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A PROSPECTIVE CROSS – SECTIONAL STUDY ON DRUG UTILIZATION PATTERN AMONG GERIATRIC INPATIENTS USING BEER'S CRITERIA

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ABSTRACT

Potentially Inappropriate Medications (PIMs) are medications in which adverse effects outweighs over its benefits. It affects the safety consequences for older adults and also health care system economically. Hence this study aims at studying such inappropriate prescriptions by using Beers Criteria. It is the American Geriatrics Society's physicians guide to help improve the safe prescription for older adults. The aim of the study was to evaluate the drug utilization pattern among geriatric inpatients using beers criteria. A Prospective cross sectional study was conducted over a period of six months in a tertiarycare hospital. A total of 140 patients case records satisfying the inclusion criteria were analysed to determine the appropriateness of the drug using BEER'S CRITERIA. Case records were prospectively reviewed for demographic details, laboratory data, management and outcomes. During the study period 140 prescriptions were screened. Out of 140 prescriptions 64% of the prescriptions were appropriate and 34% were inappropriate. 74.39% of drugs belonged to group 1 of BEERS criteria (Drugs which are considered to be potentially inappropriate in older adults). 14.63% of drugs belonged to group 2 (Drugs which may exacerbate existing disease or syndrome). 10.97% belonged to group 3(Drugs to be used with caution in older adults). The current study could assess the prescribing pattern of medicines in the geriatrics accordingto Beer's criteria 2022. The use of

inappropriate medications can be avoided using the Beers criteria 2022, which is one of the important clinical tools which can be wisely used byphysicians, pharmacists and health care providers.

KEYWORDS: Geriatrics, BEER's Criteria, PIMs.

INTRODUCTION

Geriatrics is the population that includes people above 65 years of age. According to WHO Classification of the elderly individuals is grouped as Elderly :- 65 – 75 years, Old :- 76 – 85 years and very Old :- above 86 years.[1]

According to the 2011-2036 Population Projection Technical Group report of India and states, the elderly population increased by about 34 million in 2021. It is expected to increase by 56 million in 2031, according to the 2011 census.[1]

Gerontology is the branch of internal medicine that focuses on the care of the elderly.

Its main goal is

- To Promote health and the diagnosis
- For the Prevention and treatment of diseases
- To reduce disabilities in elderly.

Now – a - days improper drug use is a normal issue in grown-ups. Potentially Inappropriate Medications (PIMs) are medications in which adverse effects outweighs over its benefits.

Older people are often excluded from randomized clinical preliminaries due to comorbidities and polypharmacy. To prevent the use of PIM, experts have begun to address this problem by publishing and developing diagnostic tools to determine the prevalence of PIM and recommend treatment options for the elderly.[2]

As a result, there are no prescription decision-making guidelines or RCT-based scientific evidences are accessible to help medicine choices made by doctors in most of the times. So Beer's criteria were therefore established by the American Geriatric Society. This tool is used to observe the use/abuse of medicines in geriatric patients.[2]

In 1991, with the assistance of approved and suitable screening devices were used to develop

the Beers criteria, which provide an explanation for the utilization or avoidance of various medications among older adults based on their well- being status.[3] The Beer List for Potentially Unsuitable Drugs for the Elderly commonly known as the Beers list, is the American Geriatrics Society's (AGS) physician's guide to help improve the Safe prescription for 65years and older. Gerontologist Mark H. Beers developed the Beers model with expert consensus using the Delphi method. In 2011, the American Geriatrics Society (AGS) convened an 11-member panel of experts from the fields of geriatrics, nursing, and medicine to develop the 2012 AGS Update Standard for Inappropriate Substances in Adult Beers. The latest edition was updated on 2022.[1]

The rapid rise in the use of PIMs is primarily due to ADEs and other drug-related issues inthe elderly population. It has an impact on the financial health of the health care system as well as older adults safety. As a result, the Beers criteria are consistently revised by the American Geriatrics Society (AGS).[5]

The Beers Criteria categorize potentially inappropriate drugs into 3 groups

1. Potentially inappropriate for all older adults: To be avoided ifpossible.
2. Potentially inappropriate due to drug-disease and drug-syndrome interactions: To be avoided in older adults with certain diseases orsyndromes.
3. To be used with caution: Benefit may offset risk in some patients.

