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ORIGINAL

Prevalence of potentially inappropriate medication use in older adults with home follow-up

Prevalencia de consumo de medicamentos potencialmente inadecuados en adultos mayores con seguimiento domiciliario

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ABSTRACT

The use of potentially inappropriate medications (PIMs) represents a priority issue in the care of older adults. This age group experiences physiological changes that alter the pharmacokinetics and pharmacodynamics of medications, increasing the risk of adverse effects, interactions, and avoidable hospitalizations. This study aims to determine the prevalence of use of potentially inappropriate medications, specifically benzodiazepines (BZDs), nonsteroidal anti-inflammatory drugs (NSAIDs), and proton pump inhibitors (PPIs), in older adult patients receiving home care in the City of Buenos Aires. An observational, descriptive, and cross-sectional study was conducted on a sample of 51 patients from the Home Care Service in Buenos Aires City. Mean age was 84.2 years (range 70–108). Polypharmacy (≥5 drugs) was present in 67.3 % of patients and extreme polypharmacy (≥10 drugs) in 16%. At least one potentially inappropriate medication was used by 69.1% of patients, mainly benzodiazepines (55%) and proton pump inhibitors (35%), with nonsteroidal anti-inflammatory drugs accounting for 24%. The findings reinforce the need to optimize prescribing and promote rational deprescribing strategies in the home setting.

Keywords: older adults – potentially inappropriate medications – polypharmacy – home care – Beers criteria.

RESUMEN

El uso de medicamentos potencialmente inadecuados (MPI) representa un problema prioritario en la atención de adultos mayores. Este grupo etario presenta cambios fisiológicos que alteran la farmacocinética y farmacodinámica de los medicamentos, incrementando el riesgo de efectos adversos, interacciones y hospitalizaciones que pueden ser evitables. El presente trabajo tiene como objetivo determinar la prevalencia de consumo de medicamentos potencialmente inadecuados, específicamente benzodiacepinas (BDZ), antiinflamatorios no esteroides (AINES) e inhibidores de la bomba de protones (IBP), en pacientes adultos mayores con seguimiento domiciliario en la Ciudad de Buenos Aires. Se realizó un estudio observacional, descriptivo y transversal sobre una muestra de 51 pacientes pertenecientes al Servicio de Atención Domiciliaria en CABA. La edad promedio fue de 84,2 años (rango: 70–108). Los resultados evidenciaron una elevada frecuencia de polifarmacia (67,3%) y de polifarmacia extrema (16%), así como una prevalencia del 69,1% de consumo de al menos un medicamento potencialmente inadecuado, principalmente benzodiacepinas (55%) e inhibidores de la bomba de protones (35%), y en menor medida antiinflamatorios no esteroides (24%). Los hallazgos refuerzan la necesidad de optimizar la prescripción y promover estrategias de desprescripción racional en el contexto domiciliario.

Palabras clave: adultos mayores – medicamentos potencialmente inadecuados – polifarmacia – atención domiciliaria – criterios Beers.

INTRODUCTION

Population aging is one of the most significant demographic phenomena of the 21st century. In Argentina, according to the National Institute of Statistics and Censuses (INDEC) [1], 11.9% of the population is over 65 years of age, representing a 9.9 percentage-point increase from 1895. The continuous rise in this figure is due to increased life expectancy and a decline in the birth rate.

This sustained increase in life expectancy leads to a rise in the prevalence of chronic diseases and, consequently, to an essential need for multiple drug therapies. This phenomenon leads to polypharmacy, defined as the concurrent administration of 5 or more medications. [2–4]

With age, patients often develop multiple chronic conditions such as hypertension, diabetes, osteoarthritis, heart failure, or cognitive decline, leading to an increase in the number of medications taken simultaneously. This is associated with an increase in adverse effects, drug interactions, falls, hospitalizations, functional decline, and reduced treatment adherence [2–6].

The complexity of prescriptions and age-related variability in physiological response make periodic review of pharmacological treatment essential [5,7].

Given the clinical complexity and risk of polypharmacy, the involvement of a gerontological case manager is essential to support the home-based physician and ensure safe care.

