

A Prospective Study on Medication Prescribing Pattern for Geriatric Patients in a Tertiary Care Teaching Hospital

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ABSTRACT :

Background: Polypharmacy and inappropriate prescriptions are prominent prescribing issues with elderly patients. Beer's criteria and other guidelines have been developed to assist in the reduction of potentially inappropriate medications prescribed to elderly patients.

Objective: The present work was undertaken to study prescribing pattern of various drugs in elderly patients and also to evaluate inappropriate prescribing with the help of Beers criteria.

Materials & Methods: This is a prospective observational study conducted in Navodaya Medical College & Hospital from November 2014 to April 2015. A total of 400 case records of inpatients ≥ 65 years in medical, surgery and orthopaedic wards were reviewed. Relevant information was recorded in a structured proforma & data was evaluated.

Results: Most of the cases were from respiratory system (28%), followed by cardiovascular system (18.75%). The most commonly prescribed drugs were antimicrobials (19.106%). Polypharmacy was observed in 344 (83.5%) patients. According to Beers criteria, 256 drugs were prescribed inappropriately & all these drugs were to be generally avoided in older adults.

Conclusion: This study has shown the patterns of diseases prevalent in geriatric patients, drug use among them and also suggests that drugs to be avoided in elderly. Prevalence of polypharmacy was high which is usually unavoidable in the elderly.

Keywords: Geriatrics, Beer's criteria, Inappropriate prescribing, polypharmacy.

INTRODUCTION:

India is ageing fast and currently the Geriatric population is about 7% of the total population. Drug utilization studies are exploratory tools to ascertain the role of drugs in the society. Geriatric medicine is the branch of gerontology which deals with clinical or medical aspect of gerontology. Generally people in India once they become aged feel dejected and insecure. The cut off age to be called geriatric is 60 years and above. The changes that occur with ageing are: Changes in the GI absorption, absorption from the skin is reduced; shrinkage of liver, hepatic blood flow is reduced. Also the body fat increases in proportion to water and muscle, fat soluble drugs undergo slower elimination. Renal function is impaired, glomerular filtration rate is reduced. [1]

Prescription of medicines is a fundamental component of the care of elderly people. Several characteristics of ageing and geriatric medicine affect medication and prescribing for these people is a challenging and complex process. [2] Special precautions have to be taken as there are changes in pharmacokinetics and pharmacodynamics due to the age. Older people with numerous health problems often require several medications to treat them; prescribing multiple drugs has been found to be related to inappropriate prescribing and therefore could increase the risk of adverse drug-related events, disability, hospitalization, inefficient

utilization of resources and even death. Physicians face the challenge of prescribing medications safely in older adults with multiple chronic disorders, balancing the complex trade-off between restricting the number of drugs prescribed and using all medications that may be beneficial, which requires extra attention in assessment when prescribing. Although the simultaneous use of multiple medications is termed polypharmacy, the minimum number of drugs needed to achieve polypharmacy is inconsistent in the literature, ranging from three to six different prescribed drugs. Prescribing medications using a standardized mode has been reported to improve the quality of prescriptions. Several assessment tools have been developed to measure potentially inappropriate medication (PIM) for older people. The Beers criteria is the most frequently used of those explicit methods for determining PIMs. [3]

Beer's criteria are comprehensive set of explicit criteria for potentially inappropriate drug use in elderly aged 65 years and above. According to Beer's criteria, drugs which are prescribed inappropriately are classified into one of the following categories:

Category A: Drugs that generally should be avoided in older adults.

Category B: Drugs that exceed maximum recommended daily dose.

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Category C: Drugs to be avoided in combination with specific co-morbidity.[4]

The objective of study was to describe Rationality of drug prescribing on general practice for elderly patients, using patient's age, sex, encounters and the occurrence of some predefined inappropriate drug prescribing, according to Beer's criteria.

MATERIALS & METHODS

It was a prospective observation study conducted for 6 months from November 2014 to April 2015 in Navodaya Medical College Hospital & Research Centre, Raichur and a 1000 bedded tertiary care teaching hospital, in which patients aged 60yrs and above were included. A total of 400 patients were randomly enrolled in to the study on their visit to hospital and the study duration was 6 months. Patients on ventilators who required ICU were excluded from our study. The study was approved by Institutional Ethics

Committee of Navodaya Medical College Hospital & Research Centre on 18th November 2014.

