

RESEARCH ARTICLE

A study on polypharmacy among elderly medicine in-patients of a tertiary care teaching hospital of North India

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ABSTRACT

Background: In the modern era, with the increase in the lifespan of individuals with increasing access to health-care facilities, the population of elderly is also increasing with an equal pace. However, on the other hand, with the increasing population of the elderly another important issue of polypharmacy has also emerged. Elderly people usually have more disease conditions for which more of medications are prescribed in older individuals as compared to younger population. Hence, optimizing drug therapy in this aging population is a challenging task for physician. Polypharmacy can also lead to increase in drug interactions, adverse drug reactions, and medication errors. **Aims and Objectives:** This study aims to study the polypharmacy among elderly medicine in-patients of a tertiary care teaching hospital in north India. **Materials and Methods:** It was an observational, cross-sectional, prospective study. The study was conducted in patients admitted in general medicine wards at Acharya Shri Chander College of Medical Sciences and Hospital, Sidhra, Jammu, Jammu and Kashmir. The study involved 64 elderly patients (above 65 years of age) of either sex for 3 months from February to March 2017. Data were collected through review of case files of all elderly patients admitted in medicine department. The information recorded included the demographic details of the patients, diagnosis, comorbid illnesses, details about medications being, the total number of drugs being used, and the factors associated with polypharmacy. **Results:** A total of 64 geriatrics were included in the study. Of 64, 29 were male and 35 were female. 32.8% of them were in the age group between 65 and 70 years. Polypharmacy was found (>5 medications/day) in 34 (53.13%) of geriatrics. Polypharmacy was found in males with 5.86 medications/day. In females, average medications/day was 4.16. Among associated clinical conditions, hypertension was found in 57.8% of study participants. Gastritis was found in 42.2% of patients. Usage of cardiovascular drugs was seen in 85.9% of study participants followed by gastrointestinal tract (GIT) drugs were used in 73.4% of individuals. **Conclusion:** Polypharmacy was found in 57.8% of individuals and highest in the age group between 76 and 80 years. Therefore, to counteract the problems associated with polypharmacy, regular follow-ups and proper monitoring of drug regimens of older individuals are the need of the hour.

KEY WORDS: Polypharmacy; Geriatrics; Elderly

INTRODUCTION

In the modern era, with the increase in the lifespan of individuals due to increased access to health-care facilities, the population of elderly is also increasing with an equal pace. However, on the other hand, with the increasing population of the elderly, the issue of polypharmacy has also emerged. The term polypharmacy is defined as the use

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of multiple medications by a patient, but generally, it ranges from 5 to 10.^[1] The use of multiple medications by a patient leads to many problems such as the drug interactions among different drugs taken together, increase in adverse drug reactions, decrease in the compliance of patients taking so many medications together, unnecessary drug expense, and all these factors putting together lead to poor quality of life of patients.^[2,3] Polypharmacy is an important issue in elderly people who tend to have more disease conditions for which therapies are prescribed as compared younger individuals.^[4]

In India, the population of the elderly as per the 1951 census was 20 million. It increased to 57 million as per the census conducted on 1991. Furthermore, a sharp increase has been noticed in the population of the elderly between 1991 and 2001, and it has been projected that the number of elderly people would rise to about 324 million by the end of the year 2050.^[5] Thus, this demographic transition in the elderly population poses a significant challenge for health authorities worldwide as with increase in age, multiple chronic diseases such as heart disease, diabetes mellitus, hypertension, arthritis, and renal diseases are associated. Therefore, with the increasing rate of chronic illnesses among the elderly people, the likelihood of taking multiple medications by the elderly is also increasing.^[6]

