

**STUDY OF PRESCRIBING PATTERN IN ELDERLY PATIENTS VISITING
MEDICINE OUTPATIENT DEPARTMENT AT A TERTIARY CARE HOSPITAL****POORWA WANDALKAR^{*1}, P.T. PANDIT² AND B.B. GHONGANE³***¹Post Graduate Student ²Professor ³Professor and Head Department of Pharmacology,
B.J Government Medical College, Pune, India***ABSTRACT**

Elderly have pathophysiological changes, higher incidence of chronic diseases, are at risk of polypharmacy and medication errors. Drug utilisation studies enable us to detect such problems and prioritize efforts to correct them. The current study was carried out with the objectives of delineating prescription pattern in elderly outpatients, determining the prescribing frequency of Potentially Inappropriate Medications (PIMs) according to Beers criteria and evaluating prescriptions according to WHO indicators. Prescriptions of elderly patients visiting Medicine OPD were collected over a year. Hypertension was the commonest diagnosis, Ranitidine the most frequently prescribed medication. PIMs were minimal (1.26%). On average, 3.7 drugs were prescribed per patient. 95.79% were prescribed by generic name, 94.53% from Essential drug list. Percentage of encounters with antibiotic prescribed was 13.9%. Prescription pattern was rational with respect to WHO indicators. Lacunae like overuse of multivitamins, prescription of PIMs came forth. More studies in other specialties are necessary to sensitize practitioners towards rational prescribing.

KEYWORDS: Drug Utilization Studies, Beers criteria, WHO indicators**POORWA WANDALKAR**Post Graduate Student Department of Pharmacology, B.J
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INTRODUCTION

In India, the elderly account for 7% of the total population.¹ The higher incidence of chronic diseases and degenerative pathologies increases demand for prescription medicines to treat these conditions, and to provide quality of life, which renders elderly susceptible to the risk of polypharmacy and drug related illnesses. Aging related pathophysiologic changes, and the resulting altered pharmacokinetics and pharmacodynamics, makes them more susceptible to adverse effects of drugs.² In spite of the fact that elderly are reported to be responsible for half the total drug usage worldwide, less than 5% of randomized controlled trials have been designed for them.³ The prevalence of inappropriate prescribing for elderly patients has been reported as between 14% and 23% of all prescriptions.⁴ However, direct comparison is hampered because studies apply different criteria for inappropriateness.⁵ A study among elderly patients receiving home care in European countries found that 20% used at least one inappropriate medication.⁶ Although not without limitations, Beers criteria is widely used for improving awareness about medications in elderly. It encompasses fifty three medication classes which are divided into three categories: potentially inappropriate medications (PIMs) to avoid in older adults, PIMs to avoid in older adults with certain diseases and syndromes that the drugs listed can exacerbate, and finally, medications to be used with caution in older adults.⁷ To improve overall drug use, especially in developing countries, international agencies like WHO and International Network for Rational Use of Drugs (INRUD) have evolved standard drug use indicators. These indicators help us to know the shortcomings in prescription writing.⁸ Drug utilisation studies in elderly, especially in our country, are few. Hence, the current study was undertaken to gain an overview of the prescribing pattern in elderly patients visiting Medicine Out Patient Department (OPD) at a tertiary hospital, to determine whether potentially inappropriate medications are

prescribed to elderly patients (according to Beers Criteria) and to evaluate the prescriptions according to WHO drug use indicators.

MATERIALS AND METHODS

This cross sectional study was conducted at our government run tertiary care hospital after getting approval from the Institutional Review Board and Ethics Committee, and permission from the Head of Department of Medicine of the institute. Written informed consent was obtained from each participant. The prescription details on case papers of 1000 patients at the Medicine outpatient department OPD were noted down on Case Record Forms (CRFs) specially designed for the study, and entered into Microsoft Office Excel sheet.

Inclusion Criteria

- Outpatients with age 60 years and above
- Patients from general medicine and geriatric OPDs
- Patients of either sex
- Those attending OPD in one calendar year from 01.01.2013 to 31.12.2013

Exclusion Criteria

- Patients from other speciality OPDs of medicine
- Patients with tuberculosis, leprosy or HIV/AIDS as monomorbidity

The CRFs were analysed for the most commonly prescribed drugs in elderly along with indications, the frequency of PIMs was studied based on Beers criteria⁷ and the prescriptions were further assessed using WHO drug use indicators⁸. Analysis was done using Microsoft Excel 2013 and Graph Pad Prism version 6.0.

