

Prescribing Pattern, Polypharmacy and Potentially Inappropriate Prescribing in Hospitalized Geriatric Patients of a Private Hospital in Nepal

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ABSTRACT

Background: According to national census 2021, Nepal has 6.01% of elderly people above the age of 65. It has been observed that there is 38.2% increase in geriatric population as compared to the previous census of 2011. Prescribing medicines to elderly increase the risk of adverse drug events as well as the chances of giving potentially inappropriate medications. The study was conducted with a goal to describe drug prescribing patterns, poly pharmacy and to measure the prevalence of potentially inappropriate medications using Beer's criteria in hospitalized older patients of private hospitals in Biratnagar, Nepal. **Materials and Methods:** A retrospective cross-sectional study was done for all hospitalized elderly patients aged ≥ 65 years of Golden Hospital in Biratnagar. WHO core prescribing indicator and Beer's Criteria 2019 were used to assess the prescribing pattern and potentially inappropriate prescribing with polypharmacy respectively. Study was conducted for 6 months from March 2022 to August 2022. **Results:** Most of the patients were in the age group of 65-74 years (74.2%) followed by the age group of 75-84 years old (21.3%). Out of the 225 patients examined, 57% were male and 43% were female. Most prescribed number of medicines per prescription was 7 and the most prescribed group of medicines were antimicrobials (26.82%) followed by cardiovascular drugs (20.63%). The number of drug prescribed in generic name was 2.97% and 55.55% of medicines were prescribed from the national essential drug list. 18.05% of the drugs prescribed were potentially inappropriate medications according to Beers Criteria. **Conclusion:** The study revealed the presence of potentially inappropriate medications and poly pharmacy in elderly patients. The case of prescriptions by generic names was found to be low. Safe prescribing practice with minimum use of drugs in elderly should be encouraged to reduce the high-risk adverse drug events.

Keywords: Beer's Criteria, Core prescribing indicator, Elderly patients, Polypharmacy, Potentially inappropriate medications, Prescribing pattern.

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INTRODUCTION

Geriatrics is at high risk of drug-related adverse effects due to age-related alteration in drugs pharmacokinetic and pharmacodynamic parameters. The use of multiple medications for prophylaxis and treatment of their age-related medical conditions adds more to their negative co morbidities.¹

According to the national census of Nepal 2021, the population of elderly patients is increased by 38.2% as compared to the census of 2011.² Due to the advances in health care system, sanitation, nutrition, health education and economic well-being, the life expectancy is increased in the past decade. Due to high prevalence of chronic illness, concomitant disease, disability and

dependency, elderly people are more likely to be prescribed with poly pharmacy, exposing them to high risk of adverse drug events, medication error, reduced patient compliance and increased cost of therapy.³ Prescribing pattern to patient needs to be evaluated periodically for providing feedback to the prescribers to create awareness towards rational and safe use of drugs. World Health Organization (WHO) has formulated a set of "core prescribing indicators" for enforcing the rational drug use.⁴ Beer's Criteria describes medications or medication classes, which are potentially inappropriate and need to be avoided or be used with caution for elderly patients.⁵

Potentially Inappropriate Medications (PIM) are defined as a therapy in which risk associated with prescribing the medicine outweighs its therapeutic benefits.⁶ It leads to high cost of treatment, emergence of antimicrobial resistance, ineffectiveness and adverse consequences to patient.^{6,7} Prescribing medications to geriatric patients is a crucial part for promoting well being; as the patients may suffer from age related variation in pharmacokinetic



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and pharmacodynamic parameters. Prescriptions can be analyzed using WHO core prescribing indicators that aims to evaluate the quality of healthcare services provided.⁴ American Geriatric Society uses Beer's Criteria to identify PIMs to be avoided in older adults, drug-disease or drug-syndrome interactions that exacerbate the disease or syndrome, drugs to be used with caution, potentially clinically important drug-drug interactions that should be avoided and medications that should be avoided or have their dosage reduced with varying levels of kidney function in older adults.⁸

MATERIALS AND METHODS

Study was conducted only after the approval from review committee of Kantipur Academy of Health Sciences. The protocol was also approved from the research committee of Golden Hospital.

The study design was single centered retrospective cross-sectional study. The time frame of study was from March 2022-August 2022 in Golden Hospital, Biratnagar, Nepal. A total of 225 patients older than 65 years of both genders who were admitted in hospital during study period were included for study. Patients unwilling to participate, out patients or who are not mentally stable were excluded from the study. Data obtained were entered, recorded and analyzed by Microsoft Office Excel (2007) as well as SPSS version 26.