In the elderly people, a drug prescription should always be written with utmost care keeping in mind the possibility of adverse drug reactions. Therefore, writing a drug prescription in the elderly should be considered as a serious challenge. In older adults, due to age-related changes in pharmacodynamics (the effect of drug on the body) and pharmacokinetics (i.e., absorption, distribution, metabolism, and excretion), many medications need to be used with special caution. Apart from these pharmacodynamic and pharmacokinetic changes, numerous other factors also contribute to the increased risk for developing drug-related problems in older individuals. These include coexisting medical illnesses, memory issues, and use of multiple prescribed and non-prescribed drugs by the elderly individuals.^[7]

According to National Health and Nutrition Examination Survey (NHANES III) in India, about 74% of the elderly population use prescribed medications. About half of these individuals aged between 65 and 74 years, use two or more prescribed medications and 12% of these individuals use five or more of prescribed drugs.^[8] Furthermore, along with this, the use of inappropriate medication among elderly patients is very common and is a major public health concern. It is estimated to be the fifth major cause of death. Thus, polypharmacy is a very important health-related issue, especially among the elderly that needs to be addressed urgently as polypharmacy can lead to affect the quality of life of the elderly.^[9]

However, polypharmacy may be the only option for the adequate treatment of comorbidities when properly recommended and

when side effects are monitored regularly.^[10] Therefore, to plan necessary actions that can promote the rational use of medications and thereby can promote a better quality of life in this age group, characteristics and factors associated with polypharmacy need to be identified, especially when there remains a gap in the knowledge of age-based differentials in the pharmacotherapy by the elderly.^[11] Studies in the predictors of polypharmacy among elderly are very scarce. Therefore, the present study was taken to study the factors associated with polypharmacy in elderly population.

MATERIALS AND METHODS

It was a cross-sectional, prospective, observational study. The study was conducted in medicine in-patients at Acharya Shri Chander College of Medical Sciences and Hospital (ASCOMS and H), Sidhra, Jammu, Jammu and Kashmir. The study was carried out on elderly patients (above 65 years of age) of either sex for 3 months from January 2017 to March 2017. Ethical approval was obtained from institutional ethics committee before commencement of the study.

A total of 64 in-patients of medicine department were enrolled in the study after evaluating for inclusion and exclusion criteria.^[12] The purpose of the study was explained and written informed consent was obtained from all the participants. The patients who were not willing to participate in the study and the patients whose case record files were incomplete or were admitted in the emergency medicine wards were excluded from the study. For the collection of the data, the case record files of all the patients admitted to the department of medicine were thoroughly reviewed each day during the study period. The case record file of each patient was considered only once for evaluating the data, most preferably on the date of discharge or a day before discharge date. Patients were also interviewed personally about any other concomitant drug intake which was not mentioned by them in the case record file.

As there is no standard definition of polypharmacy, we followed definition given by Kaufman and grouped prescribed medications into four groups <4, 5–9, 10–14, and >15 per day.^[12] The information recorded included the demographic details of the patients, diagnosis, comorbid illnesses, details about medications being, the total number of drugs being used, and the factors associated with polypharmacy. The data so obtained were analyzed using simple descriptive statistics.

RESULTS

A total of 64 geriatrics were included in the study. Of 64, 29 were male and 35 were female. 32.8% of them were in the age group between 65 and 70 years. 20.3% of them belonged to 71–75 years and 17.2% were >85 years of age [Table 1]. Polypharmacy was found (>5 medications/day) in

34 (53.13%) of geriatrics. 57.8% of them found to be using 5–9 medications/day. 39.1% of them using ≤ 4 medications/day [Table 2]. In the age group of 65–70 and 71–75 years, average medication/day was 5.4 and 4.6, respectively, whereas, in the age group of 76–80 and 81–85 years, average medication/day was 5.7 and 4.9, respectively. In >80 years of age group, 4.9 drugs were consumed per day [Table 3]. Polypharmacy was found in males with 5.86 medications/day. In females, average medications/day was 4.16 [Table 4]. Among associated clinical conditions, hypertension was found in 57.8% of study participants. Gastritis was found in 42.2% of patients. Osteoarthritis was found in 40.6% of patients. Diabetes mellitus was found in 29.7% and chronic obstructive pulmonary disease was found in 20.3% of patients [Table 5].

