

**COMPARISON OF POLYPHARMACY BETWEEN GERIATRIC AND NONGERIATRIC DIABETIC PATIENTS**Rajeshwari Shastry^{1*}, Prabha Adhikari MR², Ullal Sheetal D¹, Shashidhar Kotian M³Department of ¹Pharmacology, ²Medicine & ³Community Medicine, Kasturba Medical College, Mangaluru, Manipal University, Manipal, Karnataka, India 575001***Corresponding author e-mail:** rajeshwari.shastry@manipal.edu*Received on: 10-10-2015; Revised on: 16-11-2015; Accepted on: 21-12-2015***ABSTRACT**

Geriatric diabetics have comorbidities, requiring multiple drugs. This study was conducted to compare polypharmacy between geriatric and nongeriatric diabetics. Cross sectional study conducted in type 2 diabetics, grouped into geriatric and nongeriatric. Patients' demographic data, duration of diabetes and drugs prescribed were recorded. Polypharmacy was defined as five drugs or more per prescription. Students' t test and Chi square test were the statistical tests. A total of 477 diabetics were included (geriatrics $n=320$, nongeriatrics $n=157$); mean ages were 68.31 ± 6.06 and 49.91 ± 6.93 respectively. Comorbidities observed were hypertension, coronary artery disease (CAD), dyslipidemia, peripheral neuropathy, retinopathy, nephropathy and hypothyroidism. Significantly more geriatrics had hypertension (78.75% versus 53.5%) and CAD (31.25% versus 13.37%; $p=0.0001$). Polypharmacy was noted in 133 (41.6%) geriatrics and 40 (25.5%) nongeriatrics ($p=0.0009$). Total number of drugs per prescription among geriatrics and nongeriatrics was 4.32 ± 2.01 vs 3.39 ± 1.92 ; $p<0.001$. Mean number of drugs for diabetes and hypertension were equal among both groups. However, polypharmacy was more in geriatric diabetics, which is due to high prevalence of CAD.

Keywords: Geriatrics, Nongeriatrics, Diabetes, Polypharmacy**INTRODUCTION**

Growing old is common to all species. There are 77 million (7.4%) elderly people in India. This is expected to rise to 178 million by 2030; ^[1] consequently the burden on the health care system and society will increase. As our population continues to age and live longer, the focus of medical care seems to be shifting towards the elderly. ^[2,3] For centuries diabetes mellitus has been a known health problem and continues to be a challenge even in the 21st century. ^[4]

Polypharmacy, the administration of multiple medications is defined as the use of five or more medications. ^[5] It occurs in 20-40% of elderly patients. ^[6] Polytherapy is mandatory in the management of common ailments affecting patients

in geriatric age group and may be justified due to comorbidities or severe illness. ^[7] However, polypharmacy is also associated with poor health outcomes^[8] especially in older persons as it increases the risk of adverse drug reactions, drug interactions, hospitalizations and reduced compliance. It also contributes to increased health care costs. ^[9] Thus clinicians treating diabetic patients face a therapeutic enigma: balancing the needs of their patients, attempting to achieve optimum control of medical problems while trying to keep medication profiles simple and small. Hence the present study was undertaken to evaluate and compare polypharmacy between geriatric and nongeriatric diabetic patients.

MATERIALS AND METHODS

This was a cross sectional study conducted in a tertiary care teaching hospital for a period of one year. Prior approval from the Institutional Ethics Committee was taken. A written informed consent was obtained from each participant in the vernacular language. Patients with type 2 diabetes mellitus were grouped into geriatric (age \geq 60years) and nongeriatric. Patients' demographic data, duration of diabetes and drugs prescribed for comorbidities were recorded. Polypharmacy in patients was defined as five drugs or more per prescription.

Statistical Analysis: Students' unpaired t test was used to compare the groups. Chi square test was done to analyze distribution of patients with regard to polypharmacy. The level of significance was set at 0.05.

RESULTS

A total of 477 diabetic patients were included (geriatrics $n = 320$, nongeriatrics $n = 157$) in the study; mean ages were 68.31 ± 6.06 and 49.91 ± 6.93 ($p=0.001$) respectively. Table 1 shows the distribution of comorbidities between the groups. Significantly more number of patients in geriatrics had hypertension (78.75% versus 53.5%) and CAD (31.25% versus 13.37%) compared to nongeriatrics ($p=0.0001$).

Comparison of polypharmacy showed statistically significant difference between geriatrics and nongeriatrics (Table 2) indicating that significantly higher number of geriatric diabetics are receiving polypharmacy.