Intended use of beers criteria

1) This should be viewed as a guideline for identifying medications for which the risks of their use in older adults outweigh the benefits.
2) These criteria are not meant to be applied in a punitive manner.
3) 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.
4) 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.
5) A companion piece that addresses the best way for patients, providers, and health systems to use (and not use) the AGS Beers Criteria was also developed.[5]

MATERIALS AND METHODS

Study design : Prospective Cross sectional Study

Study setting : S H Medical Centre, Kottayam

Study duration : 6 Months

Sample size : 140 Geriatric Patients

Sampling technique : Convenience sampling technique was used

Sampling size determination

140 Cases were collected from general medicine department.

Sample size :- 140

n = ()

$$\frac{z^2\ (p*q)}{me^2}$$

Where, z = 0.95 (95%)

ME = 0.05 (5%)

p = 0.9

q = 0.1

$$n = \frac{1.96^2 * 0.9 * 0.1}{(0.05)^2}$$

= 138.27

= **140**

Criteria for patient selectionInclusion criteria

- Either sex
- Age above 65 years
- Patients with co-morbid conditions
- Prescription should contain atleast one Antibiotic

Exclusion criteria

- Age below 65 years.

RESULT

- Unconscious patients.
- Out patients

Table number 1: Evaluation of Prescription using Beers criteri

(n = 140)

CATEGORY	NUMBER OF PRESCRIPTIONS (n)
Inappropriate Prescriptions	51
Appropriate Prescriptions	89

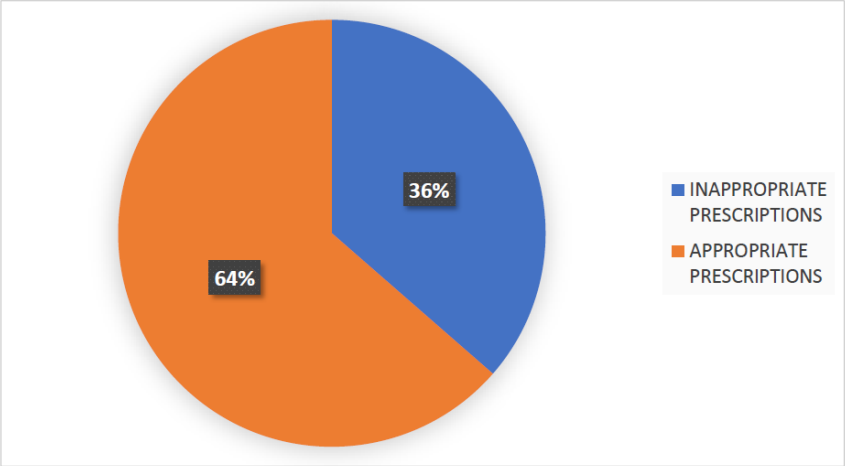

Figure number 1: Evaluation of prescriptions using Beers Criteria

Inference: The prescriptions were thoroughly screened using Beers Criteria 2022; it was found that almost 64% of the prescriptions were appropriate.

Distribution of Inappropriate Drugs prescribed according to Beers criteria

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

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

Table number 2: Inappropriate drugs Prescribed according to beers criteria

Sl no	Group 1	Frequ Ency	Group2	Frequ Ency	Group3	Frequ ency
1	Insulin (18.29%)	15	Prazosin (7.31%)	6	Quetiapine (6.09%)	6
2	Clonazepam (12.19%)	10	Chlorpheniramine (1.21%)	1	Desvenlafaxine (1.21%)	1
3	Amitriptyline (6.09%)	5	Cilastazol(1.21%)	1	Escitalopram (1.21%)	1
4	Alprazolam (6.09%)	5	Haloperidol (1.21%)	2	Paroxetine (1.21%)	1
5	Lorazepam (4.87%)	4	Hyoscyamine (1.21%)	2	Trihexyphenidyl (1.21%)	1
6	Nitrofurantoin	3	Quetiapine	1		