RESULTS

A total of 225 patients were analyzed during the study period. The gender and distribution is described in the Figures 1 and 2 given below.

Out of 225 patients, majority turned out to be male with a total of 128 (57%). Most of the patients were in the age group of 65-74 years (74%), followed by the age group of 75-84 years (21%).

Classification of drugs according to therapeutic category

Commonly prescribed medications according to therapeutic classification is depicted in Figure 3 below. Out of 1955 medications prescribed for 225 patients, antimicrobials was the most common group of drug prescribed (26.82%, N 429) followed by Cardiovascular drugs (20.63%, N 330).

WHO core prescribing indicators

Core prescribing indicators according to WHO has been described in Table 1. The average number of drugs per prescription was 7.32. Only 2.97% of drugs were prescribed by generic name and 22.64% of the prescriptions have more than one antibiotic prescribed. 57.43 of the prescriptions had injection prescribed. About 55.55% of the drugs were prescribed from national essential drug list.

Potentially Inappropriate Medication (PIM)

Table 2 describes the potentially inappropriate medications encountered during the therapy. Out of 1955 drugs prescribed, 353 (18.05%) were potentially inappropriate medications. A total of 15 medicines were used that had to be avoided in elderly patients. Among PIMs, Proton Pump Inhibitors (PPIs) were most

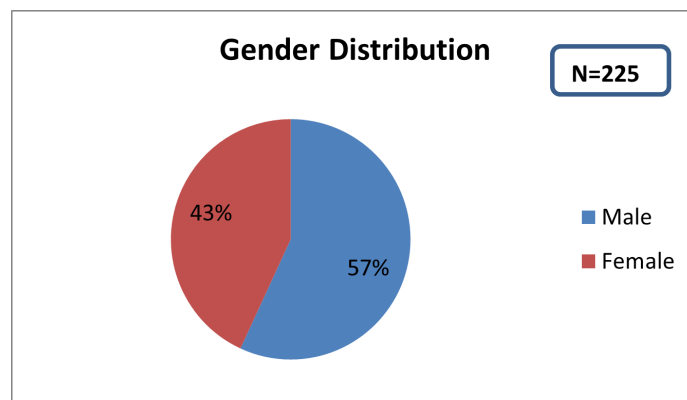


Figure 1: Gender distribution.

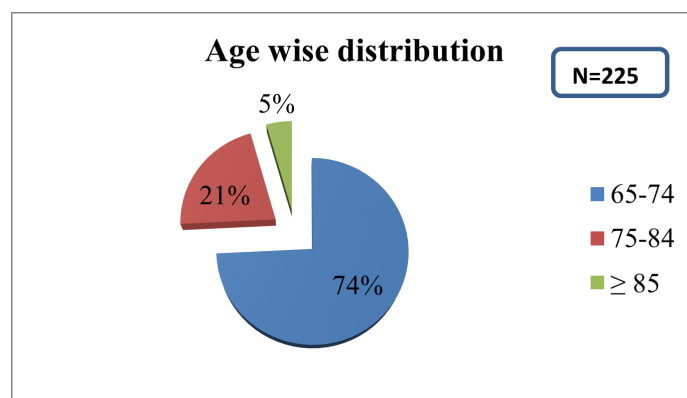


Figure 2: Age-wise Distribution.

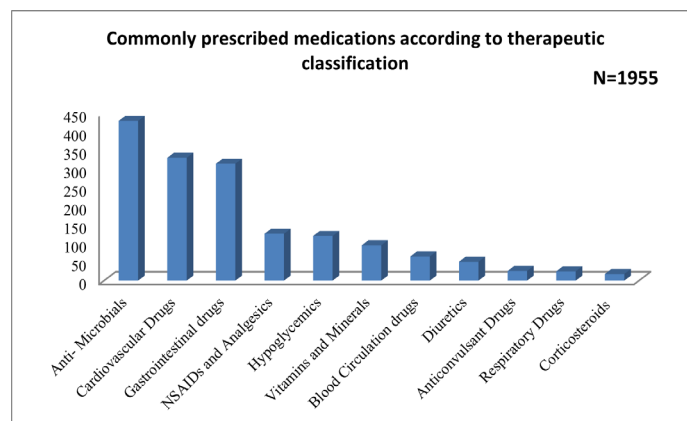


Figure 3: Classification of drugs on the basis of therapeutic category.

