

Exploring Medication Use in Geriatric Out-Patients: Observations from a Tertiary Care Set-Up in Eastern India

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Abstract:

Background: The global aging population, including India, is increasing rapidly due to healthcare advancements, leading to a significant rise in the elderly demographic. Geriatric individuals often require prolonged medical interventions and medication regimens, making it crucial to understand medication use patterns. The aim of this study is to examine the drug utilization patterns & the potentially inappropriate prescription using Beers Criteria among elderly individuals in a tertiary care setup in Eastern India.

Methods: A cross-sectional observational study was conducted on patients aged 60 years and above for 6 months at a tertiary care teaching hospital in Eastern India. Eligible patients were interviewed, and their case records were thoroughly reviewed. The collected data were entered into a pre-designed case record form.

Results: Analysis of the cohort of 130 patients revealed that 63.84% were men and 36.15% were women. Most patients (36.92%) fell between 60 and 70 years, while the fewest were above 90 years (2.3%). Polypharmacy was observed in 90.76% of the sample, with cardiovascular issues being the most prevalent (22.3%). The average number of pills per prescription was 5.5, and 85.9% of pharmaceuticals were prescribed using generic names. Antibiotic prescription stood at 61.4%, injections at 64.8%, and 96.3% of prescribed drugs were from the National List of Essential Medicines of India. Among disease prevalence in elderly most were from cardiovascular disease. According to an updated AGS-Beer criteria, 35 (27%) of adults over age 60 took at least one prescription medication, while more than 11% of the same group take more than equal to three prescriptions a month.

Conclusion: Our analysis revealed occurrences of irrational prescribing practices necessitating that prescribers should get thorough instruction on the proper and rational use of drugs, including the Beers Criteria that is specifically tailored for the elderly population.

Keyword: Drug, geriatrics patients, Beers criteria, WHO.

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Introduction

Inappropriate prescription practices pose significant challenges in the field of public health, linked to negative outcomes such as prolonged disease duration, antimicrobial drug resistance, side effects, and increased treatment expenses. [1] Rational drug usage, as defined by the World Health Organization (WHO), involves ensuring that patients receive medications suitable for their clinical requirements, administered at the proper dosage and for an adequate period, while also being affordable for both patients and the community.[2]

The primary goal is to maximize treatment efficacy and ensure patient well-being[3] Factors contributing to inappropriate prescribing include

insufficient knowledge, suboptimal patient-physician rapport, lack of suitable alternatives, and inadequate supervision, with estimates suggesting 60% of medications in poor nations are improperly prescribed.[4]

The elderly population in India, referring to individuals aged 60 years and over, is rapidly increasing, although it accounted for only 7.4% of the total population at the beginning of the new century. This particular demographic encounters a multitude of physical and psychological issues.[5] The prevalence of comorbidities contributes to high pharmaceutical consumption, with many using at least three prescribed drugs concurrently. Given the

higher prevalence of medication intake and adverse drug reactions (ADRs) among senior patients, it is crucial to investigate drug utilization patterns in the older age group. Given the changes in the way pharmaceuticals are processed and their effects on the body as individuals age, it is crucial to closely observe the impact of medications on geriatric patients. [6] This includes monitoring for adverse drug reactions (ADRs), drug interactions, and overall clinical outcomes. [7]

Due to age-related physiological changes, the elderly are prone to developing many prevalent chronic diseases, resulting in a higher usage of medications compared to earlier stages of life. [8] This circumstance leads to an escalation in irrational medication utilization, the adoption of unsuitable therapies, a financial burden, drug-related problems, and drug interactions.[7]

The process of aging can lead to unavoidable physiological, pharmacokinetic, and pharmacodynamic alterations. [9] These modifications may result in the build-up of medications in the body to a hazardous level, leading to significant problems.[10] Furthermore, the significance of drug usage patterns in the elderly has been emphasized by various factors, including the aforementioned changes, as well as behaviors involving the consumption of prescription and non-prescription drugs, self-medication, utilization of medicinal plants, irrespective of potential drug interactions with chemical medications, and non-compliance with medication adherence or insufficient drug prescriptions. [11]

Method

Study design and ethics: A cross-sectional, single-center-based observational study was undertaken for 6 months in the medicine outpatient facility of a tertiary care hospital in Eastern India. The

permission to conduct this study was obtained from the institutional ethical committee.

