International Journal of Research and Development in Pharmacy and Life Sciences
Available online at http//www.ijrdpl.com
December - January, 2015, Vol. 4, No.1, pp 1371-1374
ISSN (P): 2393-932X, ISSN (E): 2278-0238

Research Article

COST ANALYSIS OF ANTIHYPERTENSIVE DRUGS PRESCRIBED IN A TERTIARY CARE TEACHING HOSPITAL

Juno J. Joel*, Nittu Daniel, Shastry C.S

Department of Pharmacy Practice, NGSM Institute of Pharmaceutical Sciences, Mangalore

***Corresponding Author: Email junojoel@nitte.edu.in**

(Received: September 22, 2014; **Accepted**: November 16, 2014**)**

ABSTRACT

The present study was undertaken with an aim to perform the cost analysis of antihypertensive drugs prescribed in a university teaching hospital.Total of 210 patients were included during the study period of six months. Antihypertensives were prescribed to 210 patients during the study period, 118 males and 92 females.Pattern of use and cost of antihypertensive drugs prescribed alone or in combinations during the study period was determined.7226.06 INR was accounted for the total antihypertensive drugs prescribed with calcium channel blockers contributing the highest cost of 33.1% (2390.79 INR). Highest average cost per prescription was obtained for Angiotensin converting enzyme inhibitors (58.37 INR) followed by angiotensin receptor blockers (43.37 INR).

Keywords: Antihypertensive, Cost-analysis.

INTRODUCTION

Hypertension is one of the major chronic diseases resulting into high mortality and morbidity these days. Poor control of this highly prevalent disease can lead to the development of ischemic heart disease, stroke and chronic renal failure1. Several factors like socioeconomic status, social habits, sedentary life style, food and poor self-health maintenance can lead to the development of hypertension2. Epidemiological studies demonstrate that prevalence of hypertension is increasing rapidly among urban and rural populations in India3. Presently, physicians can prefer drugs from number of pharmacological agents to treat hypertension. Selection of an evidence based therapy with safety and low cost has important economic implications. Clinical pharmacist'scan play a role in pharmaceutical cost management byproviding an outlookto the physicians for prescribing a cost effective choices of drugs when it is clinically appropriate. Thus, by reducing the economic burden and enhance the quality of patient care.

MATERIALS AND METHODS

This study was carried out at the Medicine wards of a university teaching hospital. This study was conducted for a period of seven months. Approval was obtained from Institutional Ethics Committee before starting the study. The data were collected from case sheetsof patient's of all age groups and from either sex, who were admitted to the Medicine wards of the hospital.A suitable data collection form was designed to collect and document the data. Data collection form includes demographic details of patient, drug therapy information's (name of the drug, dosage form, frequency, route of administration, duration of treatment, cost per dose and cost per day). Collected data were analyzed by using Microsoft Access Data Sheet version 2010.

Table 1 Comparison of mean cost per day between various drugs prescribed as mono therapy

S. No.	Monotherapy	Number of prescriptions	%	Cost/day in Rs
1	Amlodipine	74	43.5	4.16±1.87
2	Losartan	19	11.2	4.76±3.33
3	Atenolol	16	9.4	2.58±0.60
4	Telmisartan	10	5.9	8.16±0.67
5	Nifedipine	8	4.7	5.17±4.33
6	Frusemide	8	4.7	0.63±0.12
7	Enalapril	8	4.7	2.66±0.59
8	Ramipril	7	4.1	8.67±4.65
9	Torsemide	6	3.5	5.28±0.00
10	Prazosin	5	2.9	8.07±0.00
11	Clonidine	5	2.9	1.00±0.00
12	Olmesartan	4	2.4	6.96±0.17

Table 2 Comparison of mean cost per day on drugs prescribed as combination therapy

