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Cost Analysis of Drugs Used In Elderly Patients with Cardiovascular Disorder.

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ABSTRACT

This study was conducted to estimate the cost of medications and polypharmacy in elderly with cardiovascular disorders. A retrospective cross-sectional study was conducted for six months in the outpatient department of a tertiary care hospital. The medical records of patients ≥ 60 years with cardiovascular diseases were reviewed. Demographic data and drugs prescribed for cardiovascular diseases along with other co morbidities were recorded. A total of 204 prescriptions were analyzed. Hypertension (86.2%) and coronary artery disease (19.6%) were the most often encountered cardiovascular diseases. Diabetes mellitus (53.4%) was the common comorbidity. There were 990 drug formulations among 204 prescriptions. Mean number of drugs per prescription was 4.85. Total daily cost of the prescriptions was INR 3901.91 and average cost/prescription/day was INR 19.12. Total cost of drugs for cardiovascular diseases was INR 1766.66 and average cost/prescription/day for cardiovascular diseases was INR 8.66. Total cost of anti-diabetic medications was INR 722.9 and mean cost/prescription/day was INR 3.54. Polypharmacy was seen in 113 (55.39%) patients. Cost of medication used for cardiovascular disease accounts for 45% of the total cost. Choosing less expensive and generic drugs is an effective way to save financial resources in elderly. Polypharmacy is prevalent in about 55% of the patients.

Keywords: Elderly, Cardiovascular diseases, Polypharmacy, Cost analysis.

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INTRODUCTION

The elderly population is one of the fastest growing segments in the world. It is estimated that Indians aged 60 and older will rise from 7.5% in 2010 to 11.1% by 2025 [1,2]. More than 50% of older adults have three or more chronic diseases of which cardiovascular & mental diseases are the most common [3]. Cardiovascular diseases (CVD) are the leading cause of death among elderly patients. The prevalence of cardiovascular diseases (CVD) such as hypertension, coronary artery disease and heart failure increases with age hence cardiovascular drugs are frequently prescribed for older people [4]. By 2020, coronary artery disease (CAD) is forecasted to be the most common cause of death globally and is a major burden with increasing number of cases in developing countries including India [5,6,7,8]. Various combinations of drugs are available for the management of CVD. Because of presence of comorbidities elderly will be on multiple medications which results in drug interaction, adverse drug reaction and increased pill burden as well as cost.

The common concern in the disease management of elderly is independence and financial burden of chronic disease on themselves as well as on their families. Hence it is important to understand these parameters before prescribing an expensive medication to this vulnerable population. It is always better to lookout for cheaper alternative therapies. Hence the present study was planned to estimate the cost of medications and polypharmacy in elderly patients with cardiovascular disorders.

MATERIALS AND METHODS

A retrospective cross-sectional study was conducted for a period of 6 months in the outpatient department of a tertiary care teaching hospital. The study was approved by the Institutional Ethics committee (IEC). The medical records of 204 elderly patients (≥ 60 years) with cardiovascular diseases like coronary artery disease, heart failure or hypertension were reviewed. Patients' demographic data and drugs prescribed for cardiovascular diseases along with other drugs used for their co-morbidities were recorded. The drugs used by the patient at the time of their last visit to the hospital were considered. The number of drugs prescribed in every prescription was taken into account to calculate the incidence of polypharmacy. Polypharmacy was defined as five drugs or more per prescription [9]. Brand names were identified and cost calculated using the website www.cimsacia.com. Cost of each drug in all the prescriptions were considered to get the average cost of medications per day. Prescribing frequency was expressed as a percentage of the number of prescriptions for each of the listed drugs out of the total number of prescriptions. The results were analyzed using percentage or means to summarize the distribution of each variable.

RESULTS

A total of 204 elderly patients' records were evaluated. Out of these 102 were males and 102 were females. The mean age was 69.68 ± 6.72 years. Table 1 shows distribution of prescription according to age and gender. More than 50% of the patients were in the age group 60 – 70 years.

Table 1: Distribution of prescription according to age/gender

Age (Years)	Number of prescriptions in males	Number of prescriptions in females	Total Number of prescriptions (%)
60-65	28	35	63 (30.88%)
66-70	27	30	57 (27.94%)
71-75	25	19	44 (21.56%)
76-80	17	12	29 (14.21%)
>80	5	6	11 (5.39%)
TOTAL	102	102	204

Around 50 patients (24.5%) had single disease, 73 patients (35.78%) had two diseases and 81 patients (39.70%) had three diseases. Table 2 shows distribution of prescriptions according to CVD and comorbidities. Hypertension (86.2%) and coronary artery disease (19.6%) were the most often encountered CVD. Diabetes mellitus (53.4%) was the common comorbidity.