Study Population: The study included patients of both the sexes aged 60 years and above attending medicine OPD. All consecutive patients who met the eligibility criteria and consented to participate in the study by providing written informed consent were included in this study. Those patients requiring critical care support & those admitted to the inpatient set-up were excluded.

Study variables and data collection: Eligible patients were interviewed for their basic demographics and further evaluated for a comprehensive prescription detailing; the recommended medications and their corresponding dosages along with their case records were thoroughly reviewed.

The collected data were entered into a pre-designed case record form. The prescriptions were further assessed for potentially inappropriate prescription using updated AGS Beers Criteria.

Statistical analysis: Data collected were checked for completeness and analyzed statistically using descriptive statistics. Wherever necessary, the results were depicted in the form of percentages with tables and graphs. All statistical analysis for various measures was performed using various statistical software packages such as the Statistical Package for the Social Sciences (Windows version 21.0; SPSS Inc., Chicago [IL], USA) and Microsoft Excel

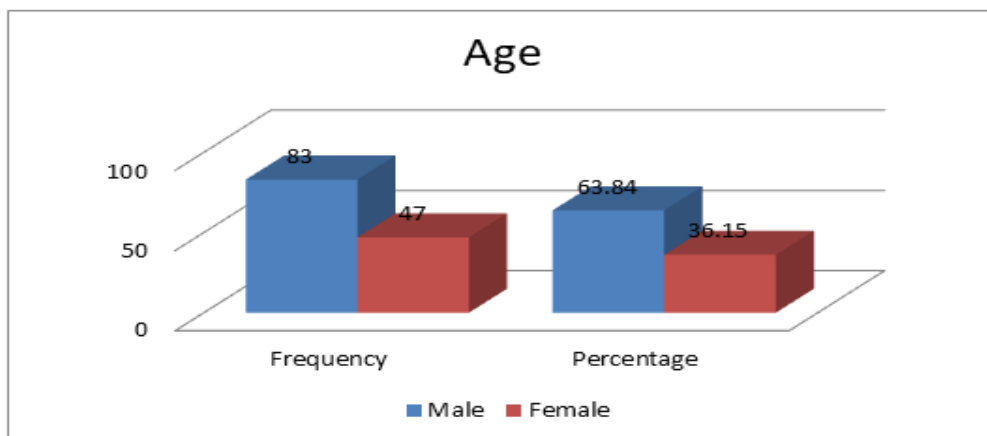
Results

A total of 130 patients who visited medical care at the geriatric outpatient department (OPD) and who consented were included in the study. An analysis of their socio-demographic profile was conducted, as presented in Tables and graphs.

Table 1: Gender wise distribution of patients

Gender	Frequency	Percentage
Male	83	63.84
Female	47	36.15
Total	130	100

The above table discusses gender wise distribution of patients in which 83 males and 47 females are participated whose percentages are 63.84% and 36.15% respectively.

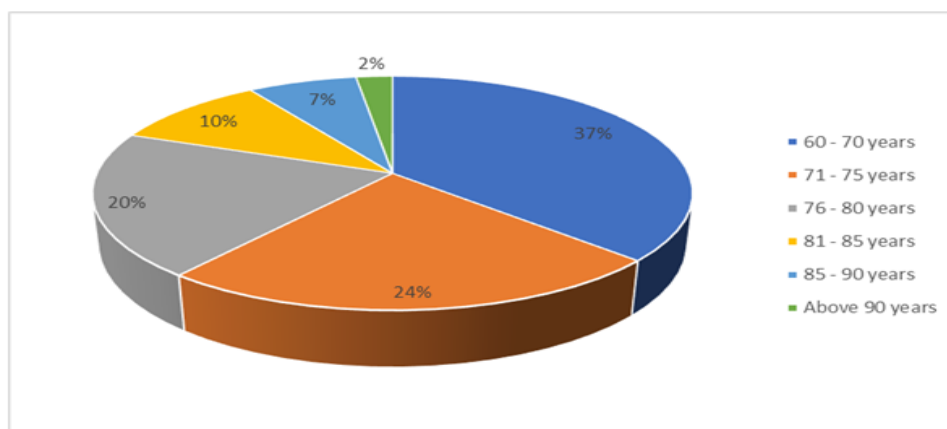


Graph 1: Gender wise distribution of patients

Table 2: Age wise distribution of patients

Age	Frequency	Percentage
60 - 70 years	48	36.92
71 - 75 years	31	23.84
76 - 80 years	26	20
81 - 85 years	13	10
85 - 90 years	9	6.92
Above 90 years	3	2.3
Total	130	100

