



Research Article

STUDY ON MEDICATION APPROPRIATENESS AMONG GERIATRICS IN TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Introduction: Older patients are considered as special population, the pharmaceutical care with focus of increasing medication appropriateness and reducing medication related problems is needed. Elderly patients have a higher prevalence of chronic and multiple illness and physiological changes associated with aging may masquerade as illness. **Aim & Objectives:** To assess and evaluate the drug prescribing pattern and inappropriate prescribing by using beers criteria 2015 among Geriatric patients. **Materials & Methodology:** A prospective observational study was conducted in general medicine out-patient department, SVRRGGH, Tirupati for period of 6months. The patients of general medicine out-patient department with age above 65yrs old were included in the study. The Patients who are not willing to participate in the study, inpatients and terminally ill patients were excluded from the study. **Results & Discussion:** Among 200 patients, distribution of age majority of the patients is male (71%) followed by females (29%), Most of patients have multiple diseases (64%) followed by Single disease (29%). All potentially inappropriate medicines (PIMS) are classified as category A, B, C. Drugs have to be avoided in geriatric patients (Category A) being the most common category of inappropriate as per Beers criteria updated by American Geriatric Society 2015. Our study reported 174 drugs as PIMS. **Conclusion:** It is also necessary to improve the geriatric care, as this age group possess risk for many diseases and medication use. In future a multidisciplinary approach, steps to be taken involving physicians, nurses and pharmacists has a team for bringing out rational drug use in geriatric population.

Key words: Geriatrics, medication appropriateness, beers criteria, adherence, pharmacist.

INTRODUCTION

Ages nearing or surpassing the life expectancy can be called as elderly or old age. According to WHO the people above 65 years of age are known as geriatrics. It is the last phase of any individual's life. Any person in this phase of ageing had a progressive deterioration of all body functions which can lead to divorce physical and psychological problems making their daily life activities troublesome.¹

Aged population faces many problems, which include problems related to health, social support and economic insecurity. Their healthcare needs differ from the other population. Medication related problems in elderly are one of the most studied preventable health related problems in elderly. Polypharmacy and irrational use of medicines are common problems in geriatric prescription. Incidence and severity of adverse drug reactions are two to three times higher in elderly and most of them are potentially avoidable².

Generally, there will be the high prevalence rates of co-morbid diseases in elderly people, so that many elderly people are treated with multiple medications leading to polypharmacy and inappropriate prescribing. Approximately 20-40% of adults aged 65 and older in developed countries are prescribed with greater than or equal to 5 medications. Polypharmacy results in medication non-adherence and increases the risk of ADRs, drug-drug interactions, medication errors and using of potentially inappropriate drugs³.

Aging involves physiological changes that can lead to pharmacokinetic (such as increased half-life and serum concentrations of drugs) and pharmacodynamic changes, supporting the need for drug-therapy monitoring and dose adjustment, especially at this age range. The possibility of drug-induced damage, even when drugs are used at recommended doses and for the correct indication, is a major problem for elderly inpatients. Polypharmacy and inappropriate medication also lead to adverse health outcomes including mortality, hospitalization, falls, cognitive impairment and therapeutic failure⁴.

Mark Beers, MD reiterate the important need of preventing adverse drug events occurrence in older adults on two decades before itself. One of the most widely used medication criteria in the world is the BEERS CRITERIA. The Beers Criteria is a specific tool to evaluate potentially inappropriate medications use among elderly people. Beers list provides guidelines for medical and paramedical professionals to improve the safety of prescribing medications for the elderly people. It accentuates on de-prescribing medication that is not needed.

According to the medication use statistics in 2010 the elderly is taking at least one inappropriate medication that should be importantly avoided. This problem is due to lack of proper medication use training and lack of awareness in geriatrics. These issues will be overcome by drug utilization evaluation, review programs⁵ and appropriate counselling providing to the patients.

This study was planned to assess and evaluate the drug prescribing pattern and inappropriate prescribing by using beers criteria 2015 among Geriatric patients.

