



An Outlook on Cost Analysis among Common Oral Antihypertensive Medications of various Brands Available in Indian Pharmaceutical Companies

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Abstract

Aim: The current study was performed to analyse the percentage of cost variations of commonly prescribing antihypertensive medications among different brands of same drugs in India.

Materials and Methods: The data of cost of commonly used antihypertensive drugs were collected from CIMS and IDR, which may provide accurate drug information. Additionally the drug prices are also checked in retail pharmacy. Data about the cost of oral antihypertensive drugs were collected as cost per 10 tablets in same strength and same dosage forms that was manufactured from different companies and they were compared to find the variation of cost. Combinations of drugs were excluded from the study. Cost ratio and percentage of cost were calculated using applicable formulae.

Results: Out of 23 drugs of different doses without combination Tablet Amlodipine (5 mg) shows the maximum price variation of 460%, followed by Tablet Enalapril (10 mg) 374.28%, Tablet Olmesartan (20 mg) 404.41%, Tablet Amlodipine (5 mg) 460% and Tablet Atenolol 100 mg 424.66% variation.

Conclusion: The study reveals that there was a huge variation of cost in drugs which was manufactured from various pharmaceutical companies. Hence physicians can prescribe the drugs in generic forms. An awareness must be created about the maximum variation of cost to the physicians, pharmacist and health care management to our economic benefits for patients and increase their benefits of therapy.

Keywords: Cost, Antihypertensive drugs, Brands, Physician, Benefits.

Introduction

In developing countries like India, hypertension is the one of the major primary etiology of many cardiovascular diseases and other events either in a direct mode or indirect mode. Furthermore, it is the leading risk factor for morbidity and

mortality⁽¹⁾. Its prevalence has major impact in worldwide; In India it varies about 17-21% and it requires lifelong treatment. Moreover, it has been the major cause for 10% of all death in the world⁽²⁾. According to epidemiology; approximately 1 billion people had hypertension

globally in 2010 and Studies showed that about 1.56 billion people will have hypertension by 2025⁽³⁾.

These cardiovascular complications such as hypertension can be prevented with pharmacological and non-pharmacological medications. There are certain common antihypertensive drugs are been prescribing major for past few years and they are Angiotension Converting Enzymes (ACE) inhibitors, Angiotensin antagonist, Calcium channel blockers (CCB), β – Adrenergic blockers, α – adrenergic blockers, vasodilators and centrally acting sympatholytic agents⁽⁴⁾. Hypertension requires long term treatment which may mount the expenses of health care and may create some burden to low socio economic patients which also leads to some psychological conditions such as stress, etc. Hence it reduces the patient's therapeutic compliance⁽⁵⁾. In developing countries like India, pricing of drugs is a sensitive issue and economics has major role in determining compliance with the treatment of disease like hypertension⁽⁶⁾. Although, there are lots of pharmaceutical industries in India, there is huge difference in drug price of antihypertensive drugs of same formulation. For a single generic drug in India, there are multi brands are available with huge variety of prices and became a competitive world of both domestic and foreign manufactures in pharmafield⁽⁷⁾.

Here, we planned to focus our study on 'Cost analysis' of different brands of same drug. Cost analysis is a type of pharmacoeconomic which compares the costs of two or more alternatives without regard to outcome. Analysis of cost variation can provide a knowledge about the inter-brand price variation and helps to give financial support partially for patients. There are few studies shown a wide variation on cost of Indian market^(8,9).

Hence the present study was aimed to compare the cost difference of multi branded drugs used in Indian market, by collecting data about cost of drugs commonly prescribed for hypertension.

Materials & Methods

The maximum and minimum costs of different brands of antihypertensive drugs were collected from CIMS– Jan 2019 (current index of medical specialties) and IDR – Jan 2019 (Indian drug review) which may provide accurate drug information. Additionally the drug prices are also checked in retail pharmacy. Data about the cost of oral antihypertensive drugs were collected as cost per 10 tablets in same strength and same dosage forms that was manufactured from different companies and they were compared to find the variation of cost. Combinations of drugs were excluded from the study.

