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PHARMACOECONOMIC EVALUATION IN PATIENTS HAVING MYOCARDIAL INFRACTION WITH HYPERTENSION IN THE GOVERNMENT TERTIARY CARE HOSPITAL

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ABSTRACT

The present review has been done to identifying, measuring and comparing the costs and benefits of programs, services or therapies and determining which alternative produces the best health outcome for the resource invested. All methods of pharmacoeconomic evaluation share the common feature of comparing inputs (cost) with outcomes (benefits) resulting from drug intervention in myocardial infraction with hypertension patients. To document the various treatments that the patients are receiving in MIMS, Mandya for hypertension and myocardial infraction. To record the expenses involved in different treatments. To apply cost effectiveness analysis and determine which of the treatments for myocardial infraction with hypertension. A cross sectional descriptive study conducted on hypertension with MI patients in the general medicine department of MIMS. The 6 months study was conducted on 200 patients. Of the total study population 58% was male, and 42% was female patients. The age group of patients were observed as 61-70years. Out of 200 patients, 70 (35%) patients had hypertension, 35 (17.5%) patients had MI, and 90 (47.5%) patients had both hypertension with MI. In monotherapy only labetalol showed a significant reduction of SBP values after 6 months. The other two groups of drugs telmisartan and cilnidipine showed reduction of both SBP at end of 3rd and 6th month and, but that reductions were not significant at any stages. In combination therapy, A significant reduction in SBP was achieved in the treatment with torsemide + spironolactone after 6th month. The reductions of SBP of the other two groups of combination were not significant. The 6 months study shows that labetalol is comparatively cost-effective in the reduction of per mmHg of SBP. In case of combination therapy, telmisartan and amlodipine are comparatively cost-effective in the reduction of per mmHg of SBP in hypertension with myocardial infraction patients.

KEYWORDS: MI, hypertension, cost effectiveness.

INTRODUCTION

Pharmacoeconomics is the process of identifying, measuring and comparing the costs, risks and benefits of programs, services or therapies and determining which alternative produces the best health outcome for the resource invested. Pharmacoeconomic evaluation provides us with the methodology to determine those treatment options, which will yield the maximum health gain per unit of currency spent.

Cost effective analysis (CEA) is an analysis which compares costs and consequences of alternative approaches to achieving a common therapeutic objective and is measured in natural units. The term natural units refers to traditional markers of clinical outcomes, including: blood pressure, life years saved, cholesterol levels, hospitalizations avoided, infection cures, lives saved, etc.

Results of CEA are also expressed as a ratio either as Average cost-effectiveness ratio (ACER) or as Incremental CER (C/E),ACER is AC/E = Healthcare cost Hypertension is an important worldwide public-health challenge because of its high frequency and concomitant risks of cardiovascular and kidney disease. It has been identified as the leading risk factor for mortality, and is ranked third as a cause of disability-adjusted life-years (DALYs).The high prevalence of hypertension worldwide has contributed to the present pandemic of cardiovascular disease. During the past century, such disease has changed from a minor cause of death and disability to one of the major contributors to the global burden of disease.

Myocardial infarction commonly known as heart attack, occurs when blood flow stop to a part of the heart causing damage to the heart muscle. The most common

symptoms are chest pain or discomfort which may travel in to the shoulder, arm, back, neck, and jaw. Often it is in the center or left side of the chest and lasts for more than a few minutes.

MATERIALS AND METHODS

Study design

This was cross sectional descriptive study conducted in the general medicine department of MIMS.

Study period

This study was conducted for a period of 6 months.

Research period

4 months of data collection and 2 months for data analysis and write up.

Study Population: Patient admitted in general medicine unit of MIMS, Mandya.

Sample size: A total of 200 cases in a 6 month period.

Sampling Method: Convenience sampling.

Methods of data collection

Study procedure

Eligible patients were enrolled based on inclusion and exclusion criteria. The data collection form which was made by department of clinical pharmacy was used for collecting the details. This form mainly contains demographic details, current medication, past medical and medication history, and other relevant data needed for present study were collected from patient's progress records, treatment chart.