Table 2: Distribution of prescription according to cardiovascular disease & comorbidity

Diseases	Number of prescription (%)*
Hypertension	176 (86.27)
Coronary artery disease	40 (19.6)
Heart failure	3 (1.47)
Diabetes mellitus	109 (53.43)
Dyslipidemia	35 (17.15)
Chronic obstructive pulmonary diseases	15 (7.35)
Others	77 (37.74)

*Total exceeds 100%, since the average patients had more than one disease.

Table 3 gives the number of drugs prescribed and cost of medication for CVD and diabetes mellitus. A total of 990 drugs were prescribed in the study population and the average number of drugs prescribed per prescription was 4.85. The total cost per day of all the medications used in the prescription was 3901.91 INR whereas the total cost of drugs used for CVD was 1799.66 INR with average cost of 8.66 INR per day.

Table 3: Analysis of prescription and cost of medications with cardiovascular disease & diabetes mellitus

Details of prescription	Numbers
Total no of prescription	204
Total no of drugs prescribed	990
Average no of drugs per prescription	4.85
No of fixed dose combination	128
Details of cost (in INR)	
Total cost of medications in all the prescriptions / day	3901.91
Average cost / prescription / day	19.12
Total cost of medications for cardiovascular diseases	1766.66
Average cost of medication for cardiovascular diseases / prescription / day	8.66
Total cost of diabetic medication	722.9
Average cost of diabetic medication / prescription / day	3.54

Table 4 gives age wise distribution of patients according to the number of drugs used per prescription. About 55.39% of the patients were on polypharmacy.

Table 4: Polypharmacy

Number of drugs/ prescription	Age					Total n=204
	60-65 n=63	66-70 n=57	71-75 n=44	76-80 n=29	>80 n=11	
<5	35	24	20	11	1	91
≥5	28	33	24	18	10	113

Drugs prescribed for CVD were beta blockers in 66 patients (32.3%), calcium channel blockers in 12 (5.8%) patients, nitrates in 25 (12.25%) patients, antiplatelets in 68 (33.3%) patients, diuretics in 38 (18.6%) patients, statins in 41 (20.09%) patients, angiotensin receptor blocker and angiotensin converting enzyme inhibitors in 48 (23.5%) patients each. For diabetes mellitus metformin (42.1%), sulfonylureas (30.8%) and insulin (10.7%) were the commonly used drugs.

DISCUSSION

As the population ages, the prevalence of chronic diseases increases resulting in an increased number of medications as well as an increase in the cost of treatment. Cardiovascular diseases are one of the chronic diseases and the main cause of death in older adults. In the present study hypertension, CAD, and heart failure were the commonly encountered CVD. A same trend has been noted in the earlier studies also [10,11]. Diabetes mellitus was the most common comorbidity in our study and it can be a primary factor in turning silent cardiovascular disease into clinical disease. Average cost of medications per day was INR 19.12 with an average cost of INR 8.66 for CVD and INR 3.54 for diabetes mellitus. Presence of diabetes mellitus had

contributed to the increased cost in these prescriptions. Use of antiplatelet agents and statins for primary prevention of coronary artery disease had also added to the cost of medications. Hence choosing less expensive brands or generic formulations can substantially reduce the cost. The average number of drugs per prescription is an important index and should be kept as low as possible to reduce polypharmacy in elderly. In our study, the average number of drugs prescribed was 4.85 which were similar to other studies [12,13]. However there is literature which shows that average number of prescribed drugs ranges between 2 to 9 [11,14,15]. Polypharmacy results in drug-drug interaction, adverse drug reaction and increased number of hospitalization and increased cost. In the present study polypharmacy was noted in about 55% of the patients which was relatively low compared to earlier reports [13,16]. Though polypharmacy is common and expected in elderly because of long standing disease requiring combination therapy as well as presence of comorbidies like diabetes mellitus which require more than one drug to have a good control, efforts should be made to reduce the cost of therapy especially in this population which may not be financially independent.

One of the limitations of our study is that it was a retrospective cross sectional study with a small sample size. Future research with longitudinal studies of different cost sharing treatment strategies for chronic illnesses with better clinical benefit are needed to understand the health economic burden in this population.

CONCLUSION

Cost of medication used for cardiovascular disease accounts for 45% of the total cost. Choosing less expensive and generic drugs is an effective way to save financial resources in elderly. Polypharmacy is prevalent in about 55% of the patients.

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