Analysis of data was performed by identifying the maximum and minimum price for different oral antihypertensive drugs and they were calculated. These are the following formulas were used to calculate the cost variation of drugs.

Cost ratio between the maximum and minimum cost of the same drug manufactured by different pharmaceutical companies was calculated as follows:

- Cost ratio= Maximum cost / Minimum cost
- % cost variation was calculated as follows:
- % cost variation

$$= \frac{(\text{Maximum cost} - \text{Minimum cost}) \times 100}{\text{Minimum cost}}$$

Result

The cost of commonly used oral antihypertensive drugs (23 drugs of different doses without combination) manufactured by different pharmaceutical companies were analysed. Of overall (Table 1) Tablet Amlodipine (5 mg) shows the maximum price variation of 460%, while Tablet methyldopa (250 mg) shows the minimum price variation of 10.93%. Table 1 shows the maximum and minimum percentage of price variation for common antihypertensive drugs. ACE Inhibitors: Tablet Enalapril (10 mg) 374.28% and Tablet Ramipril (10 mg) 73.04%, Angiotensin antagonist: Tablet Olmesartan (20 mg) 404.41% and Tablet Candesartan (4 mg) 25.67%, Calcium channel blockers: Tablet Amlodipine (5 mg) 460% and Tablet Nifedipine

(5 mg) 11.38%, β -blockers: Tablet Atenolol 100 mg 424.66% and Tablet Labetolol 100 mg 12.29%, Centrally acting sympatholytic drugs shows the minimum cost variation of Tablet

Methyldopa (250 mg) 10.93%, α -blockers: Tablet Prozion (2.5 mg) 42.75% and Prozion (5 mg) 16.41%, Vasodilators: Tablet Cinnarizine (25 mg) 165.45% and Tablet Isoxsuprine (40 mg) 25%.

Table 1: Cost variation analysis of common antihypertensive drugs

ACE Inhibitors						
S.No	Drug Name	Dose	Maximum Cost (Inr)	Minimum Cost (Inr)	Cost Variation (%)	Cost Ratio
1.	T. Enalapril	2.5 mg	29.24	6.75	333.18	4.33
		5 mg	50.57	14.22	255.62	3.55
		10 mg	99.60	21	374.28	4.74
2.	T. Lisinopril	2.5 mg	50	13.50	270.37	3.70
		5 mg	100	25	300	4
		10 mg	108.25	50.78	113.17	2.13
3	T. Ramipril	1.25 mg	32.11	12.50	156.88	2.56
		2.5 mg	56.84	25	127.36	2.27
		5 mg	97.02	45	115.6	2.156
		10 mg	130.04	75.15	73.04	1.73
4.	T. Perindopril	2 mg	111	-	N/A	N/A
		5 mg	130	-	N/A	N/A
		10 mg	160	-	N/A	N/A
Angiotensin antagonist						
5.	T. Losartan	25 mg	43.47	15.50	180.45	2.80
		50 mg	85.86	29.50	191.05	2.91
6.	T. Candesartan	4 mg	34.95	27.81	25.67	1.25
		8 mg	61.80	45.27	36.51	1.36
7.	T. Olmesartan	20 mg	171.50	34	404.41	5.04
		40 mg	163	54	201.85	3.02
8.	T. Telmisartan	20 mg	42	27.82	50.97	1.50
		40 mg	80	27	196.27	2.96
		80 mg	114	74.95	92.12	1.52
Calcium channel blockers						
9.	T. Nifedipine	5 mg	12.03	10.80	11.38	1.11
		10 mg	19.40	13.23	46.63	1.46
		20 mg	29.10	18	61.66	1.61
10.	T. Felodipine	2.5 mg	22	-	N/A	N/A
		5 mg	39	-	N/A	N/A
		10 mg	69	-	N/A	N/A
11.	T. Amlodipine	2.5 mg	27.75	8.80	215.34	3.15
		5 mg	70	12.50	460	5.6
		10 mg	53.30	30	77.66	1.77
12.	T. Cilnidipine	5 mg	49.50	25	98	1.96
		10 mg	78	29.5	164.40	2.64
		20 mg	119	49.50	140.40	2.40
13.	T. Diltiazam	30 mg	26.26	17.25	52.23	1.52
		60 mg	37.50	29.31	27.94	1.27
β-blockers						
14.	T. Atenolol	25 mg	24.10	7.9	202.76	3.02
		50 mg	23.07	5.81	297.07	3.97
		100 mg	35.52	6.77	424.66	5.24
15.	T. Carvedilol	3.125 mg	30.24	9.00	236	3.36
		6.25 mg	44.50	17.93	148.18	2.48
		12.5 mg	77.33	30	157.76	2.57
		25 mg	122	52	134.61	2.32
16.	T. Labetolol	100 mg	137	122	12.29	1.12
17.	T. Metoprolol	25 mg	46.64	18.01	158.96	2.58
		50 mg	67.61	32.80	106.31	2.06
18.	T. Nebivolol	2.5 mg	103.66	32	223.93	3.23
		5 mg	113.10	50.20	125.29	2.25
19.	T. Propranolol	10 mg	17	8.25	106.06	2.06
		20 mg	25.84	18.50	39.67	1.39
		40 mg	74.25	26.01	185.46	2.85

