



## A Study on the Prescription Pattern and Use of Potentially Inappropriate Drugs in the Geriatric Clinic of A Tertiary Care Hospital in Northeast India

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**ABSTRACT:** In keeping with the recent advances in medical science, there has been a steady shift in the demographic status in India due to rise in the elderly population of the country. However there is still a huge lag in the geriatric care in our country. Northeast India lacks the basic infrastructure for geriatric care. The geriatric population are often treated as old adults and prescribed drugs irrationally. Hence this study aims at studying such inappropriate prescriptions meted out to this special population and increase awareness regarding the same.

**Keywords:** geriatrics, PIMs, polypharmacy.

### I. INTRODUCTION

India is going through a phase of demographic transition. As per the 1991 census, the population of the elderly in India was 57 million as compared with 20 million in 1951. There has been a sharp increase in the number of elderly persons between 1991 and 2001. [1] There were 72 million persons above the age of 60 as of 2001, compared to China's 127 million. The total number of people aged more than 60 years in India as per 2011 census is 103.9 million out of which 51.1 million are males and 52.8 million are females. The life expectancy of males above 60 years of age is 16.9 years and for females 19 years. [2] According to projections, the elderly in the age group 60 and above is expected to increase to 179 million in 2031, and further to 301 million in 2051; in the case of those 70 years and older, they are projected to increase from 27 million in 2001 to 132 million in 2051. Among the elderly persons aged 80 years and above, they are likely to improve their numbers from 5.4 million in 2021 to 32.0 million in 2051. [3] The elderly population is at high risk due to drug use because of the following factors: the physiologic changes of aging and potential drug–drug and drug–disease interactions. [4] Researchers have documented the widespread incidence of inappropriate medication use in elderly persons [5] [6] [7]. Multiple drug use and polypharmacy is highly prevalent in the elderly, exposing them not only to adverse drug reactions but also to increased cost of therapy, and compliance errors. [8] In order to identify potentially inappropriate medication (PIM) use in the elderly, Beers criteria 1997 [9] subsequently updated in 2003 [10] and 2012 [11], is commonly used.

Data regarding potentially inappropriate medication use in elderly is scarce in India and more so in the North east. Hence this study aims to evaluate the pattern of drugs prescribed, detect all PIMs and to study the extent of polypharmacy if any.

### II. METHODOLOGY

The study was conducted in the Geriatrics Clinic under the Department of Medicine at Gauhati Medical College & Hospital after taking due approval from the Institutional Ethics Committee. It was a cross-sectional observational, prescription based study conducted for 6 months from 1<sup>st</sup> March to 31<sup>st</sup> August, 2015. Prescription of patients of both sexes attending the Geriatric Clinic was studied. Information retrieved from the prescription included the age and sex, medical conditions (diagnosis) for which the patient was receiving treatment, the prescribed drugs and their dosages and the number of drugs prescribed per patient. For the inappropriate prescribing, a full updated American Geriatric Society version (2012) of the Beers criteria was downloaded and printed out. The prescribed medications were then assessed using these criteria to determine

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their appropriateness. For drugs prescribed by their brand names, identification of the drugs by their generic name were done and then evaluated.

Data generated from the case notes were recorded on a spreadsheet and analyzed.

### III. RESULTS

The medical records of 135 patients were utilized for the study. The gender distribution of the patients is shown in Figure 1. 60% of the patients were male and remaining 40 % females.

Figure 1. Gender distribution of the patientsnnnn

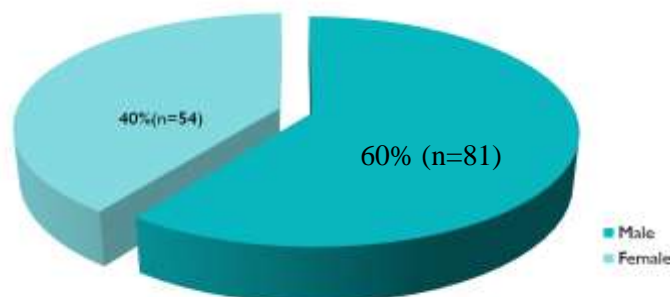


Figure 2 shows the age distribution in the study group. It was seen that most of the patients belonged to the age group of 60-69 years with the maximum age of the patients being 81 years. In all the three age groups, 60-69 years (41 males and 34 females), 70-79 years (30 males and 19 females) and 80-89 years (7 males and 4 females), male patients outnumbered females.

