



## Prescribing Patterns in the elderly to determine Potentially inappropriate prescribing patterns

Authors

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### Abstract

*This study was done to determine the incidence of polypharmacy – in males and females admitted in Tertiary care hospital and to determine the drugs most inappropriate prescribed as per START/STOPP criteria. A retrospective study was conducted in Department of Pharmacology in collaboration with medical records Department. 150 subjects were included of both male and female gender above the age of 60 years with co-morbidities, multiple prescriptions and only those who were compliant with medications. Pregnant women, post-operative patients and patients with a h/o of participation in trials in the least 6 months were not included. Data collection was done by accessing IPD files after obtaining permission from Medical Records Department. Patients will be divided in 2 categories of male and female. A list of their medications will be made and added in the Case Record form. The PIP indicator – STOPP/START was then is applied. After which since it is an exploratory study- descriptive analysis was be done.*

**Results:** *There was a high frequency of polypharmacy seen. In the recruited sample 44% were males and 56% were females. Proportion of patients receiving at least one potentially inappropriate medication (PIM) was 11.22%. Proportion of patients subjected to at least one potential prescribing omission (PPO) was 12.54%. Proportion of patients exposed to potentially inappropriate drug prescriptions as a whole (PIPs=PIMs+PPOs) was 23.76%.*

### Introduction

The elderly are high consumers of both prescription and over-the-counter medications.

Older people consume a disproportionate share of medication compared with younger people which puts them at higher risk of adverse drug events (ADEs) than the rest of the population. The occurrence of ADE contributes significantly to more frequent emergency department (ED) visits, unplanned hospitalizations, high healthcare costs, morbidity and mortality in older populations.<sup>[1,2,3]</sup>

Furthermore, concurrent prescription of several drugs increases the risk of adverse reactions and drug interactions, and multiple drug therapy with complex drug regimens can lead to poor compliance.<sup>[4,5]</sup>

Potentially inappropriate prescribing (PIP), which includes errors of co-mission as well as of omission, is common in older people. Its likelihood increases with the number of medications prescribed and it is often associated with increased costs.<sup>[6]</sup> Because of alterations in Pharmacokinetics and Pharmacodynamics with

age and the increased prevalence of ill health, these problems may be accentuated in elderly patients.<sup>[4,7]</sup>

Tools with explicit criteria are developed to screen for PIP in the population. These tools vary their ability to identify PIP in specific care settings and jurisdictions due to such factors as local prescribing practices and formularies. One promising set of screening tools are the STOPP (Screening Tool of Older Person's potentially inappropriate Prescriptions) and START (Screening Tool of Alert doctors to the Right Treatment) criteria.<sup>[8,5,9]</sup> Potentially inappropriate pre-scribing (PIP) has significant clinical, humanistic and economic impacts. Identifying PIP in older adults may reduce their burden of adverse drug events. Tools with explicit criteria are being developed to screen for PIP in this population. These tools vary in their ability to identify PIP in specific care settings and jurisdictions due to such factors as local prescribing practices and formularies. One promising set of screening tools are the STOPP (Screening Tool of Older Person's potentially inappropriate Prescriptions) and START (Screening Tool of Alert doctors to the Right Treatment) criteria. A comprehensive and explicit process measure of PIP has been developed and validated for use in European countries. The STOPP criteria (Screening Tool for Older Persons' Prescriptions) are a physiological system based screening tool<sup>[2]</sup>.

The criteria include commonly encountered instances of PIP in older people such as drug-drug and drug-disease interactions, drugs which adversely affect older patients at risk of falls and duplicate drug class prescriptions. In addition, under-prescribing of clinically indicated medications has been identified by an accompanying screening tool known as the START criteria (Screening Tool to Alert doctors to Right Treatment), for potentially appropriate drugs.<sup>9,3]</sup>

Potentially inappropriate pre-scribing (PIP) has significant clinical, humanistic and economic impacts. Identifying PIP in older adults may

reduce their burden of ADEs. Hence the present study is being undertaken.

