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Original Research Article

Cross sectional study on the prevalence of polypharmacy and potentially inappropriate medications among elderly patients in a tertiary care centre in central Kerala

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ABSTRACT

Background: Polypharmacy or the concurrent use of multiple medications, is on the rise, especially in the elderly population as they suffer from multiple co-morbidities. Polypharmacy has been reported to increase the risks for inappropriate medication intake. Objectives: The aim was to investigate the prevalence of polypharmacy and usage of potentially inappropriate medication using Beer's criteria and to find out the various risk factors of polypharmacy in hospitalised elderly.
Methods: A cross sectional study was done in patients aged 60 years and above using a pre designed semi structured questionnaire and from their case records to assess the pattern of polypharmacy by different socio-demographic characteristics and also to found out the risk factors of polypharmacy.
Results: 50 patients aged 60 and above were involved in our study out of which, 46% were females and 54% were males. Mean age of our study population was 71.5±8.3. Among them, 30 were hypertensive, 27 were diabetic, 9 of them had dyslipidaemia and 8 of them had coronary artery disease Mean number of medication use was 5.1±4.1. Polypharmacy was observed in 42% of the patients. 20% patients received potentially inappropriate drugs from Beer's list. We also found significant association of polypharmacy with diabetes mellitus and hypertension.
Conclusions: The present study has shown polypharmacy and usage of potentially inappropriate medication as an emerging public health concern. Diabetes mellitus and hypertension were found to be risk factors of polypharmacy. Deprescription should be integrated into clinical care and prescribers need to be educated about Beers criteria and encouraged for rational prescription.

Keywords: Beer's criteria, Elderly, Potentially inappropriate medication, Polypharmacy

INTRODUCTION

India, now home to 1.2 billion people, is projected to overtake China in about a decade to become the world's most populous country. Between 2010 and 2050, the number of those aged above 60 years is also expected to increase from 7% to 14% of the total population. Presently, we have about 100 million elderly in India. Elderly suffer from multiple illnesses, both acute and chronic requiring multiple hospital visits and medications from multiple specialists.

With the rise in proportion of elderly people in India, various problems related to their health are also on the rise. An estimated 50% elderly people in India suffer from at least one chronic disease that requires lifelong

medication.[1] Safe and effective prescribing of medicines in elderly continues to present a major challenge.[2]

Multimorbidity leads to use of multiple drugs, a condition known as polypharmacy. Polypharmacy has no standard definition. A simple definition would be the administration of more medicines than are clinically indicated.[3] In some studies, authors have defined the concomitant ingestion of four or more as Polypharmacy While some other studies mentioned the use of five and more medications as polypharmacy.[4-7]

Inappropriate medications can be defined, in terms of older people, as "medications or medication classes that should generally be avoided in persons 65 years or older because they are either ineffective or they pose unnecessarily high risk for older persons and a safer alternative is available.[8] 'Potentially inappropriate medicines being used as was explored using American Geriatric Association 'Beers Criteria'. The beers criteria for potentially inappropriate medication use in older adults, commonly called the Beers list, are guidelines for healthcare professionals to help improve the safety of prescribing medications.[13] Elderly form a heterogeneous group due to various factors like co-morbidities, inter individual variability in the aging process and interindividual differences in age-related pharmacokinetic and pharmacodynamic changes.[9] Multiple drug use and polypharmacy is highly prevalent in elderly, exposing them not only to adverse drug reactions but also to drug interactions, increased cost of therapy, and compliance errors.[10]

In India however, few studies have emphasized the role of polypharmacy and drug interactions among admitted elderly patients.[11,12] The literature related to the use of potentially inappropriate medications (PIMs) from India is also scarce. Hence, this study was undertaken at a tertiary care teaching hospital with the objectives of evaluating the prevalence of PIMs using Beers criteria.

METHODS

The present study was a cross sectional study to find out the prevalence of polypharmacy and potentially inappropriate medication among elderly population done in jubilee mission medical college and research institute, Thrissur for a period of 1 month July-August 2019. Potentially inappropriate medication was assessed using Beer's criteria, 2012. We also assessed the pattern of polypharmacy by different socio-demographic characteristics and also found out the risk factors of polypharmacy.

50 study subjects were selected by consecutive sampling and Study subjects were approached and verbal consent for a face to face interview was sought. The interview was based on a pre-designed semi-structured questionnaire specifically designed for this project to assess polypharmacy and potentially inappropriate medications. Prior to use, the content validity was ensured by reviewing with qualified experts from other specialties and to ensure reliability internal consistency was checked by using Cronbach's Alpha Coefficient.

Upon analysis Cronbach's alpha value was 0.75 and found to be reliable for data collection. The questionnaire included questions on socio demographics, general health status, prescription medications, over the counter medication and alternative medication taken on a daily basis. Case records were examined to confirm the details provided by the subjects regarding health status and medications.

Data analysis:

Collected data were entered in Microsoft Office Excel 2010 and analysed using SPSS. Numerical variables were expressed as mean and standard deviation and categorical variables were expressed as frequency and percentage. Chi-Square test was applied to obtain the association between various study variables. Statistical significance was considered at p-value <0.05.

RESULTS

Among 50 study subjects, 52% were aged between 60-69, 28% were aged between 70-79, 18% were aged between 80-89 and 2% was aged between 90-99 years. Mean age was found to be 71.5±8.3years.

Table 1: Socio demographic characteristics of study subjects.