GIT drugs were used in 73.4% of individuals. Among them, H2 blockers like ranitidine were found to be used in 21.8% of individuals. Proton-pump inhibitors such as omeprazole and pantoprazole, and drugs for constipation such as bisacodyl were used in 35.9% and 12.5%, respectively. Antimotility like loperamide drugs was used in 3.1% of individuals. Nonsteroidal anti-inflammatory drugs (NSAIDs) such as paracetamol, diclofenac, and nimesulide were used in 62.5% of individuals.

Table 1: Demographic details of the patients

Age group	Males	Females	Total (%)
65–70	9	12	21 (32.8)
71–75	5	8	13 (20.3)
76–80	5	6	11 (17.2)
81–85	4	4	8 (12.5)
>85	6	5	11 (17.2)
Total	29	35	64

Table 2: Average number of medications used/day

Average number of drugs used/day	n (%)
≤ 4	25 (39.1)
5–9	37 (57.8)
10–14	2 (3.1)
>15	0 (0)

Table 3: Age-wise usage of average medications/day

Age group (years)	n (%)	Average number of drugs consumption/day
65–70	21 (32.8)	5.4
71–75	13 (20.3)	4.6
76–80	11 (17.2)	5.7
81–85	8 (12.5)	4.9
>85	11 (17.2)	4.9

Usage of cardiovascular drugs was seen in 85.9% of study participants. Among these calcium channel blockers like amlodipine usage were found in 32.8%. Angiotensin receptor blockers such as losartan and telmisartan and beta blockers such as atenolol and metoprolol usage were found in 12.5% and 9.4% of individuals, respectively. Antiplatelets such as aspirin and clopidogrel and statins like atorvastatin usage were found in 20.3% and 10.9%, respectively.

Endocrine system drugs were used in 37.5% individuals. Oral hypoglycemic agents such as metformin and sulfonylureas

Table 4: Sex-wise distribution of average medications/day

Sex	n (%)	Average number of drug consumption
Males	29 (45.3)	5.86
Females	35 (54.7)	4.16

Table 5: Associated clinical conditions

Clinical conditions	n (%)
Hypertension	37 (57.8)
Diabetes mellitus	19 (29.7)
COPD	13 (20.3)
Osteoarthritis	26 (40.6)
Gastritis	27 (42.2)
Others (dyslipidemia, CVA, PVD, epilepsy)	11 (17.2)

COPD: Chronic obstructive pulmonary disease, CVA: Cerebrovascular accident, PVD: Peripheral vascular disease

Table 6: System wise commonly used drugs

System	Drugs	n (%)
Cardiovascular system	CCBs (amlodipine)	21 (32.8)
	ARBs (losartan/telmisartan)	8 (12.5)
	Beta blockers (atenolol, metoprolol)	6 (9.4)
	Antiplatelet (aspirin, clopidogrel)	13 (20.3)
	Statins (atorvastatin)	7 (10.9)
Gastrointestinal system	H2 blockers (ranitidine)	14 (21.8)
	Proton-pump inhibitors (omeprazole, pantoprazole)	23 (35.9)
	Drugs for constipation (bisacodyl)	8 (12.5)
	Antimotility drugs (loperamide)	2 (3.1)
Endocrine system	Oral hypoglycemic agents (metformin, sulfonylureas)	8 (12.5)
	Insulin	11 (17.2)
NSAIDs	Paracetamol, diclofenac, nimesulide	40 (62.5)
RS	Theophylline, salbutamol	33 (51.6)
Others	B. complex, calcium (multivitamins)	41 (64.1)

NSAIDs: Nonsteroidal anti-inflammatory drugs, RS: Respiratory system, ARBs: Angiotensin receptor blockers, CCBs: Calcium channel blockers

