



## DRUG UTILIZATION PATTERN IN ELDERLY INPATIENTS OF MEDICINE DEPARTMENT AT A TERTIARY CARE TEACHING HOSPITAL: A PROSPECTIVE OBSERVATIONAL STUDY

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### ABSTRACT

**Objective:** The study aims to evaluate the prescribing pattern and cost of drug therapy in elderly inpatients at a tertiary care teaching hospital.

**Methods:** A prospective observational study involving 302 elderly patients (>60 years) of medicine wards was conducted from October 2015 to March 2016. Relevant information was recorded in a predesigned proforma and data was analysed in terms of WHO core prescribing indicators using descriptive statistics. Cost of drug therapy was calculated to assess the economic burden. **Results:** The diseases involving central nervous system (32.78%) were the most common

indications for admission. Vitamins and minerals (20.53%), anti ulcer agents (10.70%), anti emetics (9.78%) were commonly utilized drug groups. Average number of drugs per patient was  $10.07 \pm 3.38$ . Percentage of antibiotics and injectables prescribed were 63.57% and 92.71% respectively. Percentage of drugs prescribed by generic name was 59% and from National List Of Essential Medicines 2015 was 96.35%. Average cost of drug therapy was Rs.478.90 (95% CI: 431.41-526.40) of which 14.37% was shared by the patients. **Conclusion:** The study revealed that the prescribing practices were fairly in norm with WHO core prescribing indicators as it showed good adherence to National List Of Essential Medicines (NLEM) 2015 and high generic prescribing yet there is scope for improvisation. It also gives an insight in designing hospital formulary so as to further decrease the economic burden on patients.

**KEYWORDS:** Prescribing practices, polypharmacy, pharmacoconomics, geriatric.

## INTRODUCTION

Elderly people are considered as 'special population' by The International Conference on Harmonisation because of the presence of various comorbidities leading to use of multiple medications, altered pharmacokinetics and greater vulnerability to adverse drug reactions (ADRs).<sup>[1]</sup> Concurrent use of multiple medications not only expose elderly to various drug interactions but also to non compliance and increased cost of therapy.<sup>[2-4]</sup>

Drug utilization research was defined by WHO in 1977 as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences.<sup>[5]</sup> The main aim of the drug utilization study is to facilitate rational use of drugs. Without knowledge on how drugs are being prescribed and used, it is difficult to initiate discussion on rational drug use and to suggest measures to change prescribing habits.

Various drug utilization studies conducted on elderly patients across India revealed major deviations from WHO prescribing indicators. Drugs prescribed by generic names ranges from as low as 12% to less than 50% in many of the studies.<sup>[6],[7]</sup> Percentage of drugs prescribed from National list of essential medicines is also considerably low.<sup>[6],[8]</sup>

With the introduction of newer drugs in the market, evolving clinical guidelines and detection of new adverse drug reactions, the prescription pattern changes frequently. Thus drug utilization pattern needs to be evaluated periodically.<sup>[5],[9]</sup>

There is a limited data available on utilization of drugs in elderly patients as very few studies have been carried out. Hence, we undertook the present study with the broad aim of understanding the pattern of drug use in geriatric patients.

The objective of the study was to investigate the drug utilization pattern in elderly inpatients and to determine the economic burden of drugs during the inpatient stay.

## MATERIALS AND METHODS

This was a prospective study conducted in medicine wards at S.S.G. Hospital, Baroda for six months extending from October 2015 to March 2016. The study protocol was approved by Institutional Ethics Committee prior to the commencement of the study.

Total 302 elderly inpatients from the medicine department were included in the study. The sample size was decided on the basis of pilot study. Patients of either sex of age 60 or more years were included in the study. Patients who were unwilling to participate in the study or were admitted for observation only were excluded from the study.

All the patients who participated in the study were given clear explanations about the purpose and nature of the study in the language they understood. Written informed consent was taken from every patient who participated in the study.