S. No	Drug combination	Number of prescriptions	%	Cost/day in Rs
1	Amlodipine+Atenolol	13	21.3	3.53±1.14
2	Frusemide+Spironolactone	11	18.0	2.29±0.00
3	Losartan+Hydrochlorothiazide	10	16.4	4.88±1.73
4	Losartan+Amlodipine	9	14.8	2.99±0.25
5	Enalapril+Hydrochlorothiazide	6	9.8	2.50±0.00
6	Amlodipine+Hydrochlorothiazide	5	8.2	4.98±1.99
7	Telmisartan+Hydrochlorothiazide	4	6.6	4.74±0.00
8	Telmisartan+Amlodipine	2	3.3	8.76±0.00
9	Frusemide+Amiloride	1	1.6	0.60±0.00

Table 3 Pattern of use and cost of antihypertensive drugs prescribed alone or in combinations

Drug Class	Drug	Daily dosing range (mg)	Total number of prescriptions (N)	Total price in (INR)
Diuretics	Frusemide	40	8	55.61
	Torsemide	10-20	6	195.36
	Sub-total		14	250.97
Beta blockers	Atenolol	25-50	16	298.75
Sub-total			16	298.75
CCBs	Amlodipine	5-10	74	2098.31
	Nifidipine	20-40	8	292.48
	Sub-total		82	2390.79
ACEIs	Enalapril	2.5-5	8	495.30
	Ramipril	1.25-5	7	380.3
	Sub-total		15	875.6
ARBs	Losartan	25-100	19	611.1
	Telmisartan	40-80	10	583.18
	Olmesartan	20	4	236.98
	Sub-total		33	1431.26
AABs	Prazosin	5	5	177.54
	Sub-total		5	177.54
CAAs	Clonidine	0.1	5	26
	Sub-total		5	26

	Daily dosing range (mg)	Total number of prescriptions (N)	Total price in (INR)
Fixed dose combinations			
Amlodipine+Atenolol	5/25-5/50	13	266.25
Amlodipine+Hydrochlorothiazide	5/12.5	5	238.05
Losartan+ Amlodipine	25/5-50/5	9	308.54
Losartan+ Hydrochlorothiazide	25/12.5-50/12.5	10	341.6
Frusemide+Amiloride	40/5	1	3
Telmisartan+Amlodipine	40/5	2	70.08
Telmisartan+ Hydrochlorothiazide	40/12.5	4	142.20
Frusemide+Spironolactone	20/50	11	267.93
Enalapril+ Hydrochlorothiazide	5/12.5	6	137.50
Sub-total		61	1775.15
Grand total		**231**	**7226.06**

Table 4 Average antihypertensive cost per prescription

Drug class	Total cost (INR)	% of total drug cost	Number of prescriptions encountered (N=231)	% of prescriptions	Average cost per prescription (INR)
Diuretics	250.97	3.5	14	6.1	17.93
Beta blockers	298.75	4.1	16	6.9	18.67
CCBs	2390.79	33.1	82	35.5	29.16
ACEIs	875.6	12.1	15	6.5	58.37
ARBs	1431.26	19.8	33	14.3	43.37
AABs	177.54	2.5	5	2.2	35.51
CAAs	26	0.4	5	2.2	5.2
Fixed dose combinations	1775.15	24.6	61	26.4	29.1

RESULTS

Out of 210 patients, 118 males and 92 females were identified to have prescribed with antihypertensive drugs during the study period.

In monotherapy, total 170 drugs were prescribed. Among this Amlodipine 74 (43.5%), Losartan 19 (11.2%) and Atenolol 16 (9.4%) were the most frequently prescribed drugs. In monotherapy, Ramipril shows the highest mean cost per dayof INR(8.67 ± 4.65) and Frusemide shows the lowest mean cost per day of INR(0.63 ± 0.12).(Table 1).