The above table discusses age wise distribution of patients in which 48 patients belong to 60 – 70 years age group, 31 patients belong to 71 – 75 years age group, 26 patients belong 76 – 80 years age group, 13 patients belong to 81 – 85 years age group, 9 patients belong to 85 – 90 years age group and 3 patients belong to above 90 years.

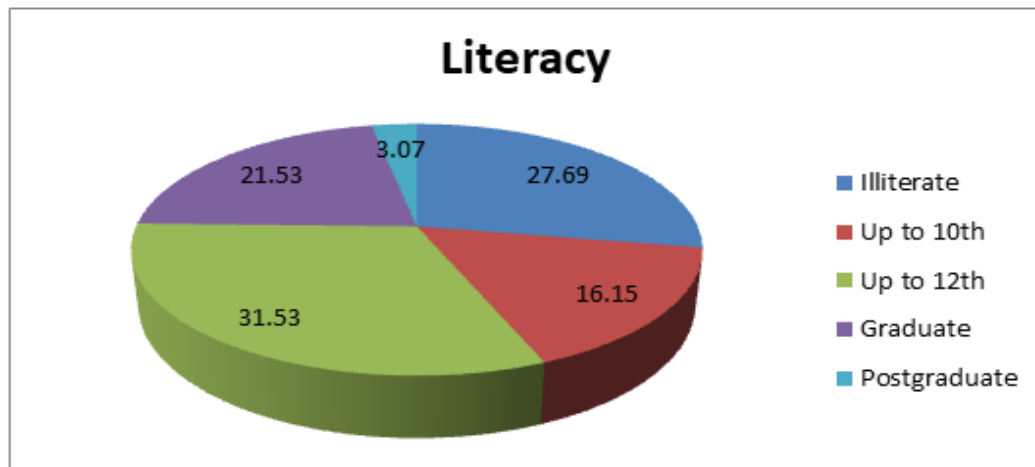


Graph 2: Age wise distribution of patients

Table 3: Education wise distribution of patients

Literacy	Frequency	Percentage
Illiterate	36	27.69
Up to 10th	21	16.15
Up to 12th	41	31.53
Graduate	28	21.53
Postgraduate	4	3.07
Total	130	100

The above table discusses education wise distribution of patients in which 36 patients are illiterate. 21 patients education is up to 10th. 41 patients education is up to 12th. 28 patients are graduate and 4 patients are post graduate.

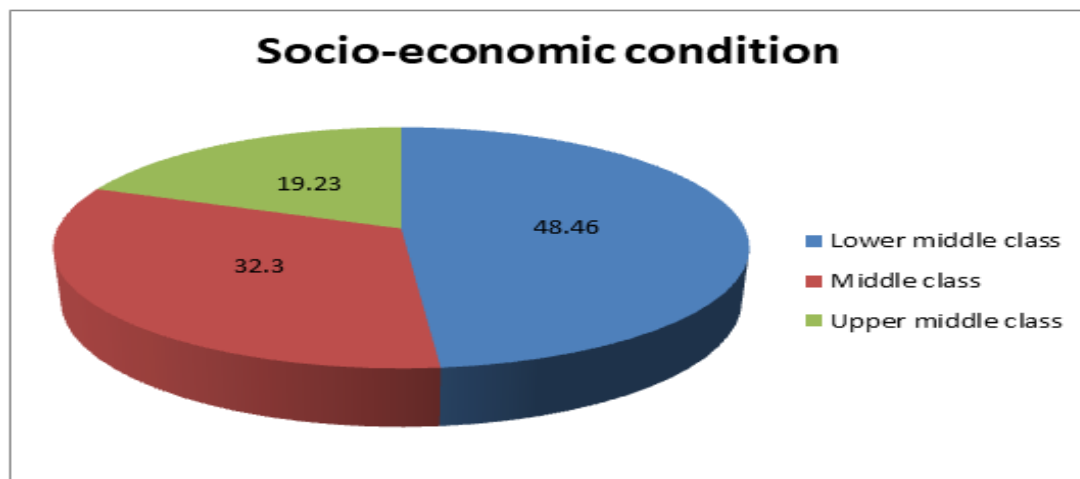


Graph 3: Education wise distribution of patients

Table 4: Socio economic condition

Socio-economic condition	Frequency	Percentage
Lower middle class	63	48.46
Middle class	42	32.3
Upper middle class	25	19.23
Total	130	100

The above table discusses socio economic condition of patients in which 63 patients belong to lower middle class, 42 patients belong to middle class. 25 patients belong to upper middle class.