Objectives

- To assess & evaluate the drugs prescribed in the elderly patients.
- To document the frequency of various diseases with co-morbidities among elderly.
- To evaluate the drug prescribing pattern by using WHO drug use indicators.
- To determine the appropriateness of medications among elderly by using BEERS criteria.

MATERIALS & METHODOLOGY

A prospective observational study was conducted in general medicine out-patient department, SVRRGGH, Tirupati for period of 6 months. The patients of general medicine out-patient department with age above 65 yrs old were included in the study. The Patients who are not willing to participate in the study, inpatients and terminally ill patients were excluded from the study. A specially designed proforma was used for collecting data which includes patient demographics, chief-complaints, past medical and medication history, diagnosis, co-morbidities, lab investigations, medications prescribed for each patient. The data was obtained from the patient case profile forms and direct interviews. After collecting data regarding treatment regimen, appropriateness was reviewed on basis of 2012 American

geriatrics society beers criteria and medication appropriateness index criteria. Hence, all patients who admitted in inpatient general medicine department were explained in prior about the purpose and nature of study in the language they can understand and written informed consent was obtained before enrolling them into study. The patients who gave informed written consent were enrolled.

Ethical consideration

Study is carried out as per International conference of Harmonization-Good Clinical Practices Guidelines (ICH-GCP) or as per Declaration of Helsinki guidelines with proposal number SPSP/2018-2019/03 from Sri Padmavathi school of pharmacy institutional ethical committee.

Format of Analysis

Patient details

Age and sex wise analysis, diagnosis, drugs prescribed, drugs per prescription

Analysis of drugs

Total number of drugs prescribed per patient; average number of drugs prescribed per patient; drugs prescribed by generic name or brand name or both; prescription pattern of drugs according to their diagnosis in category and subcategory; beers criteria.

RESULTS

TABLE 1: DISTRIBUTION BASED ON AGE & GENDER

Contents	Age (Years)	Number of patients (n=200) %
Age distribution	65-70	147(73%)
	71-75	31(15%)
	76-80	14(7%)
	81-85	5(3%)
	>85	3(2%)
Gender distribution	Male	142(71%)
	Female	58(29%)

Among 200 patients, majority of people are between age group of 65-70(73%), followed by 71-75(15%), 76-80(7%), 81-85(3%) and >85(2%). Based on distribution of age majority of the patients are male (71%) followed by females (29%).

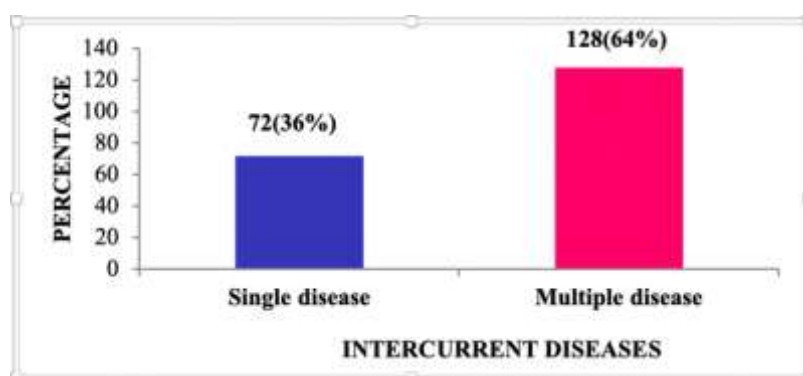


FIGURE 1: DISTRIBUTION OF DISEASES WITH CO-MORBIDITIES

The above figure shows that the majority of patients have multiple diseases (64%) followed by Single disease (36%).