The gerontological case manager is an interdisciplinary professional who coordinates comprehensive care for older patients with functional dependence or frailty. In home-based follow-up, their role includes assessing functional status, monitoring chronic treatments, preventing falls, and reviewing medication.

Their intervention helps improve treatment adherence, identify drug duplications, and apply "deprescribing" criteria [8,9], that is, the planned discontinuation of unnecessary or potentially harmful medications.

The analysis of pharmacotherapy in this context facilitates the identification of consumption patterns, the measurement of polypharmacy prevalence, and the application of standardized assessment tools.

The analysis of polypharmacy in older adults receiving home care is a priority, given that:

It allows for the detection of potentially inappropriate medications (PAMs) and the prevention of adverse reactions [7,10].

It facilitates the identification of relationships between polypharmacy and falls or functional decline [2–4,6].

It contributes to optimizing prescribing and patient safety [7,10].

It provides useful evidence to strengthen the role of the gerontological case manager [8,9].

Potentially inappropriate medications (PIMs) are those in which the risk of adverse effects outweighs the potential therapeutic benefits in older adults.

The Beers Criteria, developed by the American Geriatrics Society (AGS), are among the most widely used tools worldwide for identifying potentially inappropriate medications (PIMs) in people aged 65 years or older [7,11]. The latest update, published in 2023, groups medications into five categories:

Medications that should always be avoided in older adults, regardless of diagnosis.

Medications that should be avoided in the presence of certain diseases or syndromes (e.g., delirium, dementia, heart failure).

Medications that should be used with caution, taking into account the individual risk-benefit ratio.

Medications requiring dose adjustment based on renal function.

Clinically relevant drug interactions or interactions with certain medical conditions [7,11].

The use of these criteria helps improve medication safety, rationalize prescribing, and reduce medication-related adverse events. Their systematic application in geriatric practice—especially in home care—is a key strategy for optimizing patient-centered care, reducing the likelihood of avoidable medication-related hospitalizations, and improving older adults' quality of life by minimizing unnecessary medication burden.

In home care, regular medical check-ups may be less frequent and medication monitoring insufficient, which can lead to inappropriate prescribing or the continuation of unnecessary treatments. This scenario justifies the need to assess the extent of MPI use in this specific context [8,9], as well as to implement systematic review strategies that anticipate risks and reduce preventable adverse events.

The descriptive analysis of the gerontological case manager for home-bound patients allows for a systematic characterization of the service provided and the data collected. The case manager records clinical, functional, cognitive, social, and pharmacological information, including comorbidities, frailty scales, number of medications, history of falls, and interventions related to deprescribing or inappropriate prescribing [8,9].

This approach is important because it facilitates the early identification of risk situations, such as polypharmacy, the use of potentially inappropriate medications, and the presence of functional or cognitive decline [2–4,6,10]. In turn, it allows for the development of personalized interventions, coordination among the various professionals involved, and improved continuity of care at home [9]

thereby promoting effective communication among the various members of the healthcare team.

The implementation of a structured record for each patient facilitates the analysis of the correlation between clinical and pharmacological variables. In this context, it is important to assess whether increased medication use is associated with a higher risk of falls or with poorer performance on functional tests such as the SPPB or the Barthel and Lawton scales [2–4,6]. Although this study is descriptive rather than inferential, the information obtained helps generate hypotheses and prioritize future lines of research.

Patient management in this context is understood as a continuous process of assessment, planning, implementation, and follow-up of interventions, aimed at maintaining the greatest possible autonomy, preventing complications, and enabling older adults to remain in their familiar environment with the best possible quality of life [8,9], which constitutes a fundamental pillar of modern geriatric care.

Definition of terms and scales used:

Charlson Index: assesses the burden of comorbidities and predicts 10-year mortality based on the number and severity of chronic diseases [12].

Mini-Mental State Examination (MMSE): assesses overall cognitive status and is useful for detecting cognitive impairment or dementia [13].

Yessavage Scale: measures the presence of depressive symptoms in older adults [14].