	(3.65%)		(1.21%)			
7	Spironolactone (3.65%)	3	Trihexyphenidyl (1.21%)	2		
8	Zolpidem (3.65%)	3				
9	Clonidine (2.43%)	2				
10	Diclofenac (2.43%)	2				
11	Dicyclomine (2.43%)	2				
12	Amiodarone (1.21%)	1				
13	Clidinium (1.21%)	1				
14	Estazolam (1.21%)	1				
15	Haloperidol (1.21%)	1				
16	Hydroxyzine (1.21%)	1				
17	Hyoscyamine (1.21%)	1				
18	Nortriptyline (1.21%)	1				
Total	74.39%	61	14.63%	15	10.97%	10

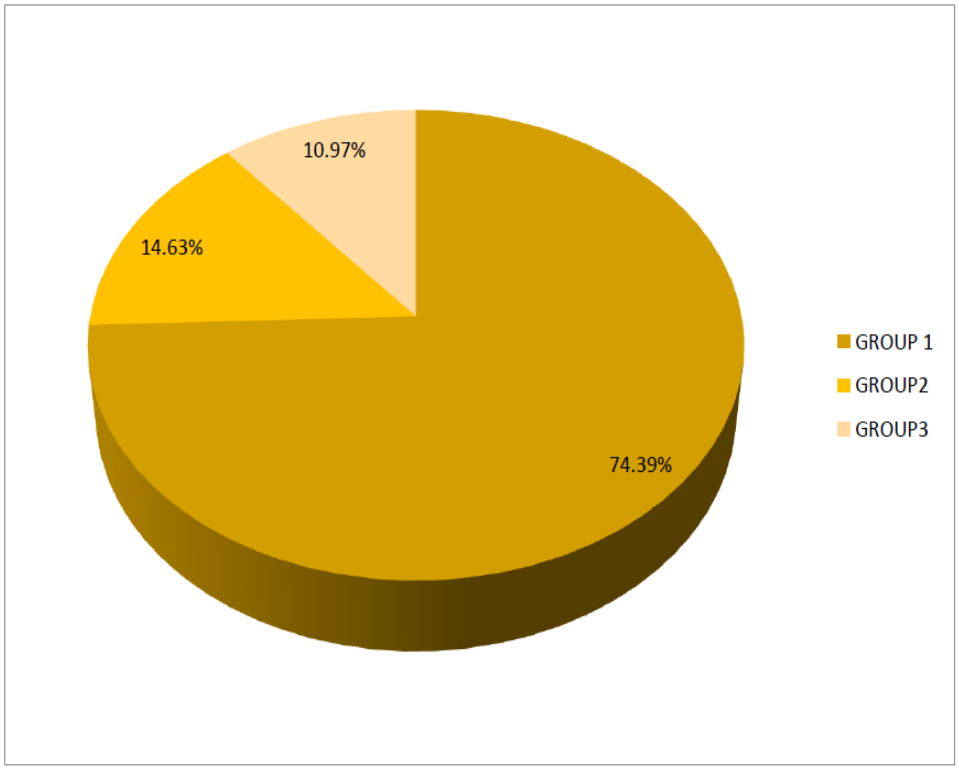

Figure number 2: Inappropriate drugs Prescribed according to beers criteria

Inference: The Drugs which were considered to be potentially inappropriate in older adults (Group-I) were prescribed the most(74.39%) followed by Drugs which may exacerbate existing disease or syndrome (Group-II)(14.63%) and the drugs to be used with caution in older adults(Group-III) (10.97%).

Table number 3: Distribution of Inappropriate Drugs prescribed as per Beers criteria.