RESULTS

In the study population 400 patients were enrolled, the demographic characteristics of these patient which include gender distribution, age wise distribution, reason of admission and number of stay in hospital are shown in Table 1. The drug prescribed for them are categorised in different class as shown in Table 2. Number of drugs prescribed per day to the patient and also the route of administration of these drugs are enlisted in Table 3 and Table 4.

Frequency of use of potentially inappropriate medicines in elderly based on beer's criteria was monitored as shown in Table 5& Fig 1. Percentage of appropriateness and inappropriateness in prescribing pattern is shown in Table 6 and drug-drug interaction in Table 7.

Table 1: Demographic characteristics of enrolled patients

Characteristic	Data
No of patients enrolled in study (n=400)	
Male	220(55%)
Female	180(45%)
Age in years	
60-69	295 (73.75%)
70-79	76 (19%)
80-89	29 (7.25%)
Reason for Admission(Clinical Condition)	
Musculoskeletal Disorders	72(18%)
Respiratory Disorder	112(28%)
Cardiovascular Disorder	75(18.75%)
GI Disorder	37(9.25%)
Endocrine Disorder	29(7.25%)
Renal Disorder	10(2.5%)
Infectious Disorder	26(6.5%)
Blood Disorder	09(2.25%)
Miscellaneous Disorder	30(7.5%)
Duration of stay	
0-5 days	52(13%)
5-10 days	235(58.75%)
10-15 days	80(20%)
>15 days	33(8.25%)

Table 2: Category of Drugs Prescribed

S.No	Category of drugs prescribed	No. of drugs	Percentage
1.	Antibiotics	586	19.106%
2.	Drugs acting on GI system	515	16.79%
3.	Analgesics and Anti-inflammatory drugs	459	14.965%
4.	Minerals,Vitamins,Calcium	476	15.52%
5.	Drugs acting on CVS	331	10.792%
6.	Drugs acting on Respiratory system	399	13.009%
7.	Drugs acting on CNS	140	4.56%
8.	Hypoglycaemic agents	51	1.66%
9.	Others	110	3.586%

Table 3: Number of Drugs per Prescription

S.NO	No. of drugs per prescription	No. of Patients	Percentage
1.	5drugs	66	16.5%
2.	5-8drugs	202	50.5%
3.	>8drugs	132	33%

Table 4: Route of Administration

S.No	Route of Administration	No of Patients	Percentage
1.	Parenteral Route of Administration	1261	42.94%
2.	Oral Route Of Administration	1675	57.05%

Table 5: Frequency of Use of Potentially Inappropriate Medicines in Elderly Based on Beer's Criteria

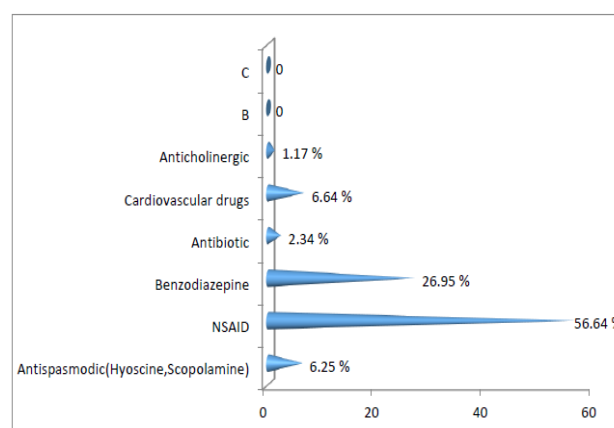
Category	Name of Drugs	Total no of drugs	Percentage
A	Generally to be avoided in older patients		
	Antispasmodic(Hyoscine, Scopolamine)	16	6.25%
	NSAID	145	56.64%
	Benzodiazepine	69	26.95%
	Antibiotic	6	2.34%
	Cardiovascular drugs	17	6.64%
	Anticholinergic	3	1.17%
TOTAL		256	
B	Drugs that exceed maximum recommended daily dose		Nil
C	Drugs to be avoided in combination with specific co-morbidity	Nil	Nil

Table 6: Percentage of Appropriateness and Inappropriateness in prescribing pattern

1.	Appropriate	226	56.5%
2.	Inappropriate	174	43.5%

Table 7: Drug Interactions

S.No	Interaction	No. of Prescriptions	Percentage	Types of interaction			Percentage (%)		
				Min	Mod	Maj	Min	Mod	Maj
1.	Prescriptions Without interactions	260	65						Maj
2.	Prescriptions With interactions	140	35	70	110	8	37.23	58.51	4.25

**Figure 1: frequency of use of potentially inappropriate medicines in elderly based on beer's criteria**

DISCUSSION

The data was collected from 400 in-patients using specially designed data collection form. Out of which 220 (55%) were males and 180 (45%) were female patients. Hence the majority of drug utilization was by males.