Table 7: Age-wise prescribing frequency of group of drugs

Age (years)	CVS	GIT	Endocrine	NSAIDS	RS	Others
65–70	16	17	12	8	7	12
71–75	12	11	4	6	11	7
76–80	8	8	3	5	4	13
81–85	10	6	2	10	7	6
>85	9	5	3	11	5	8

NSAIDs: Nonsteroidal anti-inflammatory drugs, CVS: Cardiovascular system, RS: Respiratory system

were used in almost 12.5%. Insulin usage was found only in 17.2% of individuals. Respiratory system (RS) drugs such as theophylline and salbutamol were used in 51.6% of individuals, and other drugs such as B. complex and calcium (multivitamins) usage were 64.1% [Table 6].

In the present study, the age-wise prescribing frequency of different groups of drugs was also noted down. Among 65–70 age group, GIT and cardiovascular system (CVS) drugs were used more. In 71–75 years age group, CVS, GIT, and RS drugs were used more. In 76–80 years age group of individuals, GIT and other drugs usage was more, and in 81–85 years age group, CVS and NSAIDS drug usage was more [Table 7].

DISCUSSION

In the elderly population, regular monitoring of the drug regimens is required so as to control or minimize the polypharmacy. Periodic monitoring of the drug regimens may reflect any change that needs to be done in the prescribed drug therapy. The changes may include change in the drug dosage, substituting a drug with another safer alternative, and discontinuing the medications for the illnesses from which the patient has been recovered or adding a new medication.^[13] A medication review should consider whether a change in patient status (e.g., renal or liver function) might necessitate dosing adjustment, the potential for drug-drug interaction, whether patient symptoms might reflect a drug side effect, or whether the regimen could be simplified.^[14] Elderly people are more prone to develop multiple and chronic illnesses due to declining immune status with advancing age so the number of prescribed drugs is more in such individuals.

In our study, polypharmacy was found highest in the age group of 76–80 years (5.7 average number of drug consumption/day) next highest with 65–70 years of age group (5.4). Comparing polypharmacy with respect to sex, it was found to be more in male individuals (5.86) average drugs consumption per day compared to females (4.16). These findings are in comparison with the study conducted by Mohammed *et al.*^[15]

In our study, out of 64 geriatrics population, polypharmacy,

use of more than 5 drugs per day, was found in 57.8% of individuals. The most common group of drugs used is gastrointestinal system drugs (68.75%) and the most common drug among gastrointestinal drugs being used is Tab. pantoprazole 40 mg in 15 (23.4%) for peptic ulcer disease and acute gastritis. Highest use of GIT drugs was found in the age group of 65–70 years. This is similar to the study by Shah *et al.*^[16] and Rambhade *et al.*^[17] Next commonly used group of drugs is NSAIDs (62.5%) and the most common drug among NSAIDs used is Tab. diclofenac 50 mg in 27 (42.2%) patients for complaints of knee arthritis. Among cardiovascular drugs, antihypertensive drugs were prescribed in 50% of elderly patients; most commonly prescribed drug is Tab. amlodipine 5 mg in 32.8%. Oral hypoglycemic agents were prescribed in 12.5% of the individuals and the most common prescribed drug is Tab. metformin 500 mg in 6.25%.

However, the present study had few limitations being less of sample size taken and involving only one specialty. Thus, to make prescriptions more rational, other studies need to be done involving larger elderly population and multiple specialties.

CONCLUSION

In the present study, polypharmacy was found in 57.8% of individuals and highest in the age group between 76 and 80 years. Thus, to minimize or to control polypharmacy, more of such studies are needed to be done in this field to address the issue of polypharmacy. Moreover, there is also a need to inculcate a more responsive attitude among health-care professionals toward the elderly individuals so that at every follow-up visit their drug regimens are thoroughly evaluated to prevent polypharmacy-related problems and to improve the quality of life of elderly individuals.

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