The primary objectives of the present study were to identify PIPs in elderly patients in males and females admitted in Tertiary care hospital. Secondary objectives were to study the morbidity and drug use pattern in the elderly, to appraise clinicians and get their feedback about ways of avoiding PIPs, and to study the association of various patient attributes with PIPs. This was done to determine the incidence of polypharmacy which would help determine the drugs most inappropriate prescribed as per START/STOPP criteria.

### Material and Methods

This was done by the Department of Pharmacology in collaboration with Dept of General Medicine & Medical Records Department at a tertiary care hospital. The Study design was retrospective study that was conducted in accordance with Good Clinical Practice guidelines. The Study duration was 2 years between 2016 & 2017. The sample size was 150 patients

**The inclusion** criteria was patients:

Above age 60years.

With multiple prescriptions– self prescribed and doctor prescribed.

With existing co-morbidities (such as HTN and DM.).

Either gender.

Compliance with medications.

**The exclusion** criteria was

Pregnant women.

Patients who have recently undergone surgical intervention.

Pediatric patients less than 19 years of age.

Patients with H/O participation in Trials less than past 6 months.

The data collection will be done by accessing IPD files after obtaining permission from Medical Records Department. Patients were divided in 2 categories of male and female. A list of their medications was being made and added in the

Case Record form. The PIP indicator– STOPP/ START will then be applied. Since it was an exploratory study- descriptive analysis was done. Percentage analysis was be done.

## Results

### Patient characteristics (Table 1)

A total of 150 patient records were analyzed. Out of the total 150 patients, there were 90 females 60 males. From which the females were distributed as 42 (80%) were aged 60-74 years, 30 (14.7%) were in the age group of 75-84 years and 8 (5.3%) were aged above 85 years. The mean age of the patients in the study group was 67.8 years. Of the 150 patients, 56(37.3%) were females and 94 (62.6%) were males.

The average number of chronic co-morbid medical illnesses per patient was 4.82 ( $\pm 1.5$ ). The commonest co-morbid illnesses were hypertension (n=119) (79.33%) and diabetes (n=91) (60.66 %).The average duration of hospital stay was 8.06 days (mean duration =8 days).

**Table no 1:** Morbidity pattern

Disorder	N
Cardiovascular disorders	119
Respiratory disorders	7
Gastrointestinal disorders	43
Endocrinal disorders : hypothyroidism plus BHP	19
Metabolic disorders	91
CNS disorders	14
DBM plus hypertension	91

### Polypharmacy

112 (74.6%) patients were subject to Polypharmacy. The mean number of medications consumed per day by the patients in the study group was  $5.6 \pm 2.8$ . 46 patients consumed <5 medications, 81 consumed between 5 to 10 medications, and 23 regularly consumed  $\geq 10$  medications per day.

The average number of medications taken by elderly men (n= 60) was 6.79 ( $\pm 3.2$ ) per day and elderly women (n=90) were taking 6.62 ( $\pm 2.9$ ) medications per day. The patients of the oldest category ( $\geq 85$  years) had an average of 7.38 medications/day. The 60-74 category (n=120) had

a mean of 6.21 medications per day and the 75-84 category (n=22) had a mean of 6.5 medications per day.

The prevalence of Polypharmacy was higher in those patients who had multiple co morbid illnesses. 112 patients were subject to polypharmacy. A patient who was subject to Polypharmacy had an average of 4.82 comorbid illnesses, whereas the others had an average of 2.1 comorbid illnesses.

### Potentially inappropriate medications

Of the total number of 150 patients in the study group, twenty six (26) were taking a potentially In appropriate medication. (p=0.830)

Of the 26 patients taking a PIM, men constituted the majority, 17 (65.3%) compared to women, 9 (34.7%).Eighteen of them belonged to the young old (n=120), 3 of the old (n=22) and 5 of them belonged to the oldest old category (n= 8).

Nineteen (73%) were prescribed a single inappropriate medication, one of five (5) patients were prescribed 2potentially inappropriate medicines and one of thirteen (2) were taking 3 drugs that were potentially inappropriate.