DRUG	FREQUENCY	PERCENTAGE
Insulin	15	18.29%
Clonazepam	10	12.19%
Prazosin	6	7.31%
Quetiapine	6	7.30%
Amitriptyline	5	6.09%
Alprazolam	5	6.09%
Lorazepam	4	4.87%
Nitrofurantoin	3	3.65%
Spironolactone	3	3.65%
Zolpidem	3	3.65%
Clonidine	2	2.43%
Diclofenac	2	2.43%
Dicyclomine	2	2.43%

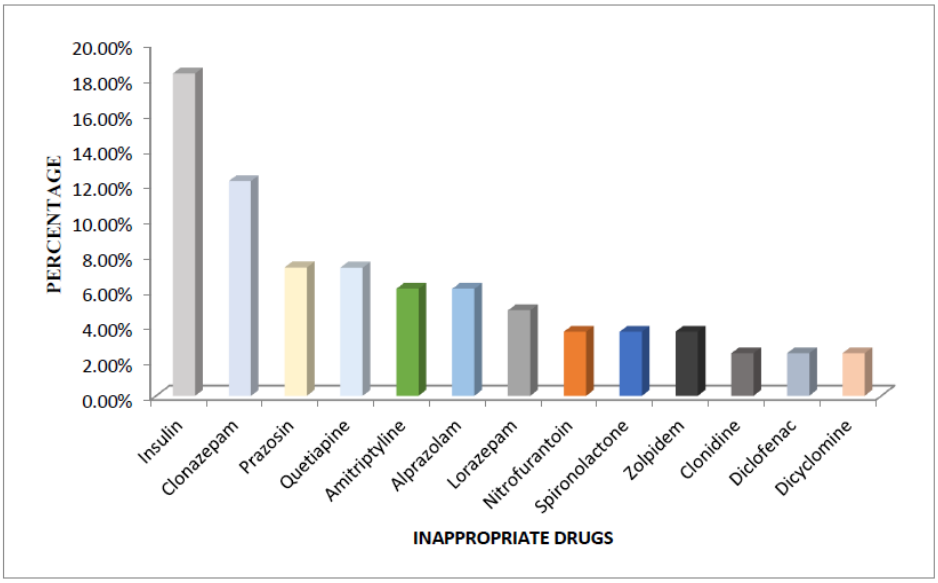

Figure number 3: Inappropriate drugs Prescribed as per Beers Criteria

Table number 4: Inappropriate drugs prescribed as per Beers Criteria

DRUG	FREQUENCY	PERCENTAGE
Haloperidol	2	2.42%
Hyoscyamine	2	2.42%
Trihexyphenidyl	2	2.42%
Amiodarone	1	1.21%

Chlorpheniramine	1	1.21%
Cilastazol	1	1.21%
Clidinium	1	1.21%
Desvenlafaxine	1	1.21%
Escitalopram	1	1.21%
Estazolam	1	1.21%
Hydroxyzine	1	1.21%
Nortriptyline	1	1.21%
Paroxetine	1	1.21%

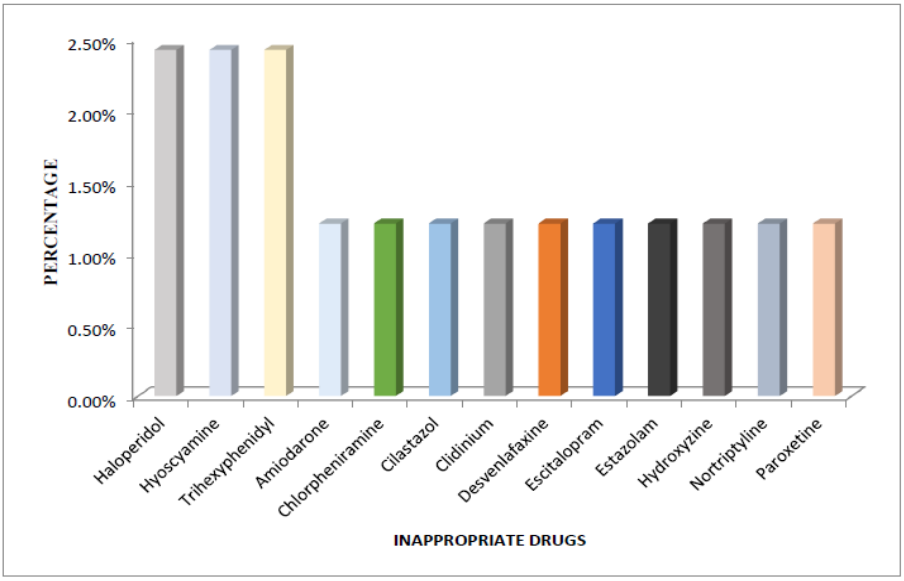

Figure number 4: Inappropriate drugs prescribed as per Beers Criteria

Inference: Based on the results, the drugs prescribed inappropriately were Insulin (18.29%), Clonazepam (12.19%), Prazosin (7.31%), Quetiapine(7.30%), Amitriptyline(6.09%), Alprazolam (6.09%) and Lorazepam (4.87%), which are to be avoided in the elderly patients.