Barthel Index: determines the degree of independence in basic activities of daily living (eating, bathing, mobility) [15].

Lawton Index: assesses the ability to perform instrumental activities (managing money, using the telephone, shopping) [16].

SPPB (Short Physical Performance Battery): assesses physical performance through balance, walking speed, and lower limb strength [17].

Dementia: defined as an acquired and persistent impairment of cognitive functions that interferes with functional autonomy [18].

Benzodiazepines (BDZ): psychotropic drugs used for anxiety and insomnia, associated with drowsiness, falls, and cognitive impairment in older adults [7,11].

NSAIDs: nonsteroidal anti-inflammatory drugs that increase the risk of ulcers and kidney damage in this population [7,11].

Proton pump inhibitors (PPIs): used for gastric diseases; their prolonged use is associated with fractures, magnesium deficiency, and cognitive impairments [7,11].

Patient management: a systematic process that coordinates, evaluates, and optimizes comprehensive patient care, prioritizing safety and therapeutic efficiency [8,9].

OBJECTIVES

General objective

To determine the prevalence of potentially inappropriate medication (PAM) use among older adults receiving home-based care in the City of Buenos Aires.

Specific objectives

To estimate the frequency of polypharmacy in the study population.

To identify the proportion of patients who use benzodiazepines (BDZ), NSAIDs, and PPIs.

To analyze the coexistence of polypharmacy and PIM use.

To describe the demographic and clinical characteristics of the population.

MATERIALS AND METHODS

Study design: A descriptive, observational, cross-sectional study was conducted to assess the prevalence of polypharmacy and the use of potentially inappropriate medications (PAMs) in older adults receiving home-based care in the City of Buenos Aires, monitored by a gerontological case manager during the period from January 2024 to August 2025.

Population and sample: The sample consisted of 51 patients over 65 years of age enrolled in the geriatric home care program.

All active patients with continuous home-based care during the study period were included.

Inclusion criteria: Patients over 65 years of age, actively receiving home-based care from a gerontological case manager, with informed consent from the patient or their representative.

Exclusion criteria: Patients hospitalized or institutionalized during the study period, and incomplete clinical records or loss to follow-up.

Setting: The study was conducted using a database of older adults (≥65 years) with at least one recorded home visit .

Sources and data collection method: No direct interventions were performed on the patients. Data were extracted from medical records and the systematic home follow-up registry, which include sociodemographic, clinical, and functional information.

Variables analyzed

Age and sex.

Primary diagnosis and comorbidities.

Charlson Index (comorbidity) [12].

Barthel Index (functional autonomy) [15].

Lawton Scale (instrumental activities) [16].

Yessavage Scale (affective state) [14].

SPPB Scale (physical performance) [17].

Mini-Mental State Examination (cognitive function) [13].

Total number of prescribed medications.

Use of high-risk medications: benzodiazepines (BDZ), NSAIDs, and proton pump inhibitors (PPIs) [7,11].

Presence of potentially inappropriate medications (PAMs) according to the 2023 Beers Criteria [7,11].

Deprescribing intervention (rational reduction or discontinuation of unnecessary medication) [9,10]. }}}

Operational definitions

Polypharmacy: use of five or more medications simultaneously [2–4].

Extreme polypharmacy: use of ten or more medications simultaneously [19,20].

Potentially inappropriate medication (PIM): a drug included in the 2023 Beers Criteria because it poses an increased risk in individuals over 65 years of age [7,11].

Deprescribing: a planned process of reducing or discontinuing inappropriate medication under medical supervision [9,10].

Data analysis

Data were processed using descriptive and basic statistical analysis.

Quantitative variables were expressed as mean, median, and range. Qualitative variables were presented as absolute frequencies and percentages. No inferential tests or advanced models were applied, as the study employed a descriptive design aimed at characterizing the population rather than establishing causal associations. The analysis was performed in a Microsoft Excel spreadsheet, consistent with the descriptive nature of the study.

Ethical considerations

This study was designed as a retrospective study, based on a review of secondary sources and home care provider records from their database.