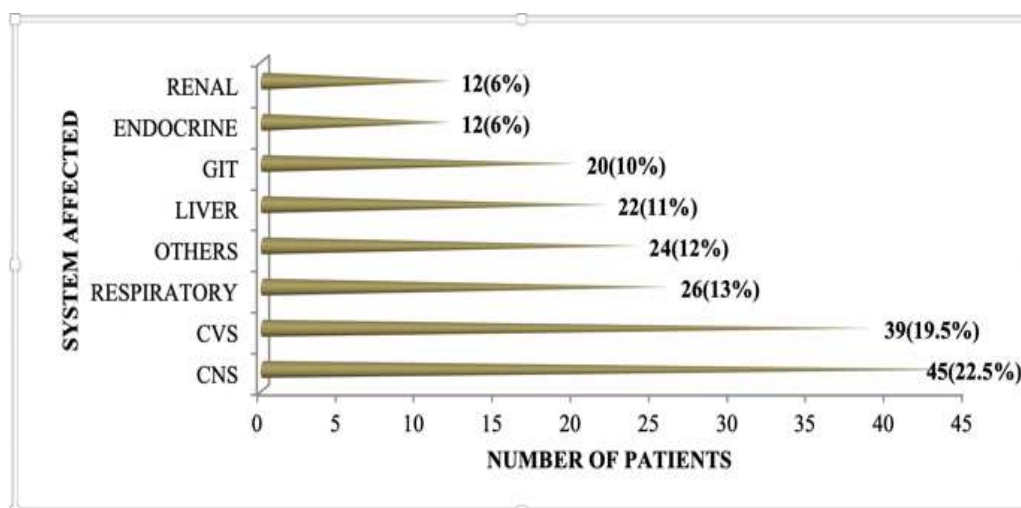


FIGURE 2: SYSTEM WISE DISTRIBUTION

Among 200 patient's majority of patients are suffering with CNS diseases (22.5%) followed by CVS (19.5%), Respiratory (13%), Endocrine (6%), Others (12%), Liver (11%), GIT (10%) and Renal (6%).

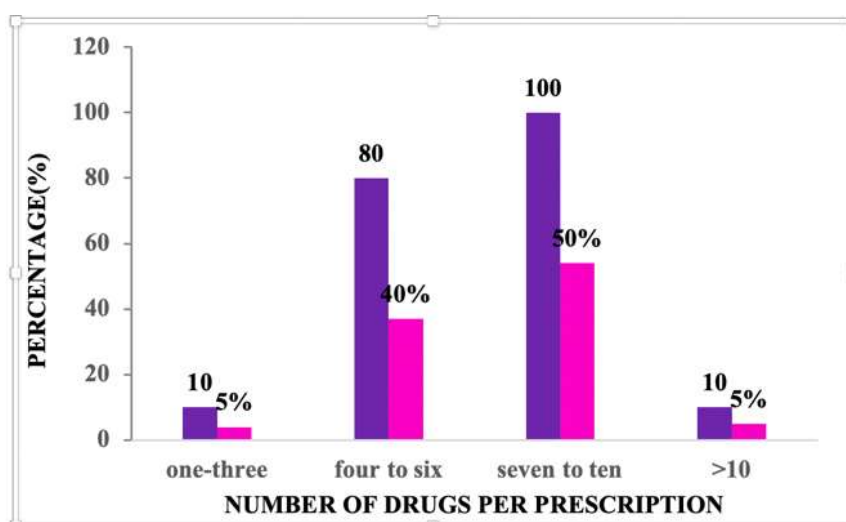


FIGURE 3: NUMBER OF DRUGS PER PRESCRIPTION

Among 200 patient's majority of the patients have 7-10 (54%) drugs per prescription followed by 4-6 (37%), >10 (5%) and 1-3 (4%).

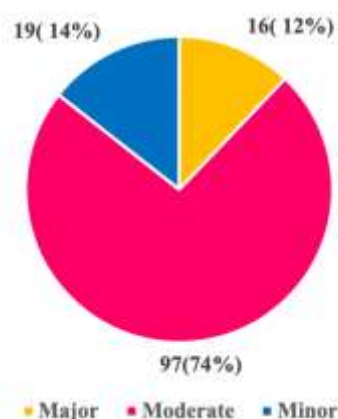


FIGURE 4: CLASSIFICATION OF DRUG –DRUG INTERACTIONS BASED ON SEVERITY

The above indicates, majority of interactions are moderate interactions (74%) followed by minor (14%) and major (12%).

