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EVALUATION OF GERIATRIC PRESCRIPTIONS APPLYING BEERS CRITERIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT:

Aim: To assess the geriatrics prescription applying beer's criteria in a tertiary care hospital of India.

Objective: To improve the quality of life of elderly patients by reducing the prescriptions of potentially inappropriate medicines and polypharmacy as per beers 2012 criteria.

Methodology: A prospective observational study was conducted over a period of 8 months at a tertiary care hospital in Hyderabad, on 150 patients admitted to various departments and wards of general medicine. The collected data was then evaluated using beers criteria.

Results: Out of the total 150 patients participated in the study, 97 (64.6%) were males and 53 (35.4%) were females. 79 patients were reported to be receiving drugs which were to be avoided as per Beers criteria and 39 patients were overprescribed as per medication appropriate index (MAI).

Conclusion: A higher proportion of patients involved in the study were found to be associated with polypharmacy and inappropriate prescriptions. There is a need to make prescribers aware of the irrational prescribing among the geriatric patients.

KEY WORDS: Beer's criteria, inappropriate prescription, polypharmacy screening tool of older person's prescriptions criteria, screening tool to alert to right treatment criteria.

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INTRODUCTION: The elderly population is the highest consumer of drugs. Prescribing a medication in this vulnerable group requires a high degree of caution as these people may experience altered pharmacokinetic and pharmacodynamics of drugs due to age related changes in the physiology.[1] Due to multiple co-morbidities they are hospitalized often which may increase the chances of inappropriate prescribing and polypharmacy. Potentially inappropriate medication (PIM) is defined as "a drug in which the risk of an adverse event outweighs its clinical benefit, particularly when there is a safer or more effective alternate therapy for the same condition". Due to potentially inappropriate medications the appearance of adverse drug reactions is high.[2,3] In order to minimize pharmacotherapy related hazards it is important to identify the potentially inappropriate medication (PIM) use in this vulnerable group.[4]

BEERS CRITERIA is one of the most widely used medication criteria around the world.[5] Beers list is a guideline for health care professionals to help improvise the safety of prescribing medications for the elderly patients.. It points on de-prescribing medication which is not necessary.[6] This polypharmacy is sometimes necessary, but may be associated with an increased risk of adverse outcomes.

BEER'S CRITERIA INTENDED USE

The aim is to improve care of elderly patients by reducing their exposure to PIMs.

- It is used as a guide for identifying medications for which the risks of use in elderly patients outweigh the benefits.
- These criteria are not meant to be applied in a disciplinary manner.
- These criteria also underscore the importance of using a team approach to prescribing and the use of non-pharmacological approaches and of having economic and organizational incentives for this type of model.
- This list is not meant to supersede clinical judgment or an individual patient's values and needs. Prescribing and managing disease conditions should be individualized and involve shared decision-making.
- Implicit criteria such as the STOPP/START criteria and Medication Appropriateness Index should be used in a complementary manner with the 2012 AGS Beers Criteria to guide clinicians in making decisions about safe medication use in elderly patients.[7,8,9]

The criteria are not applicable in all circumstances (e.g., patient's receiving palliative and hospice care). If a clinician is not able to find an alternative and chooses to continue to use a drug on this list in an individual patient, designation of the medication as potentially inappropriate can serve as a reminder for close monitoring so that the potential for an adverse drug effect can be incorporated into the medical record and prevented or detected early.[10]

METHODOLOGY:

The study entitled ―A Prospective and observational Study on Prescribing Pattern in elderly patients Using Beers Criteria was anobservational and single centred studyconducted at Aster Prime Hospital over a period of 8 months from November 2016 to June 2017 at Ameerpet Hyderabad, Telangana India. The hospital is unique and well known for its services to people who come from various parts of the state**.** Carried out in various departments including general wards. While the inclusion factors were, patients of 65 years of either sex who were admitted to the study site during the study period, the pregnant and lactating women were excluded in addition to ICU and terminally ill patients.