Centrally acting sympatholytic agents						
20.	T. Methyldopa	250 mg	24.15	21.77	10.93	1.10
α-blocker						
21.	T. Prozion	2.5 mg	114.43	80.16	42.75	1.42
		5 mg	125.33	107.66	16.41	1.16
Vasodilator						
22.	T. Cinnarizine	25 mg	36.50	13.75	165.45	2.65
		75 mg	43.20	32.2	34.16	1.34
23.	T. Isoxsuprine	10 mg	21.66	15	44.4	1.44
		20 mg	34.60	27	28.14	1.28
		40 mg	55	44.00	25	1.25

(mg) – milligram, T - Tablet

Fig: 1 Cost variation of maximum price and minimum price of commonly used antihypertensive drugs used as single therapy

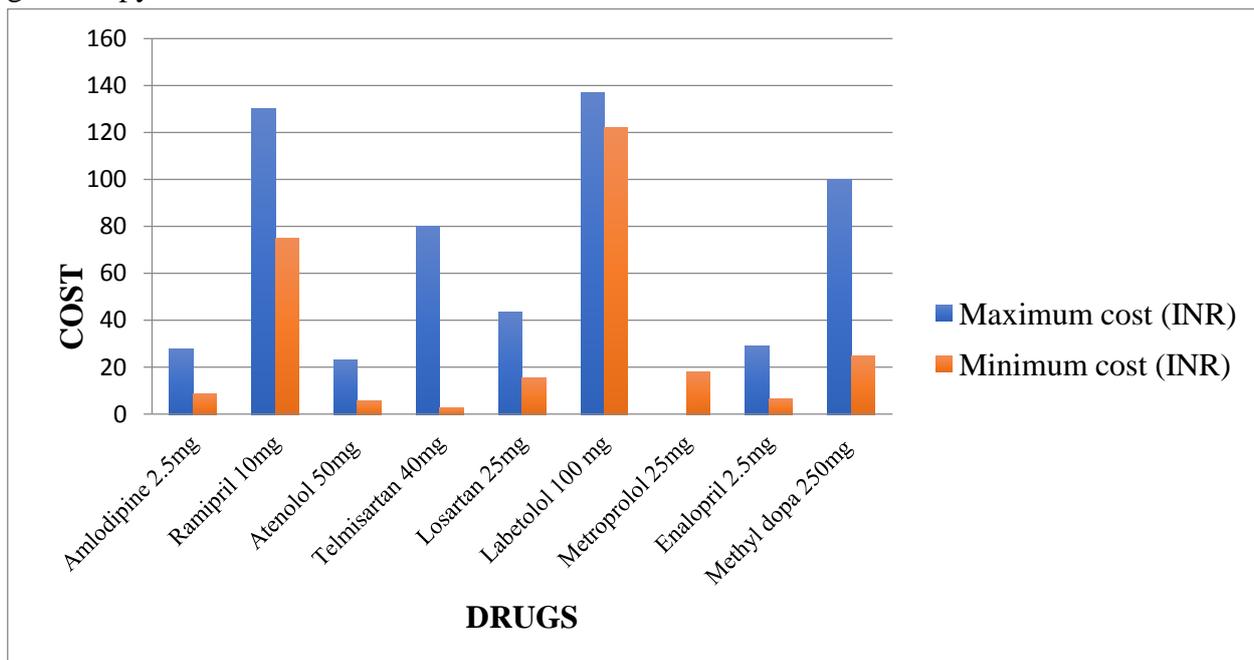


Fig: 2 Percentage cost variation of commonly used antihypertensive drugs used as single drug therapy