TABLE 2: MAGNITUDE OF PIMS

Total No. of Drugs	No. of PIMS
1358	174(13%)

All PIMS are classified as category A, B, C. Drugs have to be avoided in geriatric patients (Category A) being the most common category of inappropriate as per Beers criteria updated by American Geriatric Society 2015.

TABLE 3: FREQUENCY OF CATEGORY-A PIMS USE IN ELDERLY PATIENTS

Category	Name of the drug	Total PIMS (n=174)
Category-A: Class to be avoided in older adults	Aspirin	33
	Insulin	13
	Digoxin	7
	Diazepam	7 (n=79)
	Dicyclomine	6
	Chlordiazepoxide	5
	Scopolamine	3
	Prazosin	1
	Trihexyphenidyl	2
	Nitrofurantoin	1
	Clonidine	1
Category –B: Medications to be avoided in older adults with certain diseases and syndromes	Acetaminophen	3
	Diclofenac	1 (n= 5)
	Tramadol+acetaminophen	1
Category –C: Medications to be used with caution in older adults.	Furosemide	51
	Spironolactone	17 (n=90)
	Mannitol	14
	Metolazone	1
	Isosorbidedinitrate	6
	Nitroglycerin	1

TABLE 4: INTERVENTION DONE FOR POTENTIALLY INAPPROPRIATE MEDICATIONS IN ELDERLY PATIENTS

No	Drug prescribed inappropriately	Frequency	According to Beers criteria updated by AGS 2015	Problem Found	Intervention	Outcome
1	Aspirin	33	Aspirin increases the risk of gastrointestinal bleeding or peptic ulcer disease in high-risk groups(aged>75 years)	Out of 33 patients, 3 patients experienced gastric irritation	Proton pump inhibitors and sucralfate syrup was prescribed	Positive outcome
2	Chlordiazepoxide	5	Highly anticholinergic	Out of 5 patients, 3 patients experienced dry mouth	Oral fluids	N/A
3	Clonidine	1	High risk of CNS effects; may cause bradycardia and orthostatic hypotension.	No symptoms identified	Increase salt in your diet.	N/A
4	Diazepam	7	Increased risk of cognitive impairment, delirium, falls, fractures etc	1 patient has experienced fall	Take support of stick while walking.	N/A
5	Dicyclomine	6	Highly anticholinergic	1 patient experienced indigestion and 2 patients experienced dry mouth	Oral fluids	Positive outcome
6	Digoxin	7	Increases the risk of mortality in heart failure patients	N/A	N/A	N/A
7	Insulin	13	High risk of hypoglycemia without improvement in hyperglycemia management	No symptoms identified	Take chocolates.	N/A
8	Nitrofurantoin	1	Causes pulmonary toxicity, hepatotoxicity and peripheral neuropathy	The patient experienced tingling sensation in hands	Vitamin supplements were given.	Positive
9	Prazosin	1	High risk of orthostatic hypertension	No symptoms identified	N/A	N/A
10	Scopolamine	3	Highly anticholinergic	No symptoms identified	N/A	N/A
11	Trihexyphenidyl	1	Symptoms like constipation, dry mouth and nausea are seen	Constipation is seen in this patient	Lactulose syrup was given	Positive outcome
12	Acetaminophen (NSAID)	4	May increase the risk of acute kidney injury and further decline of renal function	Decreased urine output is seen in 1 patient	Avoid NSAIDS	N/A
13	Diclofenac (NSAID)	1	May increase the risk of acute kidney injury and further decline of renal function	No symptoms identified	Avoid NSAIDS	N/A

TABLE 5: DRUG USE ACCORDING TO WHO DRUG USE PRESCRIBING INDICATORS

Average number of drugs prescribed per encounter	Number of drugs (%) n=1358
Drugs prescribed by generic name	1249 (97%)
Number of antibiotics prescribed	390 (8.7%)
Number of injections prescribed	302 (22.2%)
Number of drugs prescribed from EDL	1190 (87.6%)

The above table shows the distribution of drugs according to WHO drug use indicators.