RESULT AND DISCUSSION

This study was conducted in general medicine unit of MIMS, Mandya. A total of 200 patients admitted in MIMS were enrolled in the study based on study criteria. The required details from the patient case sheet were recorded in a suitably designed patient profile form. The prescription data of 200 patients were analyzed in the current study.

Table 4: Distribution of mean age and number of patients based on gender.

Gender	Male	Female
Number of patients	115	85
P	58	42

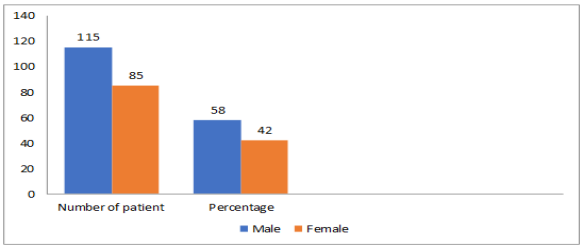

Figure 6: Distribution of mean age and number of patients based on gender.

A total of 200 patient's data was collected from in-patient department from MIMS hospital general medicine unit during a period of six months. Among the whole 200 patients under study including male and females, 115 patients were male with a mean age of 58 years (58%) and 85 patients were female with mean age of 42 years (42%). This study showed that the prevalence of hypertension and MI is more in males than in females.

Table 5: Social history.

Parameter	Number of patients	Percentage
Alcoholic	88	44
Smoking	72	36
Nil	40	20

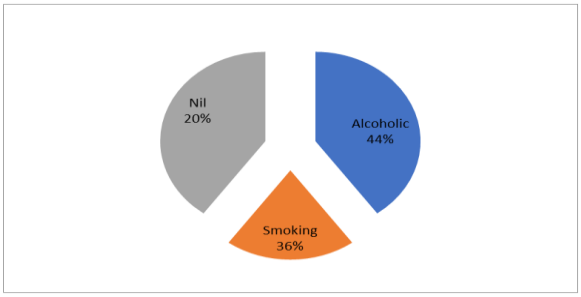

Figure 7: Social history.

In the study, among 200 patients 80% of patients were habitual. In that 44.5% of patients were alchoholic and 36.5% of patients were smokers.

Table 6: Distribution of patients based on disease.

Disease	Male	Female
Hypertension	43	27
Myocardial infraction	22	18
Myocardial infraction+ Hypertension	50	40

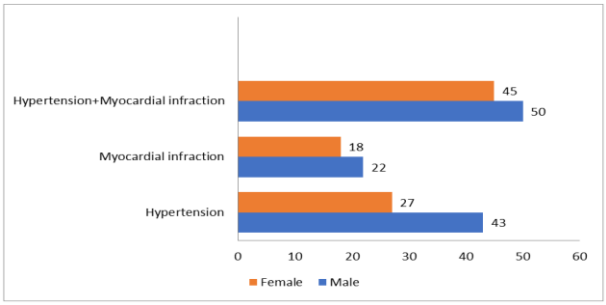

Figure 8: Distribution of patients based on disease.

The prescription data of 200 patients were analyzed in the current study Out of which, in males 43 patients were HTN, 22 patients were MI, and 50 patients were MI with HTN. In females 27 patients were HTN, 18 patients were MI and 40 patients were MI with HTN.

Table 7: Total medical cost.

Parameter	Cost (Rs)
Hospitalization charge	25
Bed charge Ward	25
ICU bed charge	25
Diagnostic and laboratory charge	750
Direct medical cost	**825**
Total travel cost	960
Total food cost	280
Direct non medical cost	**1240**
Total direct cost	**2065**

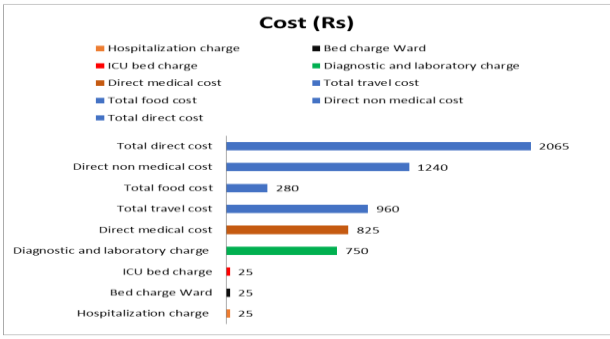

Figure 9: Total medical cost.