Table 1: WHO core prescribing indicators.

WHO core Prescribing Indicator	Findings	Optimal value ⁹
Average number of drugs per prescription.	7.32	1.6-1.8
Percentage of drugs prescribed by generic name.	2.97%	100
Percentage of prescriptions with antimicrobials.	22.64%	20-26.8
Percentage of prescriptions with injections.	57.43%	13.4-24.1
Percentage of drugs prescribed from national list of essential drugs.	55.55%	100

Table 2: Potentially Inappropriate medications.

Therapeutic Category of drugs	Name	% of PIMs
Antimicrobials	Nitofurantoïn	15 (4.24%)
Cardiovascular	Prazosin	32 (9.06%)
	Digoxin	
	Amiodarone	
Sedatives and hypnotics	Amitriptylline	23 (6.51%)
	Alprazolam	
	Clonazepam	
Hypoglycemics	Insulin	37 (10.48%)
	Glimepiride	
Proton Pump Inhibitors		138 (39.09%)
Antiemetics	Metoclopramide	13 (3.68%)
NSAIDs	Aspirin > 325mg/day	90 (25.49%)
	Ketorolac	
	Diclofenac	
Genitourinary	Desmopressin	5 (1.41%)

frequently used (39.09%) followed by NSAIDs (25.49%). All of these drugs belongs to Beers criteria Category A.

DISCUSSION

Our study focused on the prescribing pattern, polypharmacy and PIMs prescribed among elderly patients admitted in a private hospital in Biratnagar. Identification of inappropriate medications prescribing is very useful because it will help to prevent over prescribing. The preponderance of male patients (57%) in this study was similar to results from the previous studies in Nepal.^{10,11}

The descending order of age groups, based on enrolled patient frequency, followed the pattern 65-74 years >75-84 years >85 or above years. The life expectancy of Nepal is around 71 years¹² and

hence the majority of the elderly population were of the age group 65-74 years (74%).

Polypharmacy, defined as the use of 5 or more medications occurs in 20-40% of older people.¹⁰ The average number of drugs prescribed was relatively higher (7.36) than that found in similar study done by Basnet S. *et al.*⁸ It was also found that the average number of drugs was increasing with the increase in age of the patient. Our study observed that only 2.9% of drugs were prescribed in generic name. Similar study was done in Allahabad, India which revealed only 2% of the prescription was written in generic name of medicines. There is great variation in extent of using generic name during prescribing as shown by different studies in Nepal.^{10,13}

It was found that the percentage of drugs that were prescribed from essential drug list of WHO and Nepal were 48.75% and 55.55% respectively. Whereas study done by S. Basnet et al were 46.15% and 52.55% and Sapkota. S. *et al.* were 55% and 75% respectively.^{8,10}

High number of prescriptions with injections may be due to the fact that all patients evaluated were admitted in the hospital. A total of 353 (18.05%) Potentially Inappropriate Medications (PIM) were reported where similar research done in Nepal was 19.43%. The use of PIMs is associated with a higher risk of adverse drug reactions and drug interactions in elderly. Therefore, the utilization of Beers criteria is important for the identification of PIM. Timely evaluation of PIMs and appropriate intervention is critical to avoid unwarranted therapeutic failure, avoid loss of time and money for nonoptimal healthcare and improve the quality of life of the elderly. In our study, PPIs and NSAIDs were among the most commonly PIMs prescribed. PPIs have the risk of *Clostridium difficile* infection, bone loss and fracture due to Vit B12 deficiency while NSAIDs increases the risk of GI ulcer.^{14,15}

CONCLUSION

Our research indicates high prevalence of use of polypharmacy and PIMs among elderly individuals. Appropriate tools for the detection of PIM use in elderly patients will be useful in identifying inappropriate prescriptions. The trend of prescribing medicines in generic name was found to be very low, thus emphasizing the importance of writing medicines through generic name. It is necessary to employ an interdisciplinary approach to monitor the utilization of medication in elderly population. Safe prescribing practice with minimum use of drugs in elderly should be encouraged to reduce the high-risk adverse drug events.

RECOMMENDATIONS

This study was done in single centered and retrospective data of six months period, thus might not be able to reflect accurately the entire prescribing pattern of the Nepal. Therefore, multi-centered

hospital-based studies with larger sample size are necessary to substantiate findings of present study.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL APPROVAL

This study was approved by Kantipur Academy of Health Sciences-Institutional Review Committee.