Table 3 shows comparison of mean number of antidiabetic and antihypertensive drugs per prescription among geriatrics and nongeriatrics. There was no significant difference between the groups.

Table 4 shows comparison of total number of drugs per prescription among geriatrics and nongeriatrics. The difference was statistically significant.

DISCUSSION

As medical science is progressing, the life span of the population is increasing. This has resulted in an exponential rise in the number of elderly people in the society. The geriatric age group is fraught with multiple ailments. Treating a geriatric patient is a challenge in itself since most diseases are worse in the elderly. There is a progressive decline in counter-regulatory (homeostatic) mechanisms and age related changes in kidney and liver function which are the

most important physiological changes to consider when selecting an appropriate regimen for older adults. Hence polypharmacy should be employed with great caution in the elderly.

Diabetic patients usually have comorbidities, thus requiring drugs to control not only hyperglycaemia but also to treat diabetes related complications and comorbidities. Hence the number of drugs patients are on is usually high. This problem is compounded in the geriatric age group. Hence this study was planned.

In the present study 36.3% of patients were on ≥ 5 drugs (geriatrics=41.6%; nongeriatrics=25.5%) and mean drugs used per prescription was 4.01 ± 2.02 (geriatrics 4.32 ± 2.01 ; nongeriatrics 3.39 ± 1.92). In a previous study of patients randomly chosen from an outpatient clinic at Veterans Affairs Hospital (primarily a geriatric population), the mean number of medications was five, 65% were taking more than four drugs.^[10] Another study of Swedish elderly found that 39% were taking five or more drugs concomitantly.^[5] In our study 5.9% of the patients were receiving one drug, 12.8% were on two drugs, 20.3% on three drugs, 19.4% four drugs and 41.6% were using five or more drugs. This result was contrary to that published by Arslan S *et al*^[11] where 28.2% were on one drug, 24.3% two drugs, 18.5% three drugs, 11.7% four drugs and 17.3% were using five or more drugs. The reason for these contrasting reports could be that patients in the study conducted by Arslan S *et al*, were elderly with or without diabetes. In our study as all the patients were diabetics, it is likely that such patients will have a greater incidence of polypharmacy due to presence of co-morbidities (hypertension, dyslipidemia, CAD, neuropathy, renal disease) associated with diabetes which also require drug therapy.

There was no difference between the number of drugs used for diabetes or hypertension in both the populations. But total number of drugs per prescription was significantly higher in the elderly patients. This increased number of drugs in the elderly is due to increased prevalence of CAD which is responsible for polypharmacy and not hypertension. The use of nitrates and aspirin for CAD was significantly higher in the geriatric population.

CONCLUSION

The mean number of drugs prescribed for diabetes and hypertension were equal among both geriatrics and non-geriatrics. However, polypharmacy was more in geriatric diabetics, which is due to high prevalence of coronary artery disease in geriatrics.

Table 1. Distribution of Comorbidities

Comorbidities	Geriatrics n= 320 (%)	Nongeriatrics n=157 (%)	X ² value	p value
Hypertension	252 (78.75)	84 (53.50)	34.04	0.0001*
CAD	100 (31.25)	21 (13.37)	16.84	0.0001*
Dyslipidemia	71 (22.18)	25 (15.92)	2.19	0.14
Peripheral neuropathy	76 (23.75)	27 (17.19)	2.29	0.13
Retinopathy	23 (7.18)	9 (5.73)	0.16	0.67
Nephropathy	18 (5.62)	7 (4.45)	0.10	0.75
Hypothyroidism	13 (4.1)	8 (5.1)	0.09	0.78

CAD= Coronary Artery Disease; * significant

Table 2. Comparison of polypharmacy

Number of drugs	Geriatrics n (%)	Nongeriatrics n (%)	X ²
< 5	187 (58.4)	117 (74.5)	11.103
≥ 5	133 (41.6)	40 (25.5)	p=0.0009*

* significant

Table 3. Comparison of antidiabetic and antihypertensive drugs per prescription

Drugs	Geriatrics		Nongeriatrics	
	Numbers	Mean ± SD	Numbers	Mean ± SD
Antidiabetics	320	1.82 ± 0.70	157	1.83 ± 0.66
Antihypertensives	252	1.59 ± 0.77	84	1.53 ± 0.70

Table 4. Comparison of total number of drugs per prescription

Groups	Total number of drugs (Mean ± SD)	t - value	p - value
Geriatrics	4.32 ± 2.01	4.83	<0.001*
Nongeriatrics	3.39 ± 1.92		

* significant

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