The total medical expenses of an individual patients was admitted in tertiary care hospital with MI with hypertension are direct cost includes laboratory charge, bed charge, ICU charge, hospitalization charge is 825 INR. Direct non medical cost includes travel and food is 1240INR and total direct cost is 2065INR.

Table 8: Total direct cost of the patients spent for disease condition.

Total direct cost	Number of patient	Percentage
2000-3000	38	19
3000-4000	86	43
4000-5000	34	20
>5000	42	24
Total	200	100

The total direct cost spended by the patients with hypertension with MI are found to be 38 patients found to be spending of amount 2000-3000INR (19%), 86 are found to be spend around 3000-4000 INR (43%), 34 are found to be spen around 4000-5000INR (20%), and 42 patientsare found to spend more than 5000INR (24%).

Table 9: Types of anti-hypertensives prescribed.

Drug	Percentage
Angiotensin receptor blocker	
Telmisartan	60
Losartan	2
Angiotensin converting enzyme inhibitor	
Enalapril	21
Ramipril	3
Diuretics	
Spironolatone	24
Furosemide	26
Calcium channel blocker	
Amlodipine	32
Clinidipine	16
Dilitiazem	3
Beta blocker	
Atenolol	49
Metoprolol	41
Alpha +beta blocker	
Labetalol	34
Carvedelol	11

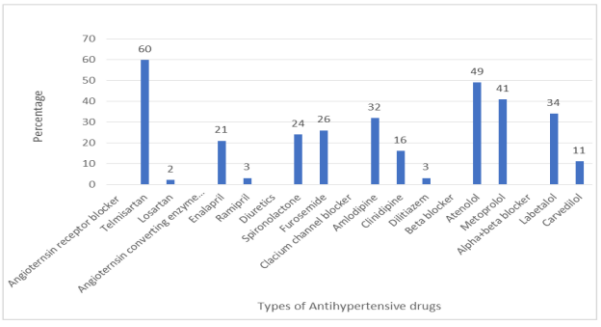

Figure 10: Types of anti-hypertensives prescribed.

Antihypertensive drugs used in the study population were identified and categorized. The 6 month study will shows that more than 6 types of antihypertensives were prescribed for MI and Hypertension patients, In that angiotensin receptor blocker (62%), betablocker (90%) were prescribed commonly then alpha+beta blocker (45%),CCB (51%),ACEI (24%),diuretics (50%).

Table 10: Percentage of anti- hypertensives medication as monotherapy.

Drugs	Number of patient	Percentage
Enalapril	42	21
Ramipril	6	3
Lasix	52	26
Spironolactone	48	24
Losartan	4	2
Telmisartan	120	60
Amlodipine	64	32
Clinidipine	82	41
Diltiazem	6	3
Atenolol	98	49
Metaprolol	32	16
Labetalol	68	34
Carvedilol	23	11.5

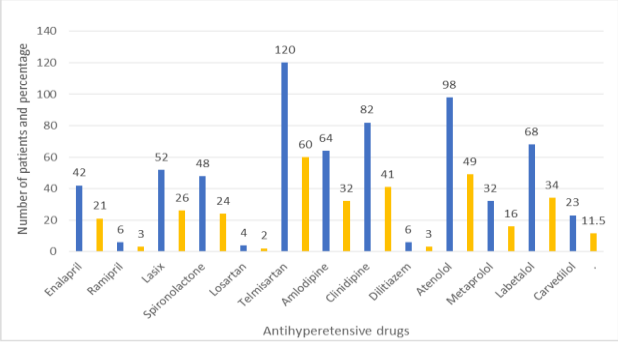

Figure 11: Percentage of anti- hypertensive medication as monotherapy.

This study shows that more than 10 antihypertensives were prescribed, In that Telmisartan (60%), atenolol (49%), clinidipine (41%) were prescribed most then others will labetalol (34%), amlodipine (32%), Lasix (26%), spironolactone (24%), enalapril (21%) and others were prescribed commonly in MI and hypertension patients.

Table 11: Percentage of antihypertensive medication as FDC.