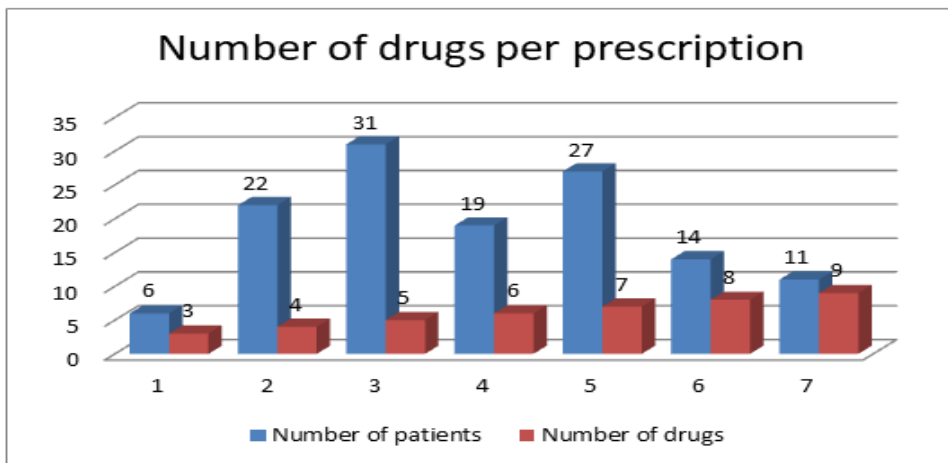


Graph 4: Socio economic condition

Table 5: Number of drugs per prescription

Number of patients	Number of drugs
6	3
21	4
27	5
16	6
23	7
14	8
11	9

The above table discusses number of drugs per prescription. Most no. of drugs 9 prescribed to 11 patients while less no. of drugs (3) prescribed to 6 patients.



Graph 5: Number of drugs per prescription

Table 6: Various groups of drugs prescribed

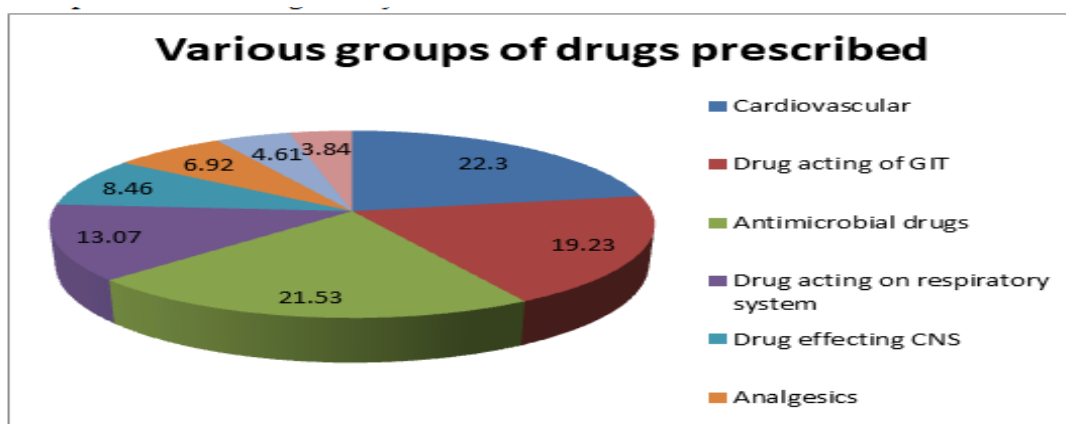
Various groups of drugs prescribed	Frequency	Percentage
Cardiovascular	29	22.3
Drug acting of GIT	25	19.23
Antimicrobial drugs	28	21.53
Drug acting on respiratory system	17	13.07
Drug effecting CNS	11	8.46
Analgesics	9	6.92
Drug effecting blood and blood formation	6	4.61
Miscellaneous	5	3.84
Total	130	100

The above table discusses various groups of drugs prescribed. In cardiovascular, frequency is 29 and percentage is 22.3%.