RESULTS

Demography

Of 1000 patients, the gender and age distribution were as follows

Table I
Gender distribution among elderly patients visiting Medicine OPD

GENDER	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS (%)
Male	532	53.2
Female	468	46.8
Total	1000	100

Table II
Age Distribution among elderly patients visiting Medicine OPD

AGE GROUP	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS (%)
60-69 years	696	69.6
70-79 years	253	25.3
80 years & above	51	5.1
Total	1000	100

Disease Pattern

Many patients had more than one co existing morbidities, the most frequently occurring of which was the presence of Diabetes Mellitus and Hypertension together, in 127 patients.

Table III
Common diagnosis/chief complaints in descending order of their frequency

DIAGNOSIS/CHIEF COMPLAINT	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS (%)
Hypertension	243	24.3
URTI	160	16.0
Diabetes Mellitus	144	14.4
Anorexia	115	11.5
Generalised weakness	104	10.4
Fever	53	5.3
Bodyache	37	3.7
Paraesthesia	34	3.4
Acidity	31	3.1
Diarrhoea	28	2.8

Drug Utilization Pattern

A total of 3715 drugs were prescribed. The majority of drugs were prescribed by oral route in the form of tablets, capsules, syrups or emulsions.

Figure I
Routes of administration of drugs prescribed

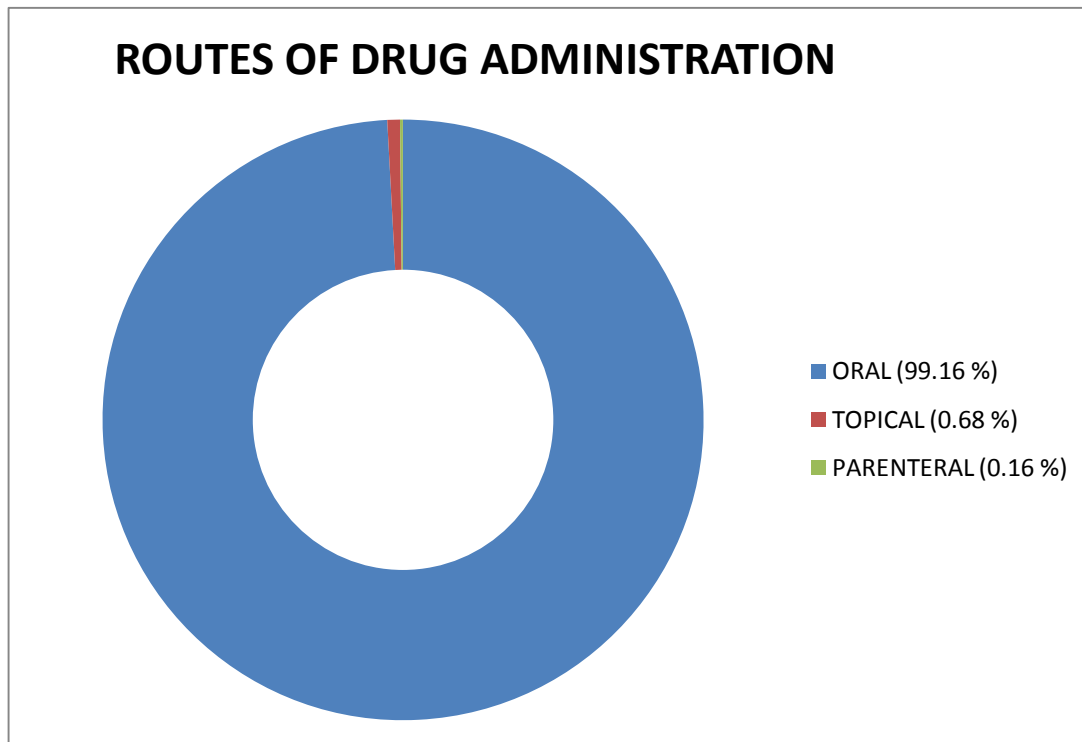
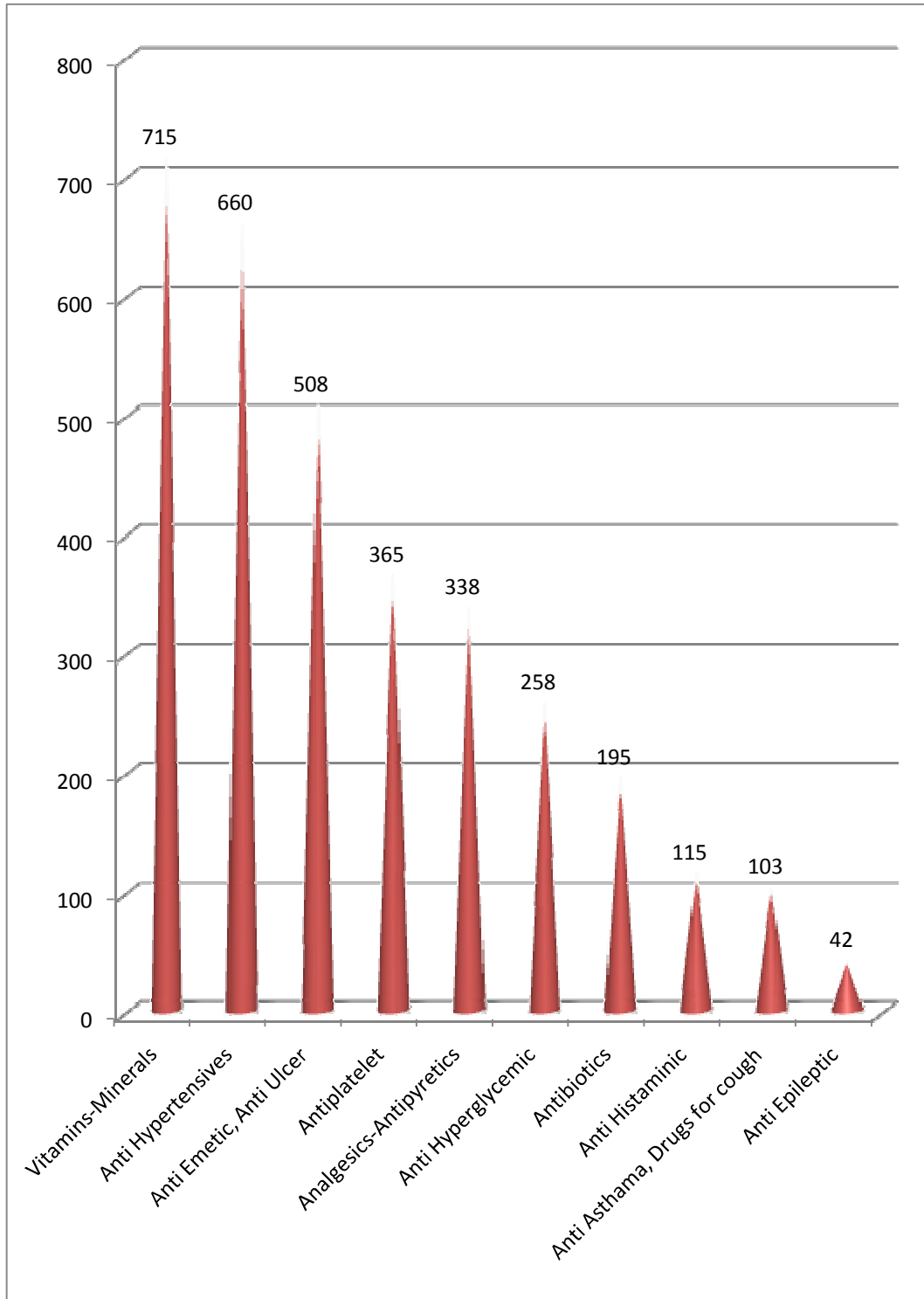