As per the start criteria where as 86.36% received Metformin. Aspirin was not prescribed to 28.6% of the patients and 87% patients were given that. Statins were given to 87.5 % and not to 12.5% patients.

As per stop criteria 88.9 prescriptions were appropriate, inappropriate for alpha blockers 8.7%, and 2 % for diphenoxylate. Proportion of patients receiving at least one potentially inappropriate medication (PIM) was 11.22%.

Proportion of patients subjected to at least one potential prescribing omission (PPO) was 12.54%. Proportion of patients exposed to potentially inappropriate drug prescriptions as a whole (PIPs=PIMs+PPOs) was 23.76%.

### Discussion

Proportion of patients exposed to potentially inappropriate drug prescriptions as a whole (PIPs=PIMs+PPOs) was 23.76%.

The study demonstrates that of the total number of patients discharged from medical wards, 23.76 % were taking at least one inappropriate medication. ( $p=0.830$ ) as STOPP/START criteria. The prevalence of PIM use was significantly associated with increasing age ( $p < 0.001$ )

Our PIP Incidence of PIP, however, was significantly higher than another study conducted by Karandikar et al 2013 (19.8%) (16) when STOPP/START criteria were used. Comparing our results using STOPP/START criteria with those from some other countries to clarify the scenario in our setup. Prevalence studies in European and other countries show substantial rates of prescription of PIP (22-77%) and a similarly high prevalence rate of PPO in hospitals as well (41- 66%).<sup>(17, 18,19)</sup> The prevalence of PIP among elderly patients in India is different Europe. This may be due to the differences between treatment guidelines in Europe and India. The prevalence of PIM use was lower than in international studies conducted on the use of inappropriate medications conducted among hospitalized elderly patients in Ireland (32%)<sup>21</sup>, France (66%),<sup>22</sup> and Taiwan (23.7%)<sup>23</sup>. Among studies conducted in India, our results were higher as compared to Karandikar et al 2013 ones conducted in other teaching hospitals in Karnataka- Bangalore<sup>24</sup>, The difference could be probably due to the differences in patient and disease characteristics, prescribing patterns, study settings and availability of medications listed in BC.

The most commonly prescribed inappropriate medication in our study were metformin , aspirin, and statins Contrary to other studies,<sup>25, 26, 27</sup> we did not find any statistically significant association with inappropriate medication use and duration of hospital stay. Studies have shown that use of inappropriate medications is significantly associated with increased duration of hospital stay.<sup>25, 26, 27</sup> We did not find such an association, This could be attributed to improved drug monitoring or other factors that could influence

duration of hospital stay e.g social factors, costs of hospitalization etc.

### **Polypharmacy**

112 (74.6%) patients were subject to Polypharmacy., Our study found a higher prevalence of polypharmacy; compared to previous studies<sup>1</sup> in northern India 110(73.3%) ( $p < 0.001$ ). The presence of diabetes, hypertension had a statistically significant association with polypharmacy use when compared to the patients with other co morbid illnesses. Of these, hypertension appeared to be the most important predictor of polypharmacy ( $p < 0.001$ )

A higher prevalence of potentially inappropriate medication use was seen among those with increasing number of medications.

Inappropriate prescription was directly linked to polypharmacy. The prescription of inappropriate medications increased as the number of concurrent medications increased. This was similar to studies conducted in other hospital in Karnataka<sup>19,20</sup>. When polypharmacy was defined as the use of 5 or more drugs, this association differed markedly. Only 21 of the total 110 were prescribed more than 5 medications, which was statistically insignificant, suggesting that a quantitative definition for polypharmacy was questionable.

The study aims to ensure the prescribing of appropriate medications to older people to enhance their quality of life. This needs to be addressed as under prescribing is common in older populations with variable prevalence rates depending on medication classes and care settings. Nevertheless, the interventions are required to reduce inappropriate prescribing with resultant improvements in the appropriateness of polypharmacy in older patients. Although these results are promising and indicate that the interventions described in this review were successful in improving appropriate polypharmacy, the clinical impact is not known.

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