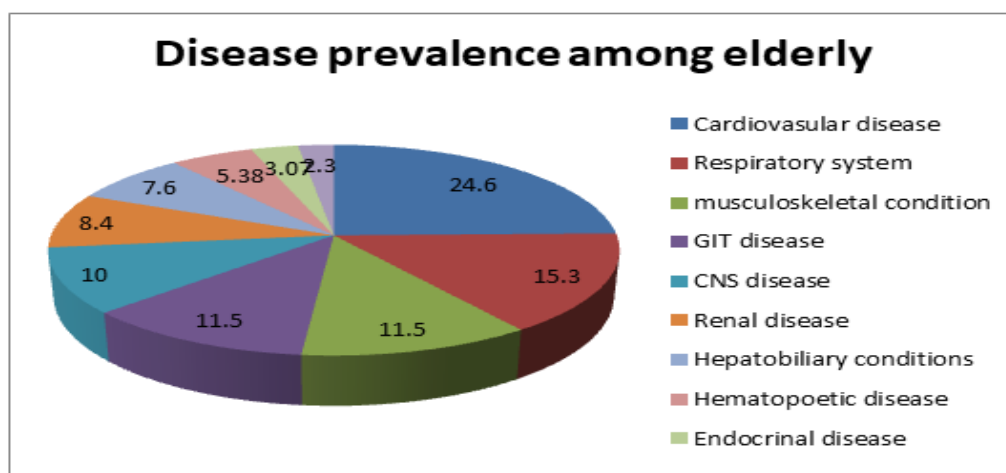
In Drug acting of GIT, frequency is 25 and percentage is 19.23%. In Antimicrobial drugs, frequency is 28 and percentage is 21.53%. In Drug acting on respiratory system, frequency is 17 and

percentage is 13.07%. In Drug effecting CNS, frequency is 11 and percentage is 8.46%.

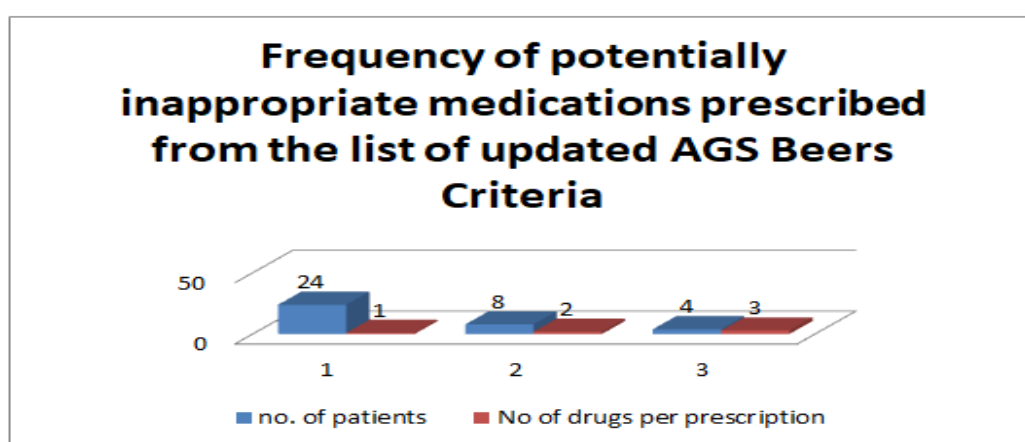
In Analgesics, frequency is 9 and percentage is 6.92%. In Drug effecting blood and blood formation, frequency is 6 and percentage is 4.61%. In Miscellaneous, frequency is 5 and percentage is 3.84%.