ABBREVIATIONS

NSAIDs: Non Steroidal Anti Inflammatory Drugs; **PIMs:** Potentially inappropriate medications; **PPIs:** Proton Pump Inhibitors; **WHO:** World Health Organization.

SUMMARY

Our research concluded that there is high prevalence of polypharmacy and Potentially inappropriate medication among elderly individuals.

REFERENCES

1. Khader H, Hasoun L.Z., Alsayed A, Abu-Samak M. Potentially inappropriate medications use and its associated factors among geriatric patients: a cross-sectional study based on 2019 Beers Criteria. *Pharmacia* 2021;68(4):789-95.
2. Central Bureau of Statistics. National Population and Housing Census 2011. Kathmandu, Nepal, 2012;1.
3. Steinman M.A., Landefeld C.S., Rosenthal G.E., Berthenthal D, Sen S, Kaboli P.J. Polypharmacy and prescribing quality in older people. *Journal of the American Geriatrics Society*. 2006;54(10):1516-23. doi: 10.1111/j.1532-5415.2006.00889.x. PMID: 17038068.
4. World Health Organization. Action Programme on Essential Drugs and Vaccines. (1993) . How to investigate drug use in health facilities: selected drug use indicators. World Health Organization. <https://iris.who.int/handle/10665/60519>
5. Abdulah R, Insani W.N., Putri N.E., Purba H.P., Destiani D.P., Barliana M.I. Pattern of medication use in geriatric patients at primary health care facilities in Karawang, Indonesia. *Drug Health care and Patient Safety*. 2019;11:1-5. doi: 10.2147/DHPS.S187829. PMID: 30799958; PMCID: PMC6371933.
6. Choonara I. Rational prescribing is important in all settings. *Arch Dis Child*. 2013;98(9):720. doi: 10.1136/archdischild-2013-304559. Epub 2013 Jul 13. PMID: 23852999; PMCID: PMC3756449.
7. Idrisnur S, Abdu N, Yohannes F, Twelde T, Russom N, Tesfamariam E.H. Potentially Inappropriate Use of Medication and Its Determinants Among Ambulatory Older Adults in Six Community Chain Pharmacies in Asmara, Eritrea: A Cross-Sectional Study Using the 2023 American Geriatric Society Beers Criteria®. *Clin Interv Aging*. 2024;19:1177-87 <https://doi.org/10.2147/CIA.S466649>
8. Basnet S, Poudel K.R., Sah A.K., Jha R.K., Sah P, Adhikari S. Prescribing pattern, polypharmacy and potentially inappropriate prescribing in hospitalized elderly patients: a retrospective study in a teaching hospital in Nepal. *International Journal of Scientific Reports*. 2016;2(1):7-12
9. Atif M, Azeem M, Sarwar M.R., Shahid S, Javaid S, Ikram H, et al. WHO/INRUD prescribing indicators and prescribing trends of antibiotics in the Accident and Emergency Department of Bahawal Victoria Hospital, Pakistan. *Springerplus*. 2016;5(1):1928. doi: 10.1186/s40064-016-3615-1. PMID: 27933228; PMCID: PMC5099312
10. Sapkota S, Pudasaini N, Cingh C. Drug prescribing pattern and prescription error in elderly: A retrospective study of inpatient record. *Asian Journal of Pharmaceutical and Clinical research*. 2011;4(3):129-32
11. Thapa A., Subedi S., Drug Utilization Pattern and Potentially Inappropriate Medications among Elderly Inpatients in a Tertiary care hospital in Western Nepal. *Journal of Health and allied Sciences* Vol. 12, No. 1, 2022
12. Yadav U.N., Yadav O.P., Singh D.R., Ghimire S, Rayamajhee B, Mistry S.K., et al. Perceived fear of COVID-19 and its associated factors among Nepalese older adults in eastern Nepal: A cross-sectional study. *Plos one*. 2021;16(7):e0254825.
13. Ansari, K. U.; Singh, S.; Pandey, R. C. Evaluation of prescribing pattern of doctors for rational drug therapy. *Indian Journal of Pharmacology*, 1998;30(1): 43-6.
14. Miller M.G., Kneuss T.G., Patel J.N., Parala-Metz A.G., Haggstrom D.E. Identifying potentially inappropriate medication (PIM) use in geriatric oncology. *Journal of Geriatric Oncology*. 2021;12(1):34-40.
15. O'Mahony D, O'Sullivan D, Byrne S, O'Connor M.N., Ryan C, Gallagher P. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. Age and ageing. 2014;44(2):213-8.

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