Socio demographic characteristics	Frequency	Percentage
Age distribution (years)		
60-69	26	52
70-79	14	28
80-89	9	18
90-99	1	2
Gender		
Male	27	54
Female	23	46
Education		
Primary school	36	72
Secondary school	8	16
Degree and above	6	12
Marital status		
Married	37	74
Widowed	13	26
Religion		
Christian	14	28
Hindu	29	58
Muslim	7	14
Occupation		
Employed	6	12
Unemployed	44	88

Among the study subjects 46% were females and 54% were males. 72% studied upto primary school, 16% studied up to secondary school, 12% who attended college, 8% were graduates and 4% were post graduates. 74% were married and 26% were widowed (Table 1). Among the study participants 6 (12%) were employed and 44 (88%) were unemployed. Out of the unemployed, 11 (22%) were not working due to ill health and 8 (16%) were retired In our study 60% had hypertension, 54% had diabetes, 18% had dyslipidemia, 16% had coronary artery disease and 50% were having other illnesses. Other illnesses include Bronchial asthma, Chronic obstructive pulmonary disease, Thyroid disease, Cerebrovascular accident, Chronic liver disease, Chronic renal failure and Parkinsonism (Table 2).

Table 2: Distribution according to health status.

Health status	Frequency
Diabetes mellitus	27
Hypertension	30
Dyslipidemia	9
Coronary artery disease	8
Others	25

Out of the study participants 58% were taking 0-4 medications, 28% were taking 5-9 medicines, 14% were taking more than 10 medicications daily. Mean medication count was found to be 5.1±4.1. we have found out that 42% had polypharmacy (Figure 1).

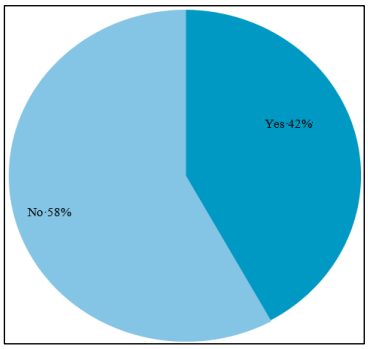

Figure 1: Distribution of polypharmacy.

Table 3: Distribution of usage of medications.

Potentially inappropriate medication	Frequency	Percentage
Yes	10	20.0
No	40	80.0
Over the counter drugs usage		
Yes	11	22.0
No	39	78.0
Use of alternate medications		
Yes	7	14.0
No	43	86.0

Table 4: Association between polypharmacy with diabetes mellitus.

Diabetes mellitus	Polypharmacy				P-value
	Present		Absent		
	N	%	N	%	
Present (27)	16	50.3	11	40.7	0.007*
Absent (23)	5	21.7	18	78.3	

*Significance at 5% level

Out of the polypharamcy 20% were found to be under potentially inappropriate medication and over the counter drugs usage is seen in 22%. 14% were reported the use of alternative system of medicine too (Table 3). Among the polypharmacy 51.9% were males but there is no significant association between polypharmacy and gender.

Out of the study subjects 50.3% of the diabetic patients and 53.3% of hypertensive patients showed polypharmacy and the association between Polypharmacy and Diabetes mellitus and hypertension were found to be statistically significant.(Table 4 and 5). 55.6% of patients with Coronary artery disease showed polypharmacy and it is not statistically significant.

Table 5: Association between polypharmacy with hypertension.

Hypertension	Polypharmacy				P value
	Present		Absent		
	N	%	N	%	
Present (30)	16	53.3	14	46.7	0.047*
Absent (20)	5	25	15	75	

*Significance at 5% level

DISCUSSION

In our study polypharmacy was found to be 42%. In a study done by Harugeri et al on 'Potentially inappropriate medication use in elderly patients in Karnataka they also found out that the distribution of polypharmacy was 44.5% which is similar to our study.[12] In a study done by Mandavi et al on 'Inappropriate drug prescribing identified among Indian elderly hospitalized patients' in Chandigarh they found out that 18% of the patients received at least one or more drugs that was identified as inappropriate which is similar to our study finding of the distribution of elderly under potentially inappropriate medication.[14]

Another study done by Zaveri et al on 'Use of potentially inappropriate medicines in elderly they found out 23.59% of patients received potentially inappropriate medication.[15]

The prevalence of potentially inappropriate medication use was lower than International studies conducted on the use of inappropriate medications among hospitalized

elderly patients in Ireland (32%), France (66%), Switzerland (22.1%), and Taiwan (23.7%).[16-19] In our study we found out significant association between polypharmacy and Diabetes mellitus.(p=0.007).

A study done by Shamna et al on 'Prescription pattern of antidiabetic drugs in the outpatient departments of hospitals in Malappuram district, Kerala' also substantiates this fact. They found that 77% of diabetic patients were under more than 5 medications in which many were multidrug combinations.[20] A study done by Paradkar SG, Sinha SR on 'Drug utilization among hypertensive patients in the outpatient department of medicine in a tertiary care hospital they found between polypharmacy and hypertension that the average number of drugs taken by a hypertensive patient was 6.[21]

Another study done by Dutta et al on 'Prevalence and risk factors of polypharmacy among elderly in India: Evidence from SAGE Data' found out that the odds of having polypharmacy is more among elderly diagnosed with hypertension, which is similar to our study finding.[22]

CONCLUSION

The present study has shown polypharmacy and usage of potentially inappropriate medication as an emerging public health concern among elderly. Polypharmacy can be avoided by sharing treatment plans and Deprescription should be integrated into clinical care. Self-medication should be avoided and they should be sensitized to avoid the use of potentially inappropriate medications. Appropriate training and awareness should be given to physicians regarding polypharmacy and their dangerous drug interactions which may help irrational prescriptions and ensure safety of the elderly.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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