The study revealed that majority of the patients who got admitted in the hospital were in the age group between 60-69years (73.5%) followed by patients who were in the age group 70-79years(19%) and the least comes under the range of 80-89 years of age(7.25%). This can be attributed to the fact that more patients who visited the hospital during study period were in the range between 60-69years of age. The elderly population suffers from numerous chronic disorders. In this study, maximum of diagnosed cases were from respiratory system (28%), followed by cardiovascular system (18.75%). Respiratory diseases like COPD, asthma & complications due to hypertension were the most common reasons for hospital admission. **Veena et al** [5] conducted a study among the elderly at Bangalore reported that respiratory and cardiovascular diseases were shown to be the predominant reasons for admission.

Antimicrobial drugs(19.10%) followed by GI protective agents(16.79%) were the most commonly prescribed medications for geriatrics. Antibiotics were used mainly for respiratory diseases and most of the drugs were administered through oral route (57.05%).

The issue of polypharmacy is of particular concern in older people compared to younger individuals; elderly tend to have more disease condition for which more therapies are prescribed. Polypharmacy is defined as the use of 5 or more medications that occurs in 20-40 % of people. Average number of drugs per prescription is an important index of the scope for review and intervention in prescribing practices. It is preferable to keep the mean number of drugs per prescription as minimum as possible. This will help to avoid the drug-drug interactions, development of bacterial resistance and will decrease hospital cost. In this study the average number of drugs per prescription was 8.5 which is 4 times more than other studies. In a study carried out by **Joshi et al** [6] in one of the teaching hospitals in Nepal the incidence of polypharmacy in elderly inpatients were found to be 73%, where as in our study the prevalence of polypharmacy was 83.5% which seems to be high.

Inappropriate prescribing can be defined as prescribing medications outside the bounds of accepted medical standards. Inappropriate prescribing is common in elderly patients since they may receive several drugs simultaneously on account of chronic diseases or/and multiple health problems. Prescription of potentially inappropriate medications, polypharmacy and drug interactions are major therapeutic issues identified in the study. Prescribing patterns of drugs reflects the clinical judgement of the clinicians. Currently there are a number of medication assessment tools available to clinicians for the purpose of evaluating medication regimens for rationality or appropriateness in elderly. The prescribed medications were reviewed using the Beer's criteria by the American Geriatric Society which

identified 8.71% of drugs were prescribed inappropriately. Beer's criteria is a well established method for evaluating appropriateness of prescribing medicines and can be an important tool for assessing appropriateness of prescribing in geriatrics. Category A which includes drugs that should be avoided in elderly and should not be prescribed, forms a major category of inappropriate use of drugs. In this study, 256 drugs were enlisted under this category. NSAIDs (diclofenac, mefenamic acid) prescribed to 56.4%, benzodiazepines (alprazolam, lorazepam, clonazepam, chlordiazepoxide) to 26.95% and cardiovascular drugs (nifedipine, prazosin, spironolactone) to 6.64% of patients form the majority of potentially inappropriate medicines in category A.

The distributions of hospitalisation among the patients were as follows, less than 5 days:

52(13%), 5-10days:235(58.75%), 10-15 days 80(20%), more than 15 days:33(8.25%).

Ignoring drug-drug interaction can affect the process of treatment or even cause serious or fatal problems for the health of patient, thus necessitates the need of constant evaluation of these events in order to prevent them. **Chitra B et al** [7] carried out a study on drug interactions in elderly revealed that 68% of the patients had drug interactions whereas, in our study it was 65% which seems to be high. Micromedex drug data base was used to check drug interactions and were evaluated and categorized into major, moderate and minor based on their severity.

CONCLUSION

Prevalence of polypharmacy was high and is usually unavoidable in the elderly. This indicates that there is a need for multidisciplinary, multifaceted & multisector approach which may improve drug safety & adherence in the elderly. Our study also emphasizes the need for creating more awareness among the general practitioners and clinicians on this important public health issue by conducting more Continued Medical Education programmes on drug therapy in elderly. The drug prescription pattern suggests the need to establish rational drug therapy. Health care professionals should be aware of the risks and fully evaluate all medications at each patient visit to prevent polypharmacy from occurring.

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