In combination drug therapy, total 61 medications were prescribed. Among this, Amlodipine+Atenolol 13 (21.3%), Losartan+Hydrochlorothiazide 10 (16.4%) and Losartan+Amlodipine 9 (14.8%)were the most frequently prescribed combinations drugs. In combination drug therapy,Telmisartan+Amlodipineshows the highest mean cost per day of INR(8.76 ± 0.00) and Frusemide+Amiloride combination shows the lowest mean cost per dayof INR(0.6 ± 0.00). There was significant difference in mean cost per day between various drugs in monotherapy as well as combination therapy ($p<0.001$). (Table 2)

We also determined the total costs of antihypertensive drugs prescribed alone and in combinationsduring the study period.Calcium channel blockers(CCBs) contributes the highest cost of (2390.79 INR) followed by fixed dose combination drugs from various classes (1775.15 INR). 7226.06 INR was accounted for the total antihypertensive drugs prescribed.(Table 3).

Angiotensin converting enzyme inhibitors (ACEIs) contributed 12.1% of total cost (875.6 INR). Angiotensin receptor blockers (ARBs) contributed 19.8% of total cost (1431.26 INR).Beta blockers contributed 4.1% of total cost (298.75 INR). Diuretics contributed 3.5% of total cost (250.97 INR). Alpha-adrenergic blockers (AABs) contributed 2.5% of total cost (177.54 INR). Centrally acting agents contributed only 0.4% of total cost (26 INR). Alpha adrenergic blockers and centrally acting agents (CAAs) were the least prescribed

drugs in the study period. Highest average cost per prescription was obtained for angiotensin converting enzyme inhibitors (58.37 INR) followed by angiotensin receptor blockers (43.37 INR). Lowest average cost per prescription was obtained for centrally acting agents (5.2 INR). The average cost per prescription of diuretics and beta blockers were (17.93 INR) and (18.67 INR) respectively (Table 4).

DISCUSSION:

74.8% of patients had received monotherapy. The present study shows that most of the patients were stable with monotherapy followed by two drug combination therapies. None of the patient's required triple drug therapies. It may bethe physiological variations that leads to the variability in response. Similar observation was seen in a study conducted by Jeschke E 4.

Our study shows that diuretics and beta blockers are much more economical than calcium channel blockers, angiotensin receptor blockers and other fixed dose combination of antihypertensive drugs. Angiotensin converting enzyme inhibitors were the costliest drugs among all other antihypertensives. In our study it occupied about 12.1% of total cost. The overallpharmacotherapeutic management cost was found to be high as per the study reports. This increased cost may be due to the less frequentprescriptions of diuretics and beta blockers and increased use of calcium channel blockers, angiotensin receptor blockers and fixed dose combination of antihypertensive drugs.

CONCLUSION

The study reveals that majority of patients were treated with calcium channel blockers. Among combination drug therapy, Amlodipine+Atenolol combination was highly prescribed. Considering the pharmacoeconomics, diuretics are more economical than calcium channel blockers. It is suggested that, while starting the drug therapy economic status of the patients should be kept in consideration. Strict lifestyle modifications should be recommended to all patients who are in pre-hypertensive stage as the cardiovascular risk factors are highly seen in these individuals.

Clinical Pharmacists are in the position to make suggestions and interventions that can save cost by reducing economic burden and enhance the quality of patient care. They can also encourage prescribers to make cost effective choices of drugs when clinically appropriate.

REFERENCES:

1. Kearney P et.al, Global burden of hypertension: analysis of worldwide data. The Lancet, Vol 365, Issue 9455, 217-223
2. Etuk E, Isezuo SA, Chika A, Akuche J, Ali M. Prescription pattern of antihypertensive drugsin a tertiary health institution in Nigeria. Annals of African Medicine 2008;7(3): 128-32
3. Gupta R, Gupta VP. Hypertension epidemiology in India: lessons from Jaipur Heart Watch.Current science 2009; 97(3) 10: 349-55
4. Jeschke E, Ostermann T, Vollmar HC, Kroz M, Bockelbrink A, Witt CM et.al. BMC Fam Pract.2009, 10:178

How to cite your article:
Joel J. J., Daniel N., Shastry C.S, "Cost analysis of antihypertensive drugs prescribed in a tertiary care teaching hospital", Int. J. Res. Dev. Pharm. L. Sci., 2015, 4(1), pp. 1371-1374.

