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PREVALENCE OF ADVERSE DRUG REACTIONS FOLLOWING POLYPHARMACY IN ELDERLY ADMITTED IN A TERTIARY CARE HOSPITAL OF NORTH KARNATAKA - AN OBSERVATIONAL STUDY

Community Medicine

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ABSTRACT

Background-Polypharmacy is defined as the intake of 2-9 medications concurrently / taking atleast one medication that is not clinically indicated (1-5. The elderly age group is the one affected the most due to the prevalence of multiple morbidities and decreased adherence to drugs.

Objective-To find out the prevalence of adverse drug reactions following polypharmacy among senior citizens admitted in a tertiary care hospital.

Material and methods -An observational study done in tertiary care hospital attached to S. N Medical college, Bagalkot, North Karnataka on 35 elderly, over a duration of 6 months (March -August '2018) were enquired along with the caregivers about ADR's and were followed up till the end of the treatment course even after discharge through detailed telephone enquiry.

Results – the prevalence according to different classifications was calculated and out of all the ADR's 34.7% were related to the drugs used in the treatment of Cardiovascular morbidities ,56.52% being mild (Hartwig and Siegel classification) with 13 belonging to Type A (Wills and Brown classification) and 69.4% having a probable association with the drug consumed (Naranjo's probability scale)

Conclusion-The research would help increase the quality of prescriptions and thereby reducing the adverse drug reactions that occur due to polypharmacy.

KEYWORDS

prevalence, polypharmacy, adverse drug reactions, elderly.

INTRODUCTION

Polypharmacy is commonly defined as the intake of 2-9 medications ,with excessive polypharmacy being intake of more than 10 drugs .It is classified as simultaneous (at the same time), cumulative (sum of different medications administered over a period of time) and continuous (for prolonged and regular periods [6].As 7.7% [7] of the total population includes the elderly in India and as the morbidities keep on increasing with age, due to disturbed metabolism, changed pharmacodynamics and pharmacokinetics and decreased adherence to drug regime and schedule , the role of polypharmacy comes in picture. All this in turn results into Pill burden[8] which refers to the number of drugs a patient consumes on a daily basis often resulting in decreased drug adherence and intake, leading to altered drug dosages and regimes. Drugs are a double edged sword which result into adverse drug reactions commonly witnessed in the older age group. 15-50%[9] of all hospital admissions of elderly patients are due to adverse drug reactions. Forgetfulness, tremors and weakness are some of the adverse drug reactions that mimic symptoms in old age and hence go undetected. Adverse reactions may also be misinterpreted as a medical condition and lead to the prescription of additional drugs [10]. The application of published guidelines to older patients with multiple comorbidities results in polypharmacy, with high risks of drug interactions and adverse reactions.[11] The prevalence of polypharmacy in urban area, among young old elderly is 4.2% and old-old elderly is 7.5%[12].

METHODOLOGY

An observational study was conducted in HSK tertiary care hospital attached to S. Nijalingappa medical college, Bagalkot, North Karnataka. All elderly, above the age of 60 years [13] admitted to the medical/surgical/orthopedic/ENT/Ophthalmology wards of the hospital setting, for chronic illnesses, consuming more than 4 drugs at a time during the study period irrespective of the duration of hospital stay were included and followed up using their telephone number after discharge from the hospital till they completed their medication course.

Whereas, deaf, dumb and visually impaired elderly (with permanent blindness), intentional or accidental poisoning cases, cases of transfusion reactions, elderly treated on outpatient department (OPD) basis and elderly patients on drug abuse were excluded from the study. Sample size was calculated with Prevalence of musculoskeletal morbidities being the highest, i.e. 66% (Asawari Raut et al) [14] and Relative error of 15%. Sample size of 40 was derived, among whom 5 elderly, opted out. (did not give consent). Finally, 35 elderly, were selected for the study meeting the inclusion criteria

RESULTS

The results were elaborated under the following headings

1. Sociodemographic variables of the study participants.
2. Adverse drug reactions observed and their system wise classification.
3. Adverse drug reactions and their classification.

1) Sociodemographic variables of study participants – (Table-1)

Where young old [15] includes elderly in the 60-74 age group and old-old[15] includes elderly in the 75-89 age group. Out of the total 33 elderly, in the young old age group, 19 (57.57%) were males and 14(42.42%) were females. In the age group of old-old 1(50%) each were male and female respectively. In the 60-74 age group, 21(63.63%) were illiterate. In the 75-89 age group, 2(100%) were illiterate. In the 60-74 age group, 14(42.42%)were unemployed. In the 60-74 age group 14(42.42%) belong to class V modified BG Prasad's classification, 5(15.15 %) belong to class IV and class III , 6(18.18%)belong to class II and 3(9.09%) belong to class I. In the 75-89 age group, 2(100%) belong to class V of modified BG Prasad's classification. In the 60-74 age group 87.87% are living with the family. In 75-89 age group 50% are living with the family (as per table1). Detailed history was elicited through caregivers of the senior citizens who were part of the study.

Adverse drug reactions observed and their system wise classification- (Table 2) 34.7% of ADRs encountered with cardiovascular system drugs were associated to cause pedal oedema (Amlodipine) being the highest occurrence, followed by heartburn (Aspirin),Orthostatic Hypotension (Furosemide) and bronchospasm (Propranolol), followed by 5.7% of Respiratory system involvement with headache (Theophylline)being the most common. 11.4% of ADR's include endocrinal and asthenia attributed to metformin being the most common occurrence. Others included patients treated for infectious diseases with a prevalence of 8.5% headache(Metronidazole) being the most common, 2.8% were associated with renal morbidities dry mouth (Tolterodine) being the most common musculoskeletal system included 2.8% of the total prevalence constipation(Tramadol) being the most common 11.4% was the prevalence for patients treated for multiple comorbidities with headache (Amlodipine) and cough (Ramipril) being the most commonly encountered ADR's .