Department Selected for Study in the Hospital:

General medicine was the department selected for the study as a higher prevalence of geriatric patients is seen in the wards associated with this department. The Department of Pharmacy Practice provides patient safety services to the entire hospital and a good co-operation from medical team made the study feasible. Knowledge on the prescribing pattern in geriatrics will help the health care professionals to ensure the proper treatment outcomes.

Design of Data Entry Form:

A separate data entry form for incorporating patient details was also designed which contained provision of entering the details such as name, age, sex, height, weight, inpatient no., date of admission, date of discharge, vital signs, reason for

admission, past medical history, past medication history, social history and allergies. Provision was also given in the format for entry of details pertaining to blood sugar levels, blood counts, liver function tests, renal function tests, electrolytes, urine examination, drug interaction chart, any interventions, IV compatibility chart and irrationality of the antibiotics chart.

RESULTS

Age Wise:

During the study period of 8 months, a total of150 prescriptions were collected and studied. Age distribution of the patients were analysed and it was found that 66.6 % of the prescription were in the age group of 65-70 years, followed by 16% in the age group 71-75 years, 4.6% in 76-80 years, 10% in the age group of 81-85 years and 2.6% in the age group of 86-90 years as depicted in fig 1.

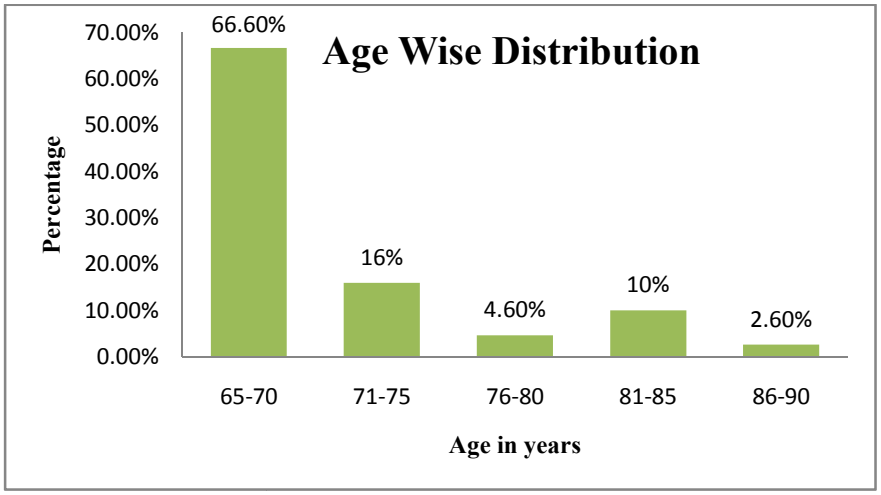

Fig- 1: **Age Wise distribution**

The current study revealed that the maximum number of hospital admissions was in the age grouping of 65-70 years.

GENDER WISE DISTRIBUTION

The study showed a male predominance (64.6%) over female patients (35.4%).