Graph 6: Various groups of drugs prescribed



Graph 7: Disease prevalence among elderly



Graph 8: Frequency of potentially inappropriate medications prescribed from the list of updated AGS Beers Criteria

Table 7: “Drug use pattern using WHO prescribing indicators” (12)

Prescribing indicators	Total drugs/ prescriptions	Average/ percent
“Average number of drugs per encounter”	834	5.5
“Percentage of encounter with antibiotics”	92	61.4
“Percentage of encounters with injection”	98	64.8
“Percentage of drugs prescribed by generic”	721	85.9
“Percentage of drugs from essential drug list”	804	96.3

A total number of 834 prescribed medication items were recorded. The mean number of drugs per prescription was 5.5, with a range of 3 to 9. There were a total of 721 drugs prescribed by their generic names, which accounted for 85.9% of the total. An antibiotic was prescribed in 92 instances of patient interactions, accounting for 61.4% of the total. Additionally, an injectable was prescribed in 98 encounters, making up 64.8% of the total. Out of a total of 804 prescription medications, a significant majority (96.3%) were included in India's National List of Essential Medicines (NLEM).

Discussion

The current study involved analyzing data from 130 patients, with 63.84% being male and 36.14%

female. This distribution aligns with the findings of a prior study conducted by Faiyza et al. in 2023 [13]. A significant portion of patients falls within the age range of 60-70 years, consistent with a previous study on geriatric patients in India by Kanagasanthosh et al. in 2015 [14]. However, a comparable study conducted by Swapna et al. in 2015 [15] in South India revealed a higher proportion of females. Approximately 27.69% of patients lacked literacy skills, while only 3.07% possessed a post-graduate degree. In terms of socio-economic status, 48.46% of the population belonged to the lower middle class, whereas only 19.23% belonged to the upper middle class. A study by Shah et al. in 2012 [16] found that the majority of patients fell into the middle (43.55%) and lower (43%) socioeconomic levels. Analysis of

prescriptions using WHO drug use indicators revealed that the average number of medications per prescription was 5.5. This figure is lower than the average of 7.3 found in a previous study conducted by Shah et al. in 2012 (16) in India on the senior population. The maximum number of medications a patient received was 9, whereas a similar study conducted in India reported up to 27 drugs being prescribed.

Conclusion

The intricate and multidimensional nature of drug utilization patterns among elderly individuals is a crucial aspect of healthcare. Various factors significantly influence the prescription, administration, and management of drugs within this specific group. The high prevalence of polypharmacy is a result of the simultaneous presence of numerous chronic illnesses, introducing an increased susceptibility to adverse effects and drug interactions. Physiological changes accompanying aging, including alterations in drug metabolism and organ function, further contribute to the complexity of medication management.

Personalized care becomes paramount when addressing the unique health conditions and requirements of each elderly patient. Healthcare professionals must conduct thorough evaluations of the potential risks and benefits of drugs, aiming for a balance that maximizes therapeutic outcomes while minimizing negative consequences. Addressing challenges such as medication non-compliance, underutilization of essential treatments, and communication difficulties is crucial for enhancing the overall quality of healthcare for elderly patients.

Our investigation identified instances of irrational prescribing practices and polypharmacy. Prescribers should receive comprehensive education on the appropriate and judicious utilization of medications, including adherence to the Beers Criteria specifically designed for the geriatric population. This proactive approach is essential for improving healthcare outcomes and ensuring the well-being of elderly patients.

Strengths of the Study:

The study conducted interviews, and thorough case data collection, ensuring a comprehensive dataset for analysis, with 130 participants aged 60 years and older, the study also provides a reasonable sample size, enhancing the generalizability of the findings to the elderly population.

The incorporation of WHO drug use indicators & Beer's criteria which, allowing for benchmarking against global standards in drug prescribing. Our study emphasizes the importance of prescribers being educated on geriatric-specific criteria, such as the Beers Criteria, highlighting a proactive

approach to improving healthcare outcomes for elderly patients.

Limitations of the Study

Conducted at a single tertiary care teaching hospital in Eastern India, the study's findings may not be entirely representative of the diverse healthcare settings in the region or across different geographic areas. The study spanned six months, which might limit the ability to capture seasonal variations in drug utilization patterns or changes over a more extended period. The reliance on patient interviews for data collection may introduce recall bias. The cross-sectional design limits the ability to establish causal relationships or track changes in drug utilization patterns over an extended period. Our study primarily relies on quantitative data, and the absence of qualitative data or patient perspectives may limit a holistic understanding of the factors influencing drug utilization.

Despite these limitations, our study contributes valuable insights into drug utilization patterns among the elderly, shedding light on potential areas for improvement in healthcare practices for this demographic

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