DISCUSSION

Geriatrics are one of the most increasing special population in the world. The special care in their medication should be very much needed in-order to avoid drug related problems. Optimization of medication regimens in elderly people is challenging due to quiet less evidence for potent interventions. Our study reveals the ratio of inappropriate drug therapy prescribing among elderly.

The present study was conducted in a government general hospital. Total 200 patients were included in the study. Among them 142(71%) were males and 58(29%) were females and most of the patients were found to be in between the age of 65-70. These findings were similar to the B. Chitra et.al.,² study where they reported majority of patients are male than female. This could be due to the reality that high number of male patients were stayed in the hospital in that study period.

In the overall study population, majority of the people are suffering with CNS diseases (21%) and many people have co-morbidities (64%). The number of drugs per prescription are 7-10(50%) in maximum number of patients which is in contrast with study conducted by Rajendran R Aparasu et.al.,⁴ study.

Average no of drugs prescribed per encounter	No of drugs (%) n=1358
Drugs prescribed by generic name	1249 (97%)
No of antibiotics prescribed	390 (28.7%)
No of injections prescribed	302 (22.2%)
No of drugs prescribed from EDL	1190 (87.6%)

According to WHO drug use prescribing indicator, the drugs prescribed by generic name are 1249 (97%), 390 (28.7%) drugs are antibiotics prescribed, total number of injections prescribed were 30 (22.2%) and 1190 (87.6%) drugs prescribed are from EDL. These findings were contrast to the B.Chitra *et al* study.

Among study population 174(13%) PIMs were detected. According to Beers criteria 79 (45%) PIMs comes under category A and 5 (3%) are category B, 90(52%). There is no severe mortality and morbidity among the patients who received PIMs. Category A which includes drugs which should be avoided in elderly and should not be prescribed, forms a major category of inappropriate use of drugs. Drugs like Aspirin, Digoxin, Clonidine, Diclofenac, Scopolamine, Dicyclomine, Insulin, Chlordiazepoxide, Prazosin, Nitrofurantoin and Diazepam are found in the category A which is agreed with the study conducted in Gujarat by Dedan Opondo et.al.⁶, study. Beers criteria define maximum daily dose of certain drugs for elderly. Drugs causing drug-disease interaction which leads to disease, it is considered as category B, 3 drugs are being listed in the study are paracetamol, diclofenac, Tramadol. Drugs that should be used in caution comes under category C, 6 drugs are listed they are Furosemide, Spironolactone, Mannitol, Metolazone, Isosorbide dinitrate and Nitroglycerin. Various factors like gender, age, duration of hospital stay, inter-current disease and polypharmacy are the contributing factors for prescribing potentially inappropriate drugs.

In India, several studies have been done in various parts to estimate the prevalence of Inappropriate drug use but very few studies are present with intervention. Our study reported 174 drugs as PIMs which was similar to the study conducted by Edward K.Osei et.al.³.

By suggesting alternative therapies for these 174 PIMs and updating the practitioner regarding new therapies can provide safer treatment for geriatric patients. Education to elderly patient regarding their treatment therapy will increase their level of understanding towards their therapy will increase their level of understanding towards their treatment regimen.

CONCLUSION

The pharmacist involvement in medication prescribing will have positive effect on prescribing in older adults, ensuring that they receive effective, safe and efficient drug therapy. The current practice in hospital is associated with greater polypharmacy and inappropriate medication use. The data presented herein reiterate the importance of a clinical pharmacist practicing in the hospital. The inclusion of pharmacists as part of a multidisciplinary team can assist in appropriate prescribing, as well as in the implementation of standard operating procedures and evidence-based guidelines to be used in the hospital. It is also necessary to improve the geriatric care, as this age group possess risk for many diseases and medication use. In future a multidisciplinary approach, steps to be taken involving physicians, nurses and pharmacists has a team for bringing out rational drug use in geriatric population.

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