Since there was no direct contact with or intervention on the patients, data confidentiality was ensured without the need for individual informed consent, in accordance with current regulations. Access to this information was formally authorized by the institution's Medical Directorate and approved by the relevant Ethics Committee, to which the home care provider belongs, in compliance with the Personal Data Protection Act and current bioethical regulations.

RESULTS

General Characteristics of the Population

The sample consisted of 51 patients, with a mean age of 84.2 years (range: 70–108), a figure consistent with profiles reported in cohorts of older adults with multimorbidity [19,20].

Sixty-five percent were female (n=33) and 35% were male (n=18), a distribution consistent with the higher life expectancy for women reported in national statistics [1].

The age range was relatively narrow, given that this was a population of older adults, resulting in a clinical profile comparable to and characteristic of this age group. This relative homogeneity in terms of age and care setting facilitated a uniform approach to pharmacological management and monitoring. All participants were under active home care by a gerontological case manager during the study period, which enabled systematic, continuous assessment of their clinical, functional, and pharmacological status.

Functional and Cognitive Status

According to functional assessment tools:

The Barthel Index had a mean score of 70/100, indicating mild dependence.

The Lawton Index showed a mean of 3/8, reflecting limitations in instrumental activities of daily living.

The SPPB Scale had a mean score of 6/12, consistent with physical frailty.

The Mini-Mental State Examination (MMSE) had a mean score of 21/30, suggesting mild cognitive impairment.

The Yessavage Scale had a mean score of 4/9, indicating mild depressive symptoms in 32.7% of patients.

Regarding the burden of comorbidities, the average Charlson Index was 2 points, with a predominance of cardiovascular and osteoarticular diseases and cognitive impairment—values characteristic of a geriatric population with multimorbidity [19,20].

Polypharmacy and Medication Use

The average number of daily medications per patient was 7.8 (range: 2–15).

67.3% had polypharmacy (≥5 medications), and 16% had extreme polypharmacy (≥10 medications).

Potentially inappropriate medications

The most frequently detected PIMs were:

Benzodiazepines (BDZ): 55%

NSAIDs: 24%

IBP: 35%

Most patients were taking more than one medication considered potentially inappropriate for their clinical condition.

Deprescribing and Falls

During the study period, 47% of patients underwent some form of deprescribing, primarily of benzodiazepines and proton pump inhibitors. Forty-three percent had suffered at least one fall in the past year. However, the study was not designed to draw inferences; a descriptive trend toward a higher frequency of falls was identified in patients with polypharmacy and benzodiazepine use, consistent with the available literature [19–24].

DISCUSSION

The results of this study show a high prevalence of polypharmacy and use of potentially inappropriate medications (PAMs) in older adults under home-based care, which is consistent with available international and regional evidence [2–6,7,10,11,19–24].

Polypharmacy affected more than two-thirds of patients (67.3%), while extreme polypharmacy was observed in 16%. These values are comparable to those reported in studies of institutionalized and ambulatory geriatric populations, where prevalence ranges from 60% to 70% [2–6,19,20].

The average of 7.8 medications per patient reflects the clinical complexity of this population, characterized by multiple chronic comorbidities, physical frailty, and mild to moderate cognitive impairment. This situation increases the risk of drug interactions, adverse reactions, and clinical events such as falls, hospitalizations, and progressive functional decline.

The Beers Criteria (2023) identified that 69.1% of patients were taking at least one MPI, representing a considerably high percentage. The most commonly implicated drugs were benzodiazepines, NSAIDs, and proton pump inhibitors (PPIs), which are associated with frequent adverse reactions such as drowsiness, cognitive impairment, gastrointestinal bleeding, renal failure, and an increased risk of fractures [7,11].

The high frequency of benzodiazepine use (55%) constitutes a clinically relevant finding, given that these drugs are linked to cognitive impairment and falls. In this study, a descriptive trend toward a higher proportion of falls was observed in patients taking benzodiazepines. However, as this is a descriptive study, it is not possible to establish causal associations.