Figure 2. Age distribution

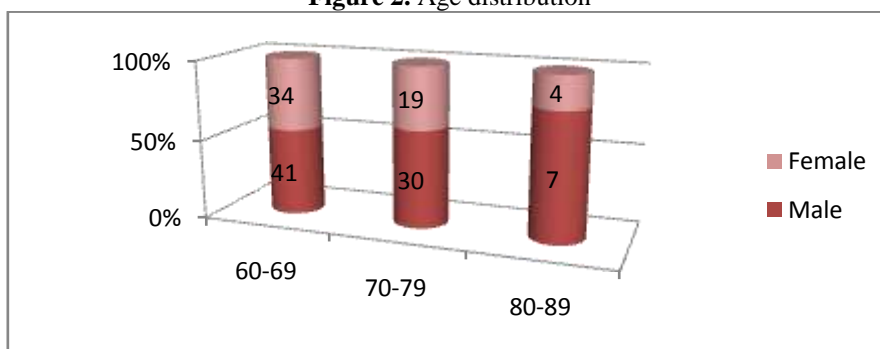
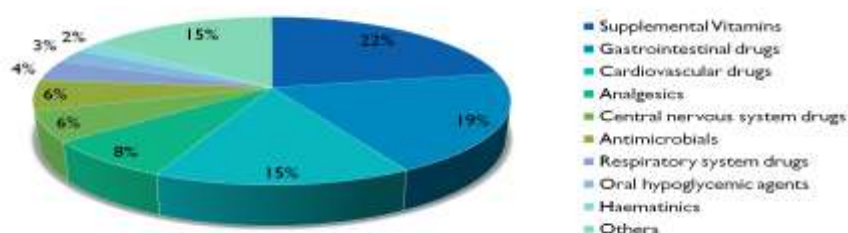


Figure 3 shows the group wise breakup of drugs which were prescribed to the study group. The most commonly used drugs were Multivitamins (including Calcium and Vitamin D3), Pantoprazole, Pantoprazole-Domperidone sustained release preparations, Amlodipine (for hypertension), Paracetamol, Aceclofenac (for chronic pain conditions). Antimicrobials such as Amoxicillin, Cephalosporins and Ciprofloxacin were used for various infections. Among oral hypoglycaemic agents (OHA), Metformin alone and in combination with other OHA was used.

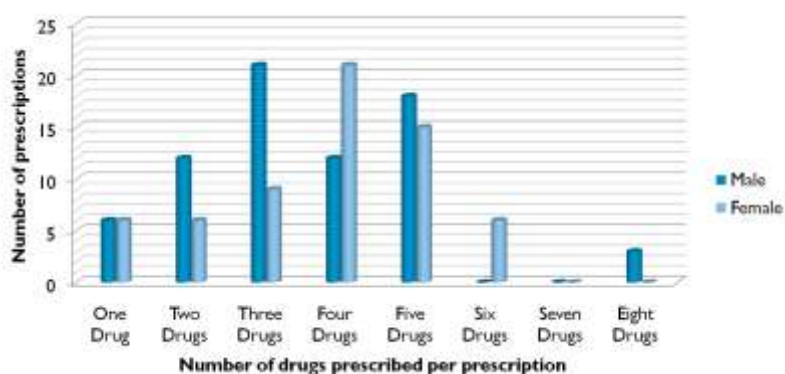
Figure 3.