Table IV
Most commonly prescribed drugs

NAME OF DRUG (TABLET)	NUMBER OF PRESCRIPTIONS WITH THE DRUG PRESCRIBED	PERECNTAGE OF TOTAL PRESCRIPTIONS (%)
Ranitidine	436	43.6
B complex	300	30.0
Acetyl Salicylic Acid	292	29.2
Enalapril	266	26.6
Amlodipine	255	25.5
Diclofenac Sodium	221	22.1
Calcium Lactate	161	16.1
Metformin	160	16.0
Folic acid	134	13.4
Atenolol	118	11.8

Figure II
Commonest drug classes prescribed



Potentially Inappropriate Medications

47 drugs or 1.26 % of the total drugs prescribed to the elderly were inappropriate, according to Beers criteria 2012. 0.1 % of the prescriptions had at least one such drug.

Table V
Prescribing frequency of PIMs

NAME OF DRUG (Tablet)	NUMBER OF PATIENTS WITH THE DRUG PRESCRIBED
Prazosin	17
Metoclopramide	14
Hydroxyzine	7
Phenobarbitone	5
Chlorpheniramine	3
Alprazolam	1

WHO prescribing indicators

Average the no of drugs per encounter - $C = B/A$ where

B is total number of different drug products prescribed

A is the number of encounters surveyed

$$C = 3715/1000 = 3.7$$

Percentage of drugs prescribed by generic name - $E = D/B \times 100$ where

D is the number of drugs prescribed by generic name

B is the total number of drugs prescribed

$$E = 3557/3715 \times 100 = 95.79\%$$

Percentage of encounters with antibiotics - $G = F/A \times 100$ where

F is the number of patient encounters with one or more antibiotic prescribed

A is the total number of encounters surveyed

$$G = 139/1000 \times 100 = 13.9\%$$

Percentage of encounters with injection prescribed - $I = H/A \times 100$ where

H is the total number of patients who received 1 or more injections

A is total number of encounters

$$I = 6/1000 \times 100 = 0.6\%$$

Percentage of drugs prescribed from essential drug list $K = J/B \times 100$ where

J is the number of products prescribed from National List of Essential Medicines⁹

B is the total number of drugs prescribed

$$K = 3510/3715 \times 100 = 94.53\%$$

DISCUSSION

1000 prescriptions were analyzed with the aim of delineating prescription pattern in elderly outpatients, determining whether PIMs were prescribed to them, and evaluating prescriptions according to WHO drug use indicators. Hypertension was the most common presentation/ diagnosis among the elderly at the OPD. This is not surprising as a report on the global burden of hypertension indicates that nearly 1 billion adults (more than a quarter of the world's population) had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025.¹⁰ In a similar study by Radhakrishnan S. et al in Tamil Nadu, the prevalence of Hypertension in Elderly was 59%.¹¹ 14.4% of the elderly patients at our setup were suffering from Diabetes Mellitus. India is presently home to

62 million diabetics. By 2030, the numbers are expected to cross the 100 million mark.¹² A study done by Moharna PR et al., among the geriatric population in Chandigarh, showed an even higher prevalence of diabetes (36%).¹³ For any given level of systolic blood pressure, the occurrence of diabetes distinctly increases cardiovascular mortality. Early identification of chronic geriatric morbidities like diabetes and hypertension should be ensured through periodic screening and regular health checkups.¹⁴ 99.16% of the drugs were prescribed by oral route of administration. This correlates with the finding that the major presenting illnesses at the OPD were Hypertension and Diabetes Mellitus, which require daily medications over long term, most commonly by oral route. The drug most frequently prescribed at the OPD was Tablet Ranitidine. The indications included both for treatment of Peptic Ulcer Disease, as well as

co prescription with NSAID. Tablet B complex followed at a close second. Folic acid too was prescribed to 11.4% of patients. The use of multivitamins and other dietary health supplements has increased considerably over the last decade in the general population. This phenomenon is even more worrisome in elderly patients due to their multiple comorbidities and the potential interaction with medications.¹⁵ Acetyl salicylic acid (ASA) was the next most common. ASA more importantly was prescribed for its antiplatelet and cardioprotective properties, in addition to its analgesic and anti inflammatory action. This finding is similar to a study by Koh N Y and Koo W. H .which also indicated that this drug was the most commonly prescribed medication.¹⁶ Enalapril Maleate, Amlodipine, Atenolol were prescribed to 25.5%, 26.6% and 11.8% patients respectively. This correlates with the finding that Hypertension was the most common presenting illness at the OPD. In a similar study by Rozenfeld S. in elderly, anti hypertensives, antirheumatics, and analgesics were the most frequently consumed therapeutic classes.¹⁷ Out of 3715 drugs prescribed in total, 47 were PIMs in elderly, according to Beers criteria. Alprazolam was prescribed to a patient for insomnia. Elderly have increased sensitivity to Benzodiazepines and decreased metabolism of long acting drugs. All benzodiazepines increase risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in elderly.¹⁸ Cotreneo A. et al suggest that in routine practice, the prescriber should preferably choose short acting compounds like Zolpidem.¹⁹ 3 patients were prescribed Chlorpheniramine Maleate, while 7 Hydroxyzine. The American Geriatric Society (AGS) has recommended avoiding use of First Generation Anti Histaminics, as they are highly Anti cholinergic, clearance is reduced with advanced age, and there is increased risk of confusion, dry mouth and other side effects.²⁰ 14 patients received Metoclopramide, which according to AGS should be avoided unless for gastroparesis, as it can cause extra pyramidal side effects including tardive dyskinesia and the risk is further increased in frail elderly adults.²¹ Elderly have increased risk of physical dependence and overdose at lower doses of drugs than younger adults.²² 7 patients