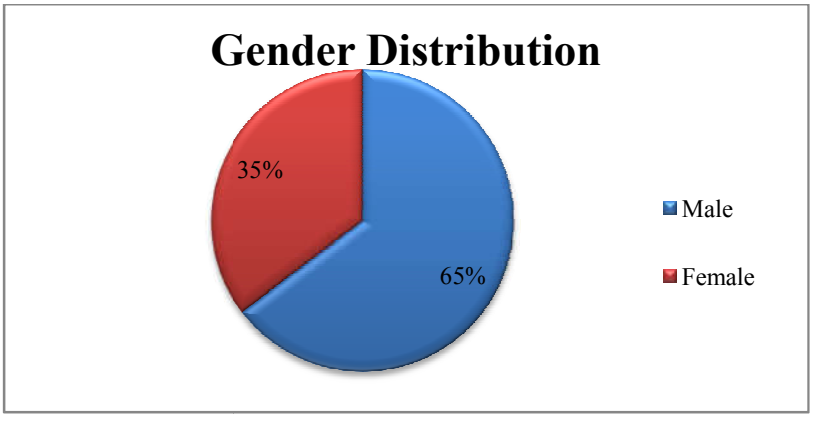

Fig-2: Gender Wise Distribution of Geriatric Patients

Length of Stay in Hospital

Among the patients admitted to the hospital, when it comes to a longer hospital stay, percentage of males outnumbered their female counterpart. It was found that 82% of patients stayed for a period of 1-4 days, 12% of patients stayed for a period of 5-9 days and 4% of patients stayed for a period of 10-14 days as shown in fig 3.

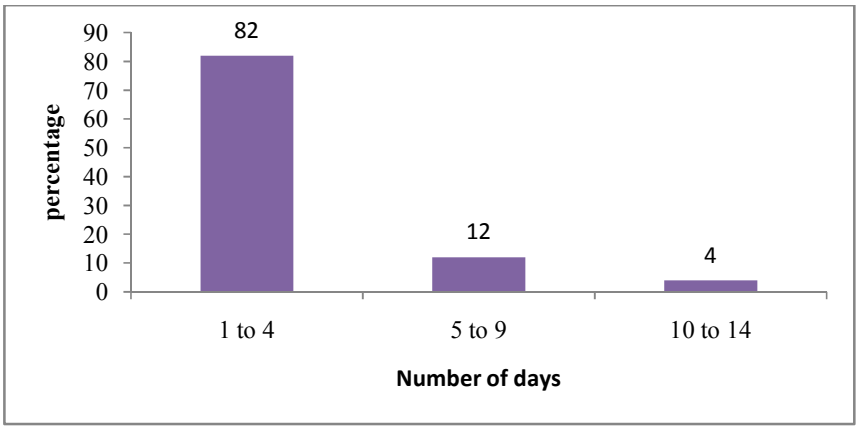

Fig.3: Length of Stay in Hospital

The average length of stay of patients in the hospital was found to be between 1-4 days.

Major Co- morbidities Observed in the Study Population

Table-1: Major Diagnosis Observed In the Study Population (N=150)

Co-morbidities	Number
Hypertension	98
Diabetes Mellitus	78
Coronary Artery Disease	29
Asthma	5
CAK	4
Hypothyroidism	4
Chronic Kidney Disease	1
Chronic Obstructive Pulmonary Disease	1
Tuberculosis	1

Table-2: Number of Medications per Prescription polypharmacy (N=150)

No of drugs per prescription	No of prescriptions	Percentage (%)
1-5	29	19.3
6-10	72	48
11-15	17	11.3
16-20	32	21.3

Prescription of Potentially Inappropriate Medicines (PIM)

Of the 150 prescriptions studied, 79 (53%) had one or more potentially inappropriate medicines from Beer's 2012 Criteria. In 19 (13%) prescriptions drug-drug interactions were ascertained according to drug-drug interactions of common OTC drugs.

Table-3: Potentially inappropriate medicines:

Brand name	Generic name
Aldactone	Spironolactone
Stamlo	Amlodipine
Mini Press XL	Prazosin
Restyl	Alprazolam
Ecosprin	Aspirin
Veloz-D	Domperidone
Clopitab	Aspirin+Clopidogrel
Dynapar-AQ	Diclofenac
Neuropin	Clozapine
Dytor	Spironolactone > 25mg
Amiodorone	Amiodarane
Dytor plus	Spironolactone
Dizriphylline	Theophylline+Etophylline
Tramadol	Tramadol
Dilzem	Diltiazem

Effect of Potentially inappropriate drugs in geriatrics:

1. **Spironolactone:** The administration of spiranolactone causes Primary Hyperaldosteronism, Edematous Conditions, Essential Hypertension, Congestive Heart Failure, Hypokalemia, Hirsutism.
2. **Amlodipine:**Swelling of your legs or ankles, Tiredness or extreme sleepiness, Stomach pain, nausea, Dizziness, hot or warm feeling in your face (Flushing), Irregular heart rate (Arrhythmia), and very fast heart rate (Palpitations).
3. **Prazosin:** Older patients may be more sensitive to the side effects of prazosin, especially dizziness and fainting, which can increase the risk of falling. Before taking this drug, you should tell your doctor if you have a history of the following conditions:
   - ❑ Heart problems
   - ❑ Low blood pressure.[11]
4. **Alprazolam:** Severe drowsiness, dizziness, confusion, clumsiness, or unsteadiness are more likely to occur in the elderly, who are usually more sensitive than younger adults to the effects of alprazolam. Elderly patients may require a lower dose to help reduce unwanted effects.
5. **Aspirin:** Older age is a strong risk factor for bleeding from aspirin use. Even low-dose aspirin can increase the risk of bleeding in the gut. Since the elderly are underrepresented in clinical trials, the extent to which this risk influences the benefits of aspirin treatment is not well understood.
6. **Diclofenac:** Diclofenac induced acute renal failure, Stomach problems, bloating, pain, cramping, constipation, and diarrhea.Upset stomach and/or bleeding in your stomach, esophagus, or intestines, Headache and ringing in the ears and rashes.[12]
7. **Clozapine:**Clozapine is associated with serious adverse effects such as agranulocytosis, seizures, myocarditis and metabolic syndrome. Other common undesirable effects such as sedation, constipation (which can be fatal), urinary incontinence and hyper salivation further limit its use.
8. **Amiodarone:**No study examining side-effects specifically in elderly patients exists. We have reviewed non-cardiac side-effects in elderly patients on long-term oral amiodarone

treatment. The most troublesome side-effect was hypothyroidism.

9. **Theophylline:**The adverse effects may be mild or life threatening and include nausea and vomiting or sinus and supraventricular tachycardia. Therefore, theophyllinesshould be prescribed with extreme caution to elderly patients with asthma or COPD.
10. **Tramadol:** Elderly patients are more likely to have unwanted side effects (e.g., constipation; light-headedness, dizziness, or fainting; stomach upset; weakness) and age-related liver, kidney, or heart problems, which may require caution and an adjustment in the dose for patients receiving tramadol.[12]
11. **Diltiazam:**Appropriate studies performed to date have not demonstrated geriatric-specific problems that would limit the usefulness of diltiazem in the elderly. However, elderly patients are more likely to have age-related kidney, liver, or heart problems, which may require caution and an adjustment in the dose for patients receiving diltiazem.

Table-4: Potentially inappropriate medications prescriptions to elderly patients.

Name of drug	Number of prescriptions
Aceclofenac	1
Alprazolam	1
Amlodipine	4
Aspirin	2
Aspirin+Clopidogrel	2
Cefodexim	1
Clopidogrel	2
Clonazepam	1
Diclofenac	7
Diltiazem	2
Folic acid	1
Furosemide	1
Glim	2
Pantoprazole	4
Para	2
Piper	1
Prazosin	2
Ranitidin	2
Spronolactone	2
Telmisartan	2
Metoclopramide	2
Tramadol	4
Torase	2

Table-5: Errors Identified in Prescriptions

S.No	Drugs Under Beers Criteria	Frequency of occurrence	Recommendations
1.	Alprazolam	19	Avoid BZD, because it increases risk of cognitive impairment, delirium, falls, fractures and motor vehicle accidents in elderly.
2.	Aspirin	4	Use with caution in adults >80 years old. Lack of evidence of benefit v/s risk in such individuals.
3.	Diclofenac	7	Avoid chronic use in elderly as it leads to bleeding / peptic ulcer disease.
4.	Prazosin	2	Avoid prazosin as it increases risk of orthostatic

			hypotension or bradycardia.
5.	Spironolactone	6	It causes hyperkalaemia in heart patients if taken greater than 25mg/day.
6.	Clonazepam	10	Avoid BZD, because it increases risk of cognitive impairment, delirium, falls, fractures and motor vehicle accidents in elderly.
7.	Metoclopramide	2	Avoid as it may cause extrapyramidal effects including tardive dyskinesia, risk may further increase in frail elderly patients.