Group-wise breakup of drugs prescribed

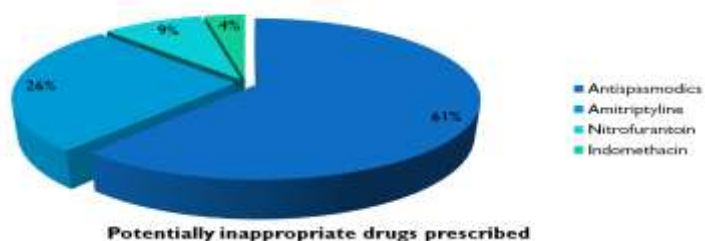


More than half of the patients were prescribed with three or more drugs with the maximum number of drugs prescribed to a single patient being 8. (Figure 4)

**Figure 4.** Number of drugs prescribed per prescription.



6.46% drugs (32 drugs out of total 495 drugs prescribed) were found to be prescribed inappropriately by the 2012 American Geriatric Society Beers Criteria for Potentially Inappropriate Medication (PIM) Use in Older Adults. Out of this, Antispasmodics were most commonly prescribed followed by Amitriptyline, Nitrofurantoin and Indomethacin (as seen in Figure 5).



Out of 135 patients, 24 received atleast 1 PIM. 12 patients received 1 PIM in their prescription and 6 received 2 PIM. 3 PIMs were received by 3 patients (Table 1).

**Table 1.** Number of potentially inappropriate medications

Number of potentially inappropriate Medications	Number (%)
0	111 (82.2)
1	12 (8.9)
2	6 (4.4)
3	3 (2.2)
4	3 (2.2)
5	0 (0)

#### IV. DISCUSSION

The present study points towards a growing concern in current clinical practice: potentially inappropriate medications in health centres. There was a female preponderance (60%) in our study which corresponds to similar studies in USA and Nigeria.<sup>[12][13]</sup> This may be due to the fact that females have higher life expectancy than males. However some other studies found a male preponderance<sup>[5]</sup> Most of the patients were in the 60-69 years age group (n=75, 41 males and 34 females). Supplemental vitamins and gastrointestinal drugs were the most commonly prescribed drugs in our study whereas multivitamins were the second most commonly prescribed medicine in a Nigerian study<sup>[13]</sup>.

In this study, 17.78% of the elderly patients received atleast 1PIM. This finding is in agreement with a study in Ahmedabad, India (23.59%)<sup>[14]</sup>. Studies carried out in different parts of the world show prevalence anywhere between 20% to 45%<sup>[15][16][17][18][19]</sup>. 6.46% of total drugs prescribed were potentially inappropriate which is similar to the study in Ahmedabad, India (7.42%)<sup>[14]</sup>. Most commonly prescribed PIMs were Antispasmodics (61%) followed by Amitriptyline (26%), Nitrofurantoin (9%) and Indomethacin (4%). In a

Japanese study, antispasmodic use was only 0.1% [20]. The study in Netherlands [15] and Ahmedabad [14] had low usage of amitryptilline (2%) as compared to our study. Nitrofurantoin and Indomethacin was a common PIM seen to be inappropriately used also in the Netherlands study [15].

Zaveri H G found inappropriate use of phenylpropanolamine in cough preparations in patients having hypertension as this drug might elevate blood pressure secondary to sympathomimetic activity. Similarly, use of nifedipine was found to be inappropriate as it might cause constipation [14]. None of these drugs were seen to be used in our study setting. Inappropriate use of NSAIDs and antiplatelet drugs in patients with clotting disorder or on anticoagulant (14.8%), use of metoclopramide and conventional antipsychotic in patients with Parkinson's disease (11.4%) and use of short/intermediate acting benzodiazepines and tricyclic antidepressants in patients with history of syncope or falls (22.3%) was reported by Niwata et al [20]. These PIMs were absent in our study. Some researchers use different criteria to evaluate the use of PIMs. [21] However, Beer's criteria being the most commonly used criteria, was used in our study.

There were some limitations in our study. The first was that our study was limited to only one health facility and hence our findings cannot be directly extrapolated to other regions. Moreover there are several limitations of the Beer's criteria which are applicable to our study as well.

## V. CONCLUSION

PIMs are potentially dangerous and harmful to the geriatric age groups. These also are easily avoidable with increasing awareness and vigil. Our study shows a good amount of inappropriate medications being used. More studies in other centres will give us a good idea of the existing prescribing pattern.

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