were prescribed Phenobarbitone in our study, while Messina S. et al in their study commented that Phenobarbitone pharmacokinetics is altered in old age. Elderly patients require smaller dosages to achieve serum concentrations comparable with those found in nonelderly adults, and careful monitoring of clinical response and serum levels may be especially warranted in this age group.²³ Prazosin was advised to 17 patients as routine treatment for Hypertension, whereas AGS recommends avoiding the same due to increased risk of orthostatic hypotension and alternative agents have superior benefit to risk profile. It may, however, be beneficial to those hypertensive elderly males who have evidence of Benign Prostatic Hypertrophy.²⁴ Similar studies from Netherlands report that 20% of ambulatory older adults received at least one potentially inappropriate drug prescription.²⁵ In a study by Dhikav, Sethi, Singhal in New Delhi, 60 out of 143 patients were taking drugs having potential to cause cognitive impairment.²⁶ The average number of drugs per encounter in our study was 3.7, which was the same as in a drug utilization study carried out at the Medicine Department of a tertiary hospital in Rajahmundry, South India.²⁷ Polypharmacy generally leads to potential Drug-Drug Interactions(DDI), that represent potential health hazards specially for the elderly. Therefore, the trends of increasing polypharmacy and DDIs deserve attention and the mechanisms behind should be investigated further.²⁸ 95.79% drugs were prescribed by generic name at our hospital, which is comparable to other studies done at government set ups in India²⁹ and Iran.³⁰ This could possibly be because the drugs available for dispensing at our tertiary care hospital are in the form of generics. The percentage is much favourable than in a study done by Kaur S. et al,³¹ where in more than 50% drugs were prescribed by brand name. The percentage of encounters with an antibiotic prescribed was 13.9%. Most of the antibiotics were prescribed for URTI, and for diarrhoea. A previous study at a tertiary hospital in Western Maharashtra indicated that 46.17% of the encounters had an antibiotic in the prescription.³² Antibiotics have effectively prolonged the life expectancy and are currently the most commonly prescribed drugs in hospitals, worldwide. But,

excessive and inappropriate use of antibiotics renders increased drug resistance. The rational use of antibiotics is a major health need.³³ 0.6% of the prescriptions had a drug administered by parenteral route. This is lower than the previous study at a tertiary institute in Maharashtra.³² 95.43% of the prescribed drugs were from the National list of Essential Medicines, which is higher than in a tertiary institute at Nepal (49.6%)³⁴ and comparable to a study at Chennai (94.48%).³⁵ Adoption of the essential medicines list for procurement and supply of medicines, especially in the public sector healthcare system, has resulted in improved availability of medicines, cost saving and more rational use of drugs.³⁶ However, our study is not without limitations. Beers criteria serve only as a guideline and not a substitute for professional judgment. The study was restricted to only one specialty at a government run institute. This influences the findings and limits the extrapolation and generalisation to other non government institutes. The potential for drug interactions with polypharmacy, patient compliance, awareness and attitude of the patients and prescribers regarding rational drug use have not been taken into consideration. More studies in other specialties and general practice are necessary to sensitize the practitioners to this important public health issue.

CONCLUSION

This observational study carried out at our tertiary care teaching hospital included 1000 prescriptions, collected over a year's duration. The male – female distribution was 53.2% and 46.8% respectively. The maximum number of patients fell in the 60-69 years age category. Hypertension was the most common

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diagnosis, while Tablet Ranitidine was the commonly prescribed medication. The drugs prescribed inappropriately according to Beers criteria was minimal (1.26%). On an average, 3.7 drugs were prescribed per patient, and about 95% of the drugs were prescribed by generic name and from the Essential drug list. Percentage of encounters with an antibiotic prescribed was 13.9% and those with a parenteral form of drug administration were negligible. The results of the study are encouraging, pointing towards rationality in prescribing practices. They also brought forth certain lacunae like prescription of PIMs and overuse of multivitamins, which were communicated to the Departmental Head of Medicine. Rational prescribing should be made a part of medical education both at the undergraduate and post graduate level with emphasis on integrated problem based pharmaco-therapeutic teaching. The process of prescription auditing is a type of vigilance activity, beneficial to every hospital in terms of reducing the burden because of medication errors and increasing the rate of patient recovery, through scrutiny of the medication process before the drugs are dispensed. The hospital formularies should be formed based on local requirement, mainly of essential drugs and prescribers should be encouraged to prescribe from the same. This will help to curtail unnecessary expenditure on costly drugs. Elderly are more likely to be in poor health than the general population and use more medications, both factors associated with increased risk of inappropriate medication use. Efforts to reduce it are likely to have a substantial impact upon reducing drug related morbidity.

CONFLICT OF INTEREST

Conflict of interest declared none.

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