The study was carried out by regular visits to medicine wards and case sheets from elderly inpatients were collected. The relevant data collected from case sheets were properly documented in a separate data collection form. The obtained data were then analyzed for WHO core prescribing indicators, category wise distribution of drugs, FDCs prescribed routes of drug administration, indications and organ system involved. Costs of drugs were calculated from Item-wise Rate Contract Information (Drug Branch), GMSCL, Gandhinagar and Indian Drug Review 2015.

Analysis was carried out using Microsoft Excel using descriptive statistics in terms of mean  $\pm$ SD, CI and percentage.

## RESULTS

A total of 302 cases were analyzed and out of which 194 (64.23%) were females and 108 (35.76%) were males. Majority of the patients were in age group of 60-69 years (n=182, 60.20%) followed by 70-79 years (n=92, 30.46%) and 80-89 years (n=26, 8.60%). Mean age of elderly patients was 68.54 years (95% CI 67.77-69.32) SD=6.87.

Average hospital stay was 4.82 days (95% CI=4.67-4.98).

Central nervous system (32.78%) was the most commonly involved system Fig.1.

The five most common conditions for admission were CV stroke (20.52%), IHD (13.24%), febrile illness of infective origin (6.62%), hypertension (4.96%) and altered sensorium (4.30%).

The total number of drugs prescribed was 3044 in all the cases out of which oral dosage forms were 62.41% while parenteral dosage forms constituted 36.13%. Only 1.44% were administered by inhalational route.

Analysis based on WHO core prescribing indicators is shown in table 1.

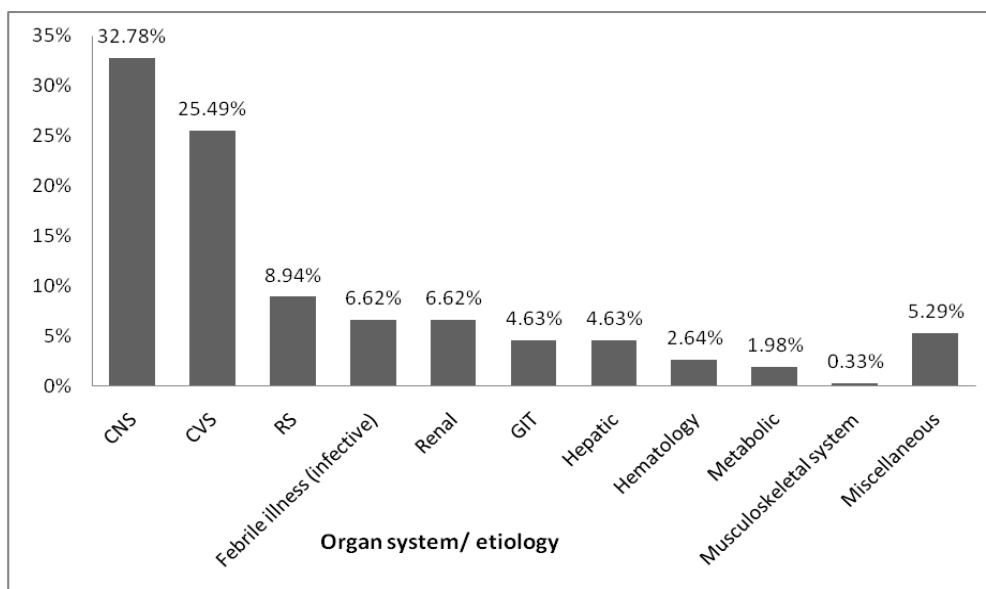
Average number of drugs per patient was 9.97 (95% CI: 9.61-10.33).

Most common drug group prescribed was nutritional supplements (21.30%) followed by antiemetic drugs (9.98%), antimicrobials (8.89%), and antihypertensives (8.25%) as depicted in Fig. 2.