Adverse drug reactions and their classifications: Based on Hartwig and Siegel[16] classification 56.52% of the adverse drug reactions were mild, 30.43% were severe and 13.04% were moderate. Classification based on the Type of ADR (Wills and Brown classification)[17],13 out of the total ADRs were Type A (Augmented), 7 were Type C (Chemical) and 3 were Type D (Delayed). Based on the probability (Naranjo's

probability scale)[18] 69.4% of all the ADRs were probable, 21.8% possible, 4.4% each were doubtful and definite respectively.

DISCUSSION:

The study helps to demonstrate one of the most common problems that the elderly face due to intake of multiple drugs .The susceptibility increases with increase in comorbidities and the fact that some of the adverse drug reactions might also mimic the ongoing problem in an elderly makes it harder to separate a symptom from the adverse drug reaction In the 35 elderly that reported adverse drug reactions ,the most commonly reported was due to amlodipine causing pedal edema with an incidence of 34.7 % followed by metformin causing asthenia with an incidence of 11.4%. 7 events were severe (30.43%)3 events were moderate (13.04%) and 13 events were mild (56.52%) with the severity being more as compared to Asawari Raut et al. with a total of 319 events, 3 events (2.06%) were severe, 16 (11.03%) were moderate and 126 (86.89%) were mild.

Causality assessment was done based on Naranjos scale in which 69.4% of all the ADRs were probable, 21.8% possible, 4.4% each were doubtful and definite respectively. Which differed from a study conducted by Asawari Raut et al. in which 65.51% of the reactions were categorized as Possible, 20.06% as Probable whereas 14.42% of the reactions were "Unlikely" related to drugs.

CONCLUSION:

The study helped us to identify the adverse drug reactions which were unnoticed and were thought to be associated with the morbidities and thus we could suggest quality prescriptions for the treating physicians.

RECOMMENDATIONS

Multiple morbidities in elderly warrants the judicious use of drugs which can only be accomplished by effective prescriptions and absolute reduction in polypharmacy.

1. Polypharmacy also leads to pill burden which can be reduced by a simple and strategic tool called the drug box [19] being available for both the normal and the special population of the elderly as ones with colour coding or the ones in Braille for colour blind and visually impaired elderly respectively.
2. "SAIL" and "TIDE" are two techniques that may help reduce polypharmacy.[20]

S -Simplify drug regimens to reduce pill burden
A-be familiar with adverse effects of medicine
I-Ensure each medication has an indication and a defined, realistic therapeutic goal.

L-List the name and dose of each medication in the chart and share it with the patient and/or caregiver.

T-Allow sufficient time to address and discuss medication issues during each encounter.

I-Apply pharmacokinetic and pharmacodynamic principles to individualize medication regimens.

D-Consider potential drug-drug and drug-disease interactions.

E-Educate the patient and caregiver regarding pharmacologic and nonpharmacologic treatments.

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TABLE 1-Sociodemographic variables of study participants.

Sociodemographic variables	Male No	%	Female No	%	Total (n=35)
Age-					
60-74	19	57.58%	14	42.42%	33
75-89	1	50%	1	50%	2
Education-					
Illiterate	13	54.17%	11	45.83%	24
Primary school	5	55.56%	4	44.44%	9
High school	5	55.56%	11	45.83%	9
PUC	2	100%	4	44.44%	2
Occupation-					
Unemployed	14	51.86%	13	48.14%	27
Unskilled	4	66.67%	2	33.33%	6
Semiskilled	1	100%			1
Skilled	1	100%			1
SES (modified B.G.Prasad)					
class 1	14	60.87%	9	39.13%	23
class 2	3	60%	2	40%	5
class 3	2	33.33	4	66.67%	6
class 4	1	100%			1
class 5					

TABLE 2-Adverse drug reactions observed and their system wise classification.

SYSTEM INVOLVEMENT	DRUGS	SUSPECTED ADR	PERCENTAGE
CVS	• Amlodipine • Aspirin • Furosemide • Propranolol • Clopidogrel • Ramipril • Tramadol	• pedal edema* • heartburn • Orthostatic hypertension • Bronchospasm • Hematuria • Cough • Insomnia	34.7%
RS	• Theophylline • Cefixime	• headache • Nausea	5.7%
INFECTIOUS	• Metronidazole • Linezolid • Chloroquine	• Headache • Diarrhea • Seizures	8.5%
ENDOCRINE	• Metformin • Metformin • Pioglitazone	• Asthenia* • Hypoglycemia • Hepatotoxicity	11.4%
RENAL	• Tolterodine	• Dry mouth	2.8%
MUSCOSKELETAL	• Tramadol	• Constipation	2.8%
MULTIPLE COMORBIDITY	• Amlodipine • Ramipril • Atenolol • Haloperidol	• Headache • Cough • Dizziness • Constipation	11.4%

TABLE 3-Adverse drug reactions and their classifications-

HARTWIG AND SIEGEL CLASSIFICATION					
MILD		MODERATE		SEVERE	
No.	%	No.	%	No.	%
13	56.52%	3	13.04%	7	30.43%

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