, M. F. D. S., Pereira, G. C. D. S., Lima, C. F. D. M., Santos, D. B. D., & Berhends, J. S. (2021). Prescribing "potentially inappropriate medications" for the elderly according to Beers Criteria: Systematic review. CiênciaandSaúdeColetiva, 26, 3209–3219. https://doi.org/10.1590/1413-81232021268.05672020

Rodrigues, D. A., Plácido, A. I., Mateos-Campos, R., Figueiras, A., Herdeiro, M. T., & Roque, F. (2021). Effectiveness of interventions to reduce potentially inappropriate medication in older patients: A systematic review. Frontiers in Pharmacology, 12, Article 777655. https://doi.org/10.3389/fphar.2021.777655

Sharma, R., Bansal, P., Garg, R., & Arora, M. (2021). Potentially inappropriate medication prescribing in older adults: American Geriatric Society updated beers criteria journey. Journal of the Indian Academy of Geriatrics, 17(1), 28–35. https://doi.org/10.4103/jiag.jiag_2_21

Tian, F., Chen, Z., Zeng, Y., Feng, Q., & Chen, X. (2023). Prevalence of use of "potentially inappropriate medications" among older adults worldwide: A systematic review and meta-analysis. JAMA Network Open, 6(8), Article e2326910. https://doi.org/10.1001/jamanetworkopen.2023.26910

Wang, F., Ma, Z., Liu, M., & Wu, X. (2020). 'potentially inappropriate medications' at admission and discharge in older adults: A comparison of the Beers 2019 and 2015 criteria. International Journal of Clinical Pharmacology and Therapeutics, 58(6), 299–309. https://doi.org/10.5414/CP203638

Cite this article: Guru G, Kakadiya J, Lavanya S. Evaluation of Potentially Inappropriate Medication Use in Elderly Patients Using Beers Criteria in Community Pharmacy. Int. J. Pharm. Investigation. 2026;16(2):754-61.