Drug	Number of patient	Percentage
Telmisartan +Amlodipine	56	28
Metprolol+Ramipril	36	18
Torsemide+Spironolactone	8	4

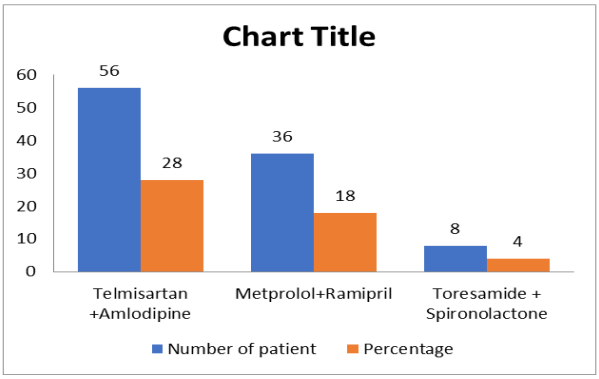

Figure 12: Percentage of antihypertensive medication as FDC.

As per FDC Telmisartan and amlodipine were prescribed 28%, Then Metprolol and ramipril will be 18% and Torsemide and spironolactone will be prescribed less.

Table 12: Cost effective analysis (CEA) of monotherapy of anti -hypertensive drugs.

Treatment option	Frequency per day	Cost of one tablet INR	Daily cost INR	Cost for 1 month INR	Maintainance of BP during follow up (mmHg)			Mean and SD	Average of maintenance BP (mmHg)
					Base	At 3 months	At 6 months		
Telmisartan	1	7.2	7.2	223.2	146.8	136.8	133.2	138.93 + 5.4	138.93
Labetalol	1	14	14	434	144.8	132.6	128.8	135.4 +3.03	135.4
Clinidipine	1	9.3	9.3	288.3	149.2	136.8	135.6	140.53 +11.8	140.53

Cost-effective analysis (CEA) was analyzed in a total of 200 myocardial infraction and hypertension patients getting a monotherapy. The normal cost of each category of medicine was calculated in INR, by applying mean and standard deviation formula on readings, The average value of maintenance of BP was obtained in that labetalol was (135.4), telmisartan (138.9) and clinidipine (140.5), it shows labetalol is comparatively cost-effective in the reduction of per mmHg of SBP when compared with others.

Table 13: Incremental cost effectiveness ratio for monotherapy.

Drug	ICER (Rs/ unit SBP decrease)
Telmisartan and labetalol	59.71
Labetalol and cilnidipine	28.5
Clinidipne and telmisartan	40.68

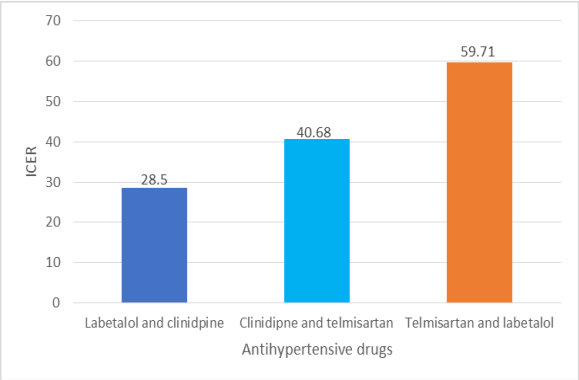

Figure 13: Incremental cost effectiveness ratio for monotherapy.

In monotherapy only labetalol showed a significant reduction of SBP values after 6 months. However, SBP values were almost stable at ends of 3rd and 6th month with labetalol treatment. Though the other two groups of drugs showed reduction of both SBP at end of 3rd and 6th month, but that reductions were not significant at any stages.

The cost for reduction of per mmHg of SBP and cost required to maintain the targeted SBP is given for monotherapy in ICER. This shows that labetalol is comparatively cost-effective in the reduction of per mmHg of SBP.

Table 14: Cost effective analysis of antihypertensive drugs for combination therapy.