Based on the results, the drugs prescribed inappropriately were Alprazolam, Aspirin, Diclofenac, Prazosin, Spironolactone, Clonazepam and Metoclopramide which are to be avoided in elderly patients.

Table-6: Categorisation of Drugs According To Beers Criteria

The inappropriate drugs identified are categorized under Group I, Group II and Group III.

GROUP I	GROUP II	GROUP III
Alprazolam	Sertraline	Aspirin
Clonazepam		
Spironolactone		
Diclofenac		
Prazosin		
Metoclopramide		
Hydroxine		

- **Group I -** Drugs which are considered to be potentially inappropriate in elderly patients.
- **Group II-** Drugs which may exacerbate existing disease or syndrome.
- **Group III-** Drugs to be used with caution in elderly patients.

DISCUSSION

The purpose of the study was to evaluate geriatric prescriptions applying Beers criteria in a tertiary care hospital at Hyderabad. The present study revealed a high incidence of PIM and polypharmacy in elderly patients. A total of 150 patients, 97(66.1%) were males and 53(35.4%) were females. Out of 150 patients, 79 were receiving drugs which were to be avoided as per Beers criteria. Among the total patients, 39 patients were overprescribed as per Medication Appropriateness Index (MAI). In the 150 prescriptions studies, 79(53%) had one or more potentially inappropriate medications from Beers criteria.[13] In 19(13%) prescriptions drug-drug interactions were ascertained according to drug-drug interactions of common OTC drugs in this study the number of males patients were more when compare to females out of 150 prescriptions. Male prescriptions were 97(64.6%) and female's prescriptions were found to be 53(35.4%). As we are comparing the gender here males are more when compare to females as per this the length of stay in hospitals of males were more than female patients. It was found that 82% of patients stayed in hospital for a period of 1-4 days, 12% of patients were stayed for a period of 5-9 days and 4 % of patients were stayed for a period of 10-14 days. The maximum number of prescriptions was obtained from the age group of 65-70 with 100 numbers of prescriptions. From age 71-75, 24 prescriptions was found and after that the next age group was from 81-85 in this age group 15 prescriptions and the least number of prescriptions were in the age group 86-90, i.e. 4. The maximum numbers of prescriptions were collected from the general wards.[14,15]

The major diagnosis observed in the study population were systemic hypertension (25%) and type 2 diabetes mellitus (23%) followed by

coronary artery disease (10%) and chronic obstructive pulmonary disease (1.3%) showing that most of the population is suffering from systemic hypertension. Out of the150 prescriptions, polypharmacy of 6-10 drugs was found in 72 prescriptions, 16-20 drugs in 32 prescriptions, 1-5 drugs in 29 prescriptions and 11-15 drugs in 17 prescriptions. All the drugs were prescribed by the brand names but prescriptions with generic names help in identification of products, making it easier for the prescribers. A brief study was also conducted on PIM drugs where Diclofenac was found in 7 prescriptions, Amlodipine and Tramadol were found in 4 or less than 4 prescriptions and the least was found with Asprin in only 2 prescriptions. The above drugs were noted down according to Beers criteria 2012.

CONCLUSION

This study reveals high incidence of potentially inappropriate medication and polypharmacy in elderly patients. Beers 2012 criteria is a potent tool in identifying potentially inappropriate medication and polypharmacy than beers 2013 criteria, which can be efficiently used by pharmacists, physicians and other health care providers. Hence, pharmacist plays a vital role in decreasing inappropriate medications used and reducing the polypharmacy. This approach will provide a safe and effective treatment and will improve the quality of life of elderly patients.

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