Table number 5: Description of Errors Identified in Prescriptions

SL.NO	DRUG	NUMBER	PERCENTAGE	RECOMMENDATION
1	Insulin	15	18.29%	High risk of hypoglycaemia without improvement of hyperglycaemia.
2	Clonazepam	10	12.19%	Avoid BZD, because it increases risk of cognitive impairment, delirium, falls, fractures in elderly.
3	Prazosin	6	7.31%	Higher risk of orthostatic hypotension not recommended as routine treatment for hypertension.
4	Quetiapine	6	7.3%	Increases risk of stroke and mortality in person withdementia.

5	Amitriptyline	5	6.09%	Use with caution as it may exacerbate syndrome of hyponatremia, SIADH.
6	Alprazolam	5	6.09%	Avoid BZD, because it increases risk of cognitive impairment, delirium, falls, fractures in elderly.
7	Lorazepam	4	4.87%	Avoid BZD, because it increases risk of cognitive impairment, delirium, falls, fractures in elderly.
8	Nitrofurantoin	3	3.65%	Potential for pulmonary toxicity.
9	Spironolactone	3	3.65%	High risk of hyperkalaemia, hypotension (>25mg/dl)
10	Zolpidem	3	3.65%	BZD receptor agonists have similar adverse effects as thoseof BZD in older adults (e.g.: delirium, falls, fractures): minimal improvement in sleep latency and duration.
11	Clonidine	2	2.43%	Higher risk of adverse CNS effects, bradycardia, orthostatic hypotension.
12	Diclofenac	2	2.43%	Avoid chronic use in elderly as it leads to bleeding/peptic ulcer disease.
13	Dicyclomine	2	2.43%	Highly anticholinergic uncertain effectiveness.
14	Haloperidol	2	2.42%	Increase risk of stroke and dementia.
15	Hyoscyamine	2	2.42%	Highly anticholinergic uncertain effectiveness.
16	Trihexyphenidyl	2	2.42%	Not recommended for extrapyramidal symptoms with antipsychotics; Avoid due to effectiveness.
17	Amiodarone	1	1.21%	It is associated with multiple toxicities including thyroid disease, pulmonary disorders, and QT interval prolongation.
18	Chlorpheniramine	1	1.21%	Highly anticholinergic; increased risk of confusion, drymouth, constipation, and other anticholinergic effects.
19	Cilastazol	1	1.21%	Potential to promote fluid retention and/or exacerbate heart failure.
20	Clidinium	1	1.21%	Highly anticholinergic uncertain effectiveness

21	Desvenlafaxine	1	1.21%	Use with caution as it may exacerbate syndrome of hyponatremia, SIADH.
22	Escitalopram	1	1.21%	Use with caution as it may exacerbate syndrome of hyponatremia, SIADH.
23	Estazolam	1	1.21%	Avoid BZD, because it increases risk of cognitive impairment, delirium, falls, fractures in elderly
24	Hydroxyzine	1	1.21%	Avoid use as it is highly anticholinergic and its clearanceis decreased with age. Risk of dry mouth.
25	Nortriptyline	1	1.21%	Use with caution as it may exacerbate syndrome of hyponatremia, SIADH.
26	Paroxetine	1	1.21%	Increase risk of stroke and dementia.

Errors identified in prescriptions

CONCLUSION

Geriatric population is rising throughout the world. The aging process makes geriatric populations more prone to various chronic diseases for which more number of medications are to prescribed. The current study assessed the Drug evaluation pattern of medicines in Geriatrics according to Beers criteria - 2022. Beers criteria and other guidelines have been developed to assist in the reduction of PIMs prescribed to elderly patients. A significant number of patients receive drugs which are to be avoided as per Beers criteria in this study.

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