Treatment option	Frequency per day	Cost of one tablet INR	Daily cost INR	Cost for 1 month INR	Maintenance of BP during follow up (mmHg)			Mean and SD	Average of maintenance BP(mmHg)
					Base	At 3 month	At 6 month		
Telmisartan +Amlodipine	1	14.2	14.2	440.2	152.3	148.6	136.6	145.8+8.3	145.8
Metprolol+ Ramipril	1	22.8	22.8	706.8	149.9	142.8	138.8	143.8+5.6	143.9
Torsemide +spironolactone	1	4.93	4.93	152.83	146.7	139.7	135.8	140.73	140.73

Cost-effective analysis(CEA) was analyzed in a total of 200 myocardial infraction and hypertension patients getting a combination therapy, the average value of maintainance BP was obtained in torsemide + spironolactone shows (140.73mmHg), metoprolol + ramipril (143.9mmHg) and telmisartan + amlodipine (145.8mmHg). Cost analysis shows that Torsemide +spironolactone comparatively cost-effective.

Table 15: Incremental cost effectiveness ratio for FDC.

Group	ICER (Rs/unit SBP decrease)
Telmisartan+amlodipine and torsemide +spironolactone	56.68
Metaprolol+Ramipril and telmisartan +amlodipine	133.3
Metaprolol+Ramipril and torsemide +spironolactone	180.44

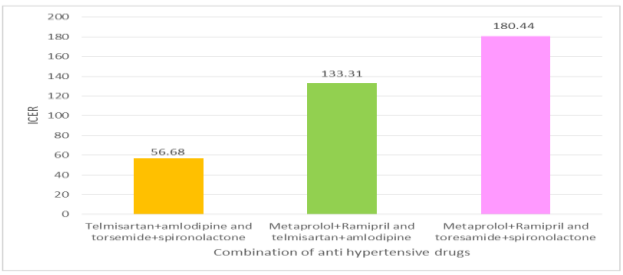

Figure 14: Incremental cost effectiveness ratio for FDC.

The results on combination therapy with telmisartan + amlodipne, metaprolol+ Ramipril and torsemide + spironolactone are given. The group of combination drugs of telmisartan + amlodipine and torsemide + spironolactone showed 56.68 reduction of SBP, metoprolol + ramipril and telmisartan + amlodipine showed 133.3 reduction of SBP and metoprolol + ramipril and torsemide + spironolactone showed 180.4 reduction of SBP at the end of 3rd 6 months .A significant reduction in SBP was achieved in the treatment with torsemide and spironolactone after 6th month. The reductions of SBP of the other two groups were not significant from base to reviews. In case of combination therapy, telmisartan and amlodipine are comparatively cost-effective in the reduction of per mmHg of SBP.

Cost effective analysis of two-drug combination therapy shows that telmisartan + amlodepine is the most cost-effective therapy.

Myocardial infraction

As per our study on MI with HTN the data which we collected for the MI drugs which are given completely from the hospital provide with no cost as a free, Hence we are unable to do the cost effective analysis on MI drugs. The following drugs which are given for the patients with MI are, Aspirin (65%) and clopidogrel (60%) were prescribed as antiplatelet drugs and Atorvastatin (60%) were prescribed as dyslipidemic drug

in MI patients, these drugs will be free supply in hospital.

CONCLUSION

A cross sectional descriptive study was conducted among 200 patients to analyze the various treatment receiving from patients for hypertension and myocardial infraction and the expenses involved in various treatments and to apply cost effective analysis and determine which of the treatment for HTN and MI is most cost effective in a government tertiary care hospital. The demographic data shows that prevalence of MI and Hypertension was more in males (58%) than in females (42%) and 44% of patients were alcoholic and 36% were smokers. The required details are collected from the patient case sheet were recorded in a suitably designed patient profile form. Out of 200 patients 70 were hypertensive patients, 40 were MI patients and 90 were MI with hypertension patients. The preferential drugs employed among the patients were CCBs followed by diuretics, ACE inhibitors, alpha blockers, mixed alpha beta blockers, ARB (62%) and beta blockers (90%) in that telmisartan (60%) and atenalol (49%) are commonly prescribed . It was concluded in monotherapy only labetalol showed a significant reduction of SBP values after 6 months. In case of combination therapy, telmisartan and amlodipine are comparatively cost-effective in the reduction of per mmHg of SBP.

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