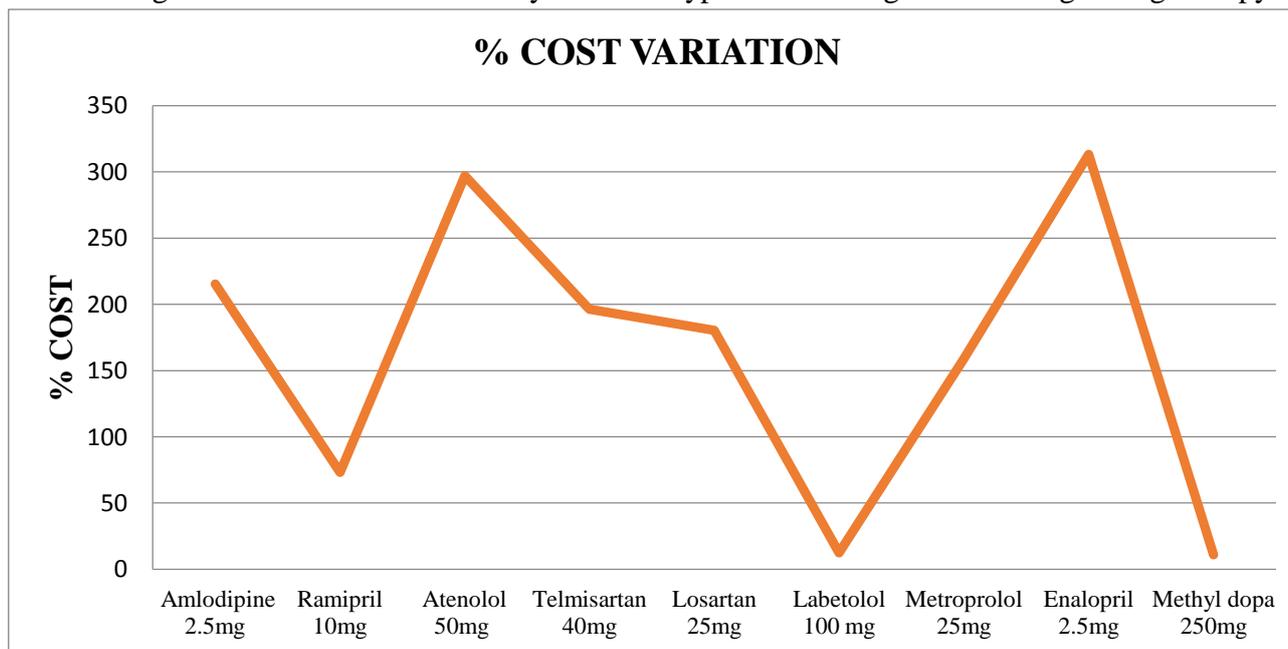
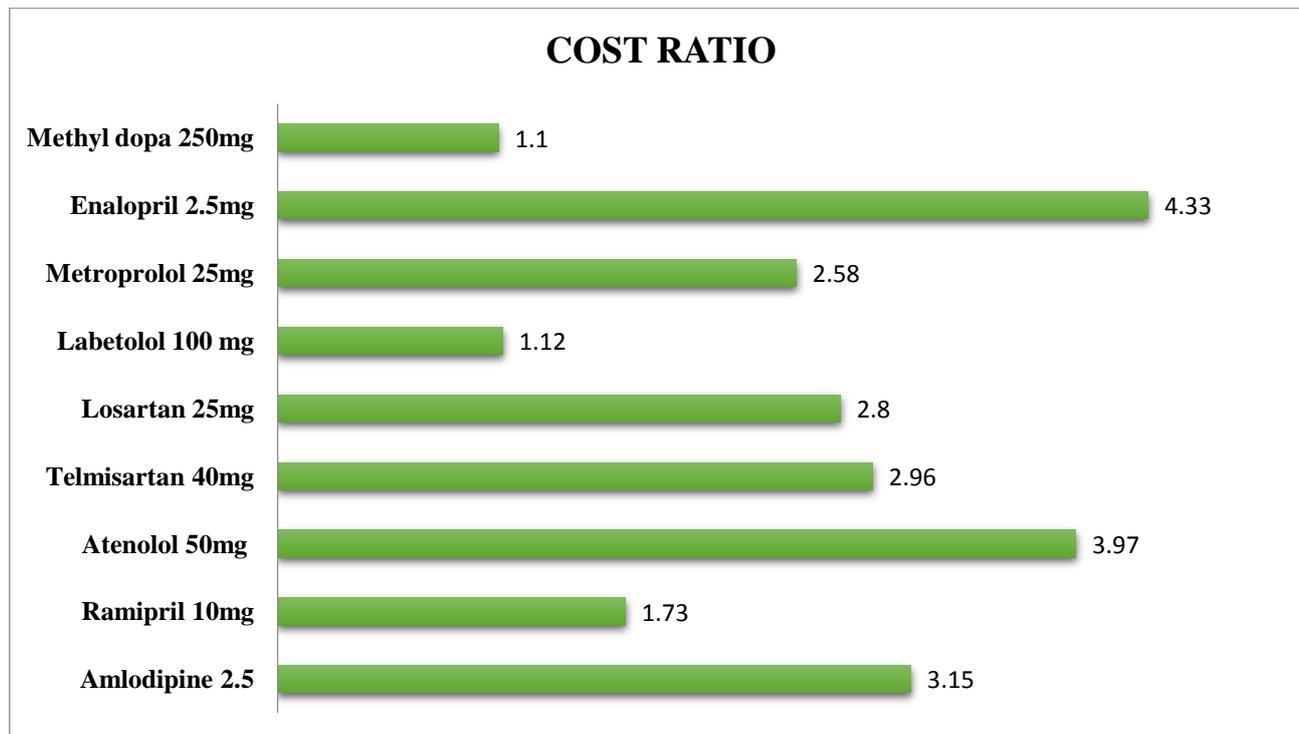


