ASSESSMENT OF DRUG USE IN GERIATRIC PATIENTS AT RURAL TERTIARY CARE TEACHING HOSPITAL IN SOUTH INDIA

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ABSTRACT

Introduction: Geriatrics are more vulnerable to drug use problems and requires monitoring of prescriptions to identify and solve potential problems. Objective of this study is to assess the drug use in geriatric patient at rural tertiary care teaching hospital. Methods: A prospective and observational study was carried out at tertiary care teaching hospital, South India after institutional ethical committee approval. Data were collected after taking patient consent in designed data collection form. Data were measured to observe prescribing indicators and to record contraindicated drugs if any by using Microsoft excel and analysed using descriptive statistics. Results: We observed 1503 drugs in 200 geriatric patient prescriptions where males (75%) were more than females (25%). Majority of them were in age group of 60-65 years (47%) followed by 65-70(27%) years and then above 70 years(26%). Prescribing indicators showed evidence for potential drug use problem like high drugs per prescription, i.e polypharmacy (6.25 ±1.6), use of less generic drugs (23.1%) and essential drugs (56%). Injections and antibiotic prescribing were 7% and 23.28% respectively. In 2.5% patient cases, drug which could exacerbated further disease condition were prescribed. Conclusion: Use of drugs contraindicated in different disease conditions and high prevalence of polypharmacy along with less generic prescribing shows prescribing habbits in geriatric patient has to be reviewed. Tools like explicit and implicit criteria already developed to assess potentially inappropriate medications in geriatric patient has to be adopted.

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KEYWORDS: Geriatric population, prescribing indicators, Assessement of drug use.

INTRODUCTION
The worldwide estimated number of elderly population of 605 million in year 2002 is expected to rise beyond 1.2 billion by 2025, with about 840 million representing developing countries.\[1\] In India, size of elderly population is growing rapidly; from 5.6% of total population in 1961, it is projected to rise to 12.4% by year 2026.\[2\] Discoveries in Medical science and improved social condition during past few decades have increased the life span of man. It is thus elder population is exposed to more drugs owing to multiple chronic illness requiring more drugs in comparison to adults.

Though geriatric patients are reported to be consumers of half the total drugs prescribed, <5% of randomized control trials have been designed for them.\[3\] This shows that assessement of drug use in geriatric is needed continuously in practice.

Polypharmacy remains the common problem in both developing and developed countries. Some studies mentions that more than 5 drug or more than 4 drugs as polypharmacy.\[4,5\] There is no standard definition of polypharmacy. A simple definition would be the administration of more medicines than are clinically indicated.\[6\] Polypharmacy indicates more chance of both pharmacokinetic and pharmacodynamic drug interaction owing to increased risk of adverse drug reaction, increase in cost and decrease in adherence. Apart from polypharmacy there will be lot of drug use problems. The best way to investigate drug use in health facilities is usage of indicators created and validated by the World Health Organization. Drug use indicators are a set of standardized indices used to measure drug use.\[7\] They provide a measure of the optimal use of these resources and can help in correcting deviations from expected standards and in planning.\[8\] Since no such study was carried before in our hospital with the objective to to assess the drug use in geriatric patient.

MATERIAL AND METHODS
Study design: This study was a prospective and observational study.

Study site: The present study was conducted in medicine department of Adichunchanagiri Hospital and Research Center, B.G. Nagara. It is a 1030-bedded, tertiary care, teaching, service oriented hospital having different specialties like medicine all units, pediatrics in
three units. This hospital provides specialized health care services to all strata of people in and around B.G. Nagar, Karnataka, India.

**Study period:** This study was conducted for a period of 6 months.

**Study approval:** Ethical clearance was obtained from the Institutional Ethical Committee of AH and RC, B.G. Nagara.

**Study criteria:** Patient were selected on following basis:

Inclusion Criteria: All patient above 60 years of age and allowed to participate in study.
Exclusion Criteria: Patients having incomplete patient record.

**Source of data:** Patient data relevant to the study was obtained from the patient consent form, patient data collection form and patient case note/prescription.

**Study procedure**

In-patients in medicine unit who met above study criteria were enrolled to the study for assessing prescriptions of these patients. Doctor of pharmacy, student; intern clinical pharmacist collected the data during time period between 10:00 am to 12:00 clock prospectively during study period. A suitably designed data collection form was used to record all the necessary data including patient demographic details and prescribing indicators. Operational definition of polypharmacy is more than 5 drugs in prescription.

**Statistical methods**

The data were subjected to descriptive statistical analysis using Microsoft Excel. Microsoft word and Excel have been used to generate bar graph, pie charts and tables.

**RESULTS AND DISCUSSION**

A total of 200 patient were enrolled into the study. Prescribing indicators showed potential problems evident in geriatric pharmacotherapy. We also listed contraindicated drug use prescribed.

**Gender and Age distribution**

A sample of 200 geriatric patients were followed where we found more male patients (56%) than the female patients (44%). Majority of these geriatric population were within a age group of 60-65 years ie. 47% followed by 65-70 years age group i.e. 27% and patient within
age above 70 years i.e. 26%. In a study by Kolhe et al. 58.66% were male and rest were females. This result shows that male predominance to access of health care. Majority were within the age group of 65-70 year followed by 22.6% within age group of 70-75 year. Another study by kartik et al in geriatric population also seen male predominance i.e 62%. They had also seen similar pattern of age distribution in their study.