Among nutritional supplements, majority of drugs prescribed was multivitamins (n=260) folic acid (n=165), followed by iron (n=72). In antiemetics, ondansetron constituted 179 of total prescriptions while domperidone 114 of total prescriptions. Cefotaxime (n=85), ceftriaxone (n=57), azithromycin (n=46) were the commonly prescribed antimicrobials. Among antihypertensives, Amlodipine (n=82), enalapril (n=80), metoprolol (n=43) were commonly prescribed.

41.05% of prescriptions contained a fixed dose combination. Most commonly prescribed FDC was multivitamins and iron folic acid tablets. Table 2.

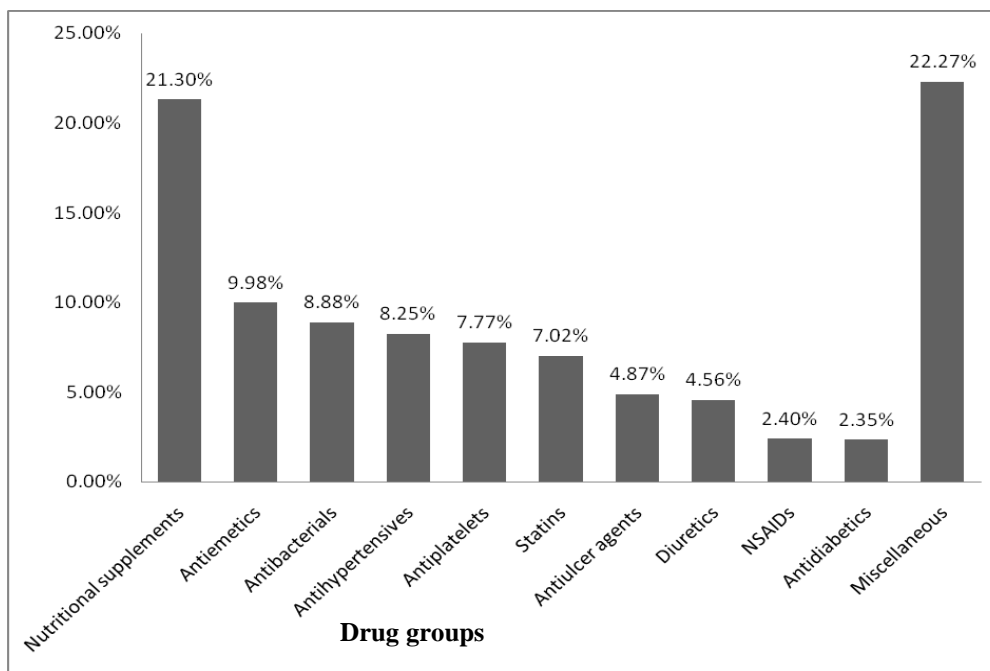
Average cost of treatment per patient was Rs. 478.90 (95% CI: 431.41-526.40). Table 3. Hospital and patient shared 88.62% and 11.38% of the total treatment cost, respectively.



**Fig. 1: Organ system/ etiology wise distribution.**

**Table 1: WHO Core Prescribing Indicators.**

S.No.	Indicator Assessed	Result
1	Average number of drugs per patient	10.07±3.18
2	Percentage of drugs prescribed by generic name	59%
3	Percentage of patients with an antibiotic prescribed	63.57%
4	Percentage of patients with an injection prescribed	92.71%
5	Percentage of drugs prescribed from NLEM	96.35%

**Fig. 2: Drug group wise distribution.****Table 2: Fixed dose drug combinations.**

S.No.	FDC	No. of patients in which prescribed
1	Multivitamin B complex	117
2	Amoxicillin + clavulanic acid	33
3	Vitamin A + Vitamin D	17
4	Iron + folic acid	12
5	Piperacillin + tazobactam	8
6	Cefoperazone + sulbactam	3
7	Bromhexine + guaifenesin + terbutaline	3
8	ORS powder	2
9	Trimethoprim + sulfamethoxazole	1