Fig: 3 Cost ratios of commonly used antihypertensive drugs used as a single drug therapy



Discussion

The present study reveals that the high fluctuations are seen in oral antihypertensive; variation of cost being manufactured by several companies (Fig 1). The percentage of cost variation seems to be above 100% for majority of drugs which is used commonly by the patients (Fig 2). Cost ratio also observed to have more high deviations in chart (Fig 3).

A related study of Kamath L also showed that higher deviations of cost variation in different brands of antihypertensive drugs⁽¹⁰⁾. There are more similar studies have been performed on oral hypoglycemics, anxiety, ocular preparations, antiglaucoma drugs, oral hypolipidemics, tuberculosis, anticancer are also found the related results⁽¹¹⁻¹⁶⁾.

These variations are due to competitions between different brands of drugs manufactured by companies. Drug Price Control Order (DPCO) is order established by government of India where all the price of the drugs must be according to DPCO as per they fixes the rate of the drugs. These drugs cannot dispense at the price more than the pointed rate by the government of India⁽¹⁷⁾. Here, physician and pharmacist also play a vital role by initiating and dispensing specific

brands of high cost for their economic gain. This wide variation of prices of different formulations of same drug may leads to a severe economic impact. In India doctors have less awareness in cost difference of different brands of same drug. Hence prescribing generic names are more appreciable, so patients can choose the affordable brands⁽¹⁸⁾.

Conclusion

Our current study reveals that there was a huge variation of cost in drugs which was manufactured from various pharmaceutical companies. To be said poor knowledge and condition of health care system also the important reason for the patient's burden. Hence physicians can prescribe the drugs in generic forms and patients can save their money and their therapeutic compliance will be increased. An awareness must be created about the maximum variation of cost to the physicians, pharmacist and health care management to our economic benefits for patients and increase their benefits of therapy.

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