Table 1: Gender Distribution of patients

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>112</td>
<td>56</td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Age wise distribution of patient studied

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency(N)</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-65</td>
<td>94</td>
<td>47</td>
</tr>
<tr>
<td>65-70</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td>Above 70</td>
<td>52</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

Prescribing indicators

Prescribing indicators of our study were as shown in table number 3. We seen that in average 6.25 ±1.6 number of drugs in a prescription and total drugs of 1503. This values shows that our senior citizen are being frequently exposed to polypharmacy. Polypharmacy results in increased cost of treatment, which may lead to non-adherence by patients as they have more medicines than they can cope with. It also increase the chance of drug interaction and adverse drug reactions. As people age, they develop more chronic conditions, often resulting in more medications prescribed. Prescribers are often reluctant to change drugs other prescribers (specialists or hospitalists) have started and may have difficulty recognizing medication side effects, thus increasing the risk of prescribing cascades (i.e., new medications added to manage side effects). Pharmacokinetics and pharmacodynamics also change as people age and very few clinical studies have been conducted in the elderly. In a study by John et al, in Karnataka, India, average number of drugs been prescribed was found to be 9. In their study 52.18% with more than 5 drugs and 27.52% with 9-12 drugs. In our study 70.67% of prescription contained more than 5 drugs which was similar to the study by John et al. In our study 23% of drugs were prescribed with antibiotics and 7% were prescribed with injections. Drugs with generic name format is very less(23.1%) as well as drugs from WHO drug essential list (56%). These indicator values suggest that there is still more chance to improve the
prescribing habits. Prescribing in generic name allows to decrease the cost of therapy and adhering to essential drug list make possible of cost effective use of medicine. Due to aggressive marketing by pharmaceutical companies and a faulty drug policy, doctors prefer to use the brand name of drugs in their prescribing in India. Prescribing by generic name also allows flexibility of stocking and dispensing various brands of a particular drug that are cheaper than and as effective as proprietary brands. This is the basis of use of drugs from essential drug list.[14] Concerns of use of antibiotics is due to increasing pattern of resistance globally.

In a study by Kolhe et al., they found similar pattern of prescribing indicators in geriatrics. In their study 22.64% of drugs were prescribed with generic drugs and 4.53% of drugs in injection formulation and 77.94% with essential drug list.[9] In our study, 2.5% patient were also exposed to contraindicated drugs. In 5 different patient conditions 6 drugs were contraindicated which had the evidence to further exacerbate disease condition. Pantoprazole were given in a case of patient with interstitial nephritis, Spironolactone in a case of hyperkalemia, Doxycycline in a case of thrombocytopenia and morphine in case of cardiac arrhythmia. There is a need to avoid such mistakes. This shows that need of monitoring of drug therapy of geriatric prescription is very essential. Clinical pharmacist in developed countries make sure that there will minimal risk to the patient due to drug therapy through the process of pharmaceutical care. This is in a bud stage and may not be happening in India. There are different assessment technique which have developed to assess drug use or to identify drug use problems in elderly in developed countries.[15] Throughout the years, explicit criteria have been proposed by groups around the world, such as PRISCUS, Najanjo, Laroche’s French consensus, McLeod, Winit-Watjana, Australian Prescribing, Zhan, ACOVE, HEDIS, DUR, STOPP-START and Beers in 1991, 1997, 2003 and most recently 2012. Medication appropriateness index is another implicit approach. The Ottawa Top Ten Tool (OTTT) and the anticholinergic risk score (ARS) are other two simplified tools that have been developed and are used to help clinicians enhance safer prescribing and reduce the risk of ADRs in older patients. Trial of discontinuation is still another approach.[16] In developing country like India routine practice of such tools is not evident.

### Table 3: Prescribing indicators
<table>
<thead>
<tr>
<th>Drug prescribing Indicators</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of drugs per prescription</td>
<td>6.25 ±1.6</td>
</tr>
<tr>
<td>Percentage of patients with polypharmacy (&gt;5 drugs)</td>
<td>70.67%</td>
</tr>
<tr>
<td>Percentage of drugs prescribed with antibiotics</td>
<td>23.28%</td>
</tr>
<tr>
<td>Percentage of drugs prescribed by generic name</td>
<td>23.1%</td>
</tr>
<tr>
<td>Percentage of drugs prescribed from WHO essential drug list 2011</td>
<td>56%</td>
</tr>
<tr>
<td>Percentage of drugs prescribed in injections formulation</td>
<td>7%</td>
</tr>
<tr>
<td>Percentage of prescription with contraindicated drugs</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

LIMITATION
This study focus only on prescribing indicators in geriatric patient. Patient clinical information like diagnosis, length of stay in hospital and drug use outcome like drug interaction, Adverse drug reaction and other drug related problem was not studied in detail. More systematically based on explicit and implicit criteria further drug use problem can be studied in future. This study is also having less sample size and conducted for short period (6 month).

CONCLUSION
Prescribing indicators shows that prescription of geriatric population has to be reviewed continuously in our hospital. Reviewing of drugs to see contraindicated drug use is necessary. More systematic methods like explicit: beer’s criteria and implicit: medication appropriateness index can be employed. Though polypharmacy will be necessary to cure multiple disease states, it is already known to increase the risk of drug interaction, adverse drug reaction, cost etc. So monitoring is required. Figure of generic prescribing and drugs from essential drug list is very less; it must be 100% to ensure cost effective medicine. Use of antibiotic and injection formulations has to be carefully assessed before use. Based on result of these indicator alone physician can improve their prescribing habits.

CONFLICT OF INTEREST: No conflict of interest declared.

REFERENCES