**Table 3: Cost analysis of drugs prescribed.**

	<b>Number</b>	<b>Cost of drugs (INR)</b>	<b>Average cost of drugs per patient (INR)</b>
Total drugs prescribed during the total stay	3044	1,44,629.50	478.90
Drugs purchased by patients from outside pharmacy	346	20,786.41	68.82

## DISCUSSION

The study showed female preponderance over males in elderly patients being admitted to a tertiary care teaching hospital.<sup>[6]</sup> The mean age of patients and average duration of hospital stay was in accordance with other studies.<sup>[10-12]</sup>

Majority of the diagnosed cases belonged to central nervous system followed by cardiovascular and respiratory system which depicts the common organ systems being affected with age. The pattern of diseases prevalent in elderly was similar to other studies.<sup>[10-12]</sup>

The study showed high average number of drugs per patient which is also seen in other studies.<sup>[6],[7],[13]</sup> This can be explained by the fact that since the elderly patients tend to have multiple co-morbid conditions, it generally leads to a higher number of drugs being prescribed per patient. Although polypharmacy increases the risk of drug interactions, adverse drug reactions and increased cost of treatment, it becomes unavoidable in many patients.

Percentage of drugs prescribed by generic name was high in this study as compared to other studies.<sup>[6],[7],[14]</sup> Prescribing by generic names allows flexibility of stocking and dispensing various brands of a particular drug that are cheaper and as effective as proprietary brands. High percentage of drug prescribing by generic names helps in controlling drug costs in the health care services due to the fact that the drugs of general references are more expensive.

The study revealed that the percentage of drugs prescribed from essential drug list was very high as compared to other studies.<sup>[6],[7]</sup> This suggests good adherence to the essential drug list in our set up. Prescribing drugs from essential drug list provides a framework for rational prescribing; drugs are well established drugs, already tested in practice, with established

clinical use and lower cost than newer drugs. Besides controlling costs, it also guarantees the treatment of principal diseases of the population.

Percentage of encounters with an antibiotic prescribed is comparatively lower.<sup>[7]</sup> The misuse of antibiotics is threatening to health of populations worldwide. Irrational prescribing of antibiotics can lead to adverse reactions leading to hospital admissions and risk of emerging resistant strains.

The study showed high use of injectables as compared to other studies.<sup>[7],[15]</sup> This can be attributed to the fact that since the study was conducted in a tertiary care teaching hospital where patients with serious conditions are treated, parenteral formulation ensures faster onset of action. Also the study setting involved inpatients, so there are more chances of prescribing injectables.

In this study FDCs prescribed were high as compared to other studies.<sup>[6]</sup> Majority of FDCs were approved by CDSCO. The main FDC prescribed is multivitamin B complex. On the one hand there is an ease of administration, better compliance, with minimal chances of administration errors while on the other hand dose cannot be individualised for the drugs used in combination and drugs with different pharmacokinetic parameters cannot be combined. Thus FDC should be used only when necessary and preference should be given to single drug where appropriate.

Cost of treatment per patient was Rs. 478.90 (7.4 USD where 1 USD= 66.98INR) with only 11.38% of the total cost was shared by the patient. Cost of treatment per patient is comparatively lower in this study than reported by Jhaveri et al. (10 USD) and Shankar et al. (26.6 USD).<sup>[6],[13]</sup> It may be due to the use of less number of antimicrobials and its comparatively less contribution to overall cost. Also in this study, a large number of drugs were prescribed by generic names thus contributing in reduction of cost of treatment. However, use of nebulisation therapy has increased the total cost shared by patients in our set up. This could be due to lack of solutions for nebulisation in hospital supply. It should be included in hospital formulary.

However, this study has some limitations. Findings of this study can only be generalized to tertiary care teaching hospital in a developing country. The study was conducted for a short duration. Only inpatients were included in the study of one particular discipline. Line of

treatment varies from physician to physician for the given condition and study provides no data for the same.

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