On the other hand, the deprescribing or discontinuation of potentially inappropriate medications (PAMs) observed in 47% of patients highlights the active role of the gerontological case manager in reviewing treatments. This process represents an advancement in home care, as it focuses on patient safety, optimizing pharmacotherapy, and improving the quality of care in the home. In this context, identifying and discontinuing unnecessary medications is a key tool for reducing the risk of adverse effects, improving treatment adherence, and lowering healthcare costs [8–10].

The role of the gerontological case manager is a pillar of interdisciplinary care for frail older adults, enabling early detection of inappropriate medication use, coordinating medical care, and strengthening communication among the patient, family, and healthcare team.

This study reinforces the need to systematically apply the Beers Criteria and planned deprescribing strategies in all geriatric home care programs [7,11]. It also underscores the importance of continuing education in safe prescribing and functional and cognitive assessment as essential components of a comprehensive approach to older adults.

Study Limitations

Among the main limitations are the small sample size and the absence of inferential analysis, given the design's descriptive nature. However, the results provide valuable information for the field of geriatric home care, helping to identify areas for improvement in care practice and medication safety.

The study demonstrates a high prevalence of potentially inappropriate medication use among older adults receiving home care. A considerably high percentage (69.1%) was receiving at least one medication included in the Beers Criteria.

Benzodiazepines were the most commonly used inappropriate medications, a finding consistent with multiple studies linking them to daytime sleepiness, falls, fractures, and cognitive decline [7,11,19–24]. Their persistent use is often due to a lack of therapeutic reevaluation and the difficulty in implementing tapering strategies.

CONCLUSION

This study described the prevalence and characteristics of medication use among older adults receiving home-based care, highlighting the magnitude of the problem of polypharmacy and the use of potentially inappropriate medications (PAMs) in this geriatric population.

The results show that 2 out of every 3 patients evaluated meet the criteria for polypharmacy, and 1 in 4 reach levels of extreme polypharmacy. These figures should not be interpreted as isolated numbers, but rather as indicators of vulnerability that underscore the urgency of implementing mechanisms for continuous monitoring and systematic review of treatments, especially in the home setting, where medical supervision is often less consistent than in a hospital setting.

An encouraging aspect of the study is that 47% of patients underwent deprescribing, primarily involving discontinuation of benzodiazepines and PPIs. This finding reflects a positive trend and a paradigm shift toward prudent and rational prescribing, demonstrating that it is possible to optimize pharmacotherapy without compromising the management of chronic conditions, particularly through the intervention of the gerontological case manager.

In this regard, home-based case management emerges as an effective strategy for coordinating interdisciplinary care, identifying drug interactions, monitoring treatment adherence, and promoting medication safety. The gerontological case manager plays an essential role in the care of older adults, as they possess a comprehensive perspective that allows them to conduct functional, cognitive, and social assessments while optimizing pharmacological treatment.

Furthermore, the results underscore the importance of conducting a comprehensive functional assessment using standardized scales (Barthel, Lawton, SPPB, Mini-Mental, Yesavage, Charlson), which help assess the impact of medication on independence, physical performance, and psychological well-being, thereby providing an objective basis for clinical decision-making.

Although the descriptive design of this study does not allow for the establishment of causal relationships, a consistent trend was observed between benzodiazepine use and the frequency of falls. This finding suggests the need for more rigorous assessment and preventive interventions to reduce pharmacological risk.

This study provides relevant evidence for clinical practice and for health policies aimed at healthy aging. It promotes the integration of quality criteria for prescribing and interdisciplinary management in the home care of geriatric patients.

In short, periodic review of pharmacotherapy, planned deprescribing, and the systematic application of the Beers Criteria should be pillars of modern geriatric care.

The approach to older adults must be individualized, interdisciplinary, and aimed at improving quality of life, reducing iatrogenic risks, and promoting functional autonomy.

Finally, this study highlights the need to explore further research on polypharmacy and medication safety in the home setting by expanding sample sizes, incorporating longitudinal analyses, and evaluating the impact of deprescribing interventions on morbidity, mortality, and quality of life.

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CONFLICT OF INTEREST

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