



Research Article

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A STUDY ON COST ANALYSIS OF ORAL ANTIHYPERTENSIVE DRUGS AVAILABLE IN INDIA

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ABSTRACT

The major health care problem in developing world is shifting from communicable diseases to non-communicable disease which causes morbidities more than mortality affecting the personal efficiency. Hypertension is a major health care burden in developing countries like India causing both morbidity and mortality. Few studies shows that the hypertension prevalence has raised from 2% to 15% in rural population and 2% to 25% in urban population in last six decades in India. This research work aims to enumerate the price of commonly available oral antihypertensive drugs in India. It also aims to study the cost variation of oral antihypertensive drugs. The present study was carried out in the department of Pharmacology in a tertiary care medical college in south India. The cost analysis of individual drugs by different manufacturers were done. Percentage of cost variation was analysed. The variation in cost of most of the antihypertensive drugs is more than 100%. It's found maximum in Amlodipine (5mg) with cost variation of 625%, Atenolol 100 mg with cost variation of 413%. In India there is a wide price variation among antihypertensive drugs. The major gap in the cost variation of antihypertensive drugs to be narrowed for the benefit of the patients. So the government and the prescribing doctors should think about the huge difference in cost and work in the direction of benefitting the patient.

INTRODUCTION

The major health care problem in developing world is shifting from communicable diseases to non-communicable disease which causes morbidities more than mortality affecting the personal efficiency.

Non communicable diseases like hypertension and diabetes mellitus is posing major threat to well-being of the population.

Hypertension is a major health care burden in developing countries like India causing both morbidity and mortality. Few studies shows that the hypertension prevalence has raised from 2% to 15% in rural population and 2% to 25% in urban population in last six decades in India [1].

Hypertension may lead to stroke, ischemic heart disease, renal failure. These complications can be prevented by efficient and

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judicious use of available pharmacological and non-pharmacological modes of management. The majority of the patients can be managed by common available antihypertensive drugs like Calcium channel blockers (CCB), Angiotension Converting Enzymes (ACE) inhibitors, β – Adrenergic blockers, Angiotensin antagonist, vasodilators, α – adrenergic blockers and centrally acting sympatholytic agents [2, 3].

The efficient management of hypertension is need of the hour to prevent morbidity and mortality. Even though many anti-hypertensive drugs are available in India the cost factor pose a major hindrance to its usage. It poses a major burden in low socio economic patients which sometimes may lead to psychological disturbance of the patient [4, 5].

With introduction of generic drugs in India the cost factor for antihypertensive drugs is no longer a major issue. But the patient's acceptability for it is still a question [6, 7, 8].

The present study is carried out to analyse the cost effectiveness of different pharmaceutical products available in India for the management of Hypertension. It will provide information to the patient about the variations in the cost of a drugs with different manufacturers and helps cost effective choosing of drugs leading to better socioeconomic compliance [9, 10].

The aim of this work is to enumerate the price of commonly available oral antihypertensive drugs in India and study the cost variation of oral antihypertensive drugs

MATERIAL AND METHODS

The present study was carried out in the department of Pharmacology in a tertiary care medical college in south India. The list of commonly used oral antihypertensive drugs was made and the cost of the same by different manufacturers in different strength and combinations were obtained from "Current Index of Medical Specialties" and "Indian Drug Review" (IDR) . The cost of drugs was also crosschecked at pharmacy or retail drug store.

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

$$\text{Cost ratio} = \frac{\text{Maximum cost}}{\text{Minimum cost}}$$

Percentage cost variation was calculated as follows

$$\text{Cost ratio} = \frac{\text{Maximum cost} - \text{Minimum cost}}{\text{Minimum cost}} \times 100$$

The cost variation is analysed with SPSS software 2.0 version with tools of median and interquartile range

RESULTS

The cost of different antihypertensive drugs were analysed and minimum and maximum cost of the drugs in a particular dosage are tabulated. The cost variation is analysed with SPSS software 2.0 version with tools of median and interquartile range

The variation in cost of most of the antihypertensive drugs is more than 100%. It's found maximum in Amlodipine (5mg) with cost variation of 625%, Atenolol 100 mg with cost variation of 413%.

DISCUSSION

India is a developing country where most of the people are socioeconomically backward. Lack of awareness about the long term complications of hypertension as well as price factor of drugs make them compromise for the treatment [8, 9]

Though lot of manufacturers are there for antihypertensive drugs the variations in the price of drugs puts the patient in dilemma. Choosing an appropriate manufacturer with cost effective pricing is very much needed for proper management of the disease without compromising their daily basic needs [10].

As India predominantly has a branded generic market, 60,000 to 70,000 pharmaceutical products are available in the market [10]. Hence there is wide range of variation in price is seen.

A very few studies are available in Indian scenario to analyse the cost effectiveness of drugs. Antihypertensive drugs which are commonly used drugs in middle and old aged people pose a major cost burden. The variation in cost of most of the antihypertensive drugs is more than 100% in our study which is found to be similar to many studies carried out in India.

Our study may act as an eye opener for both manufacturers and consumers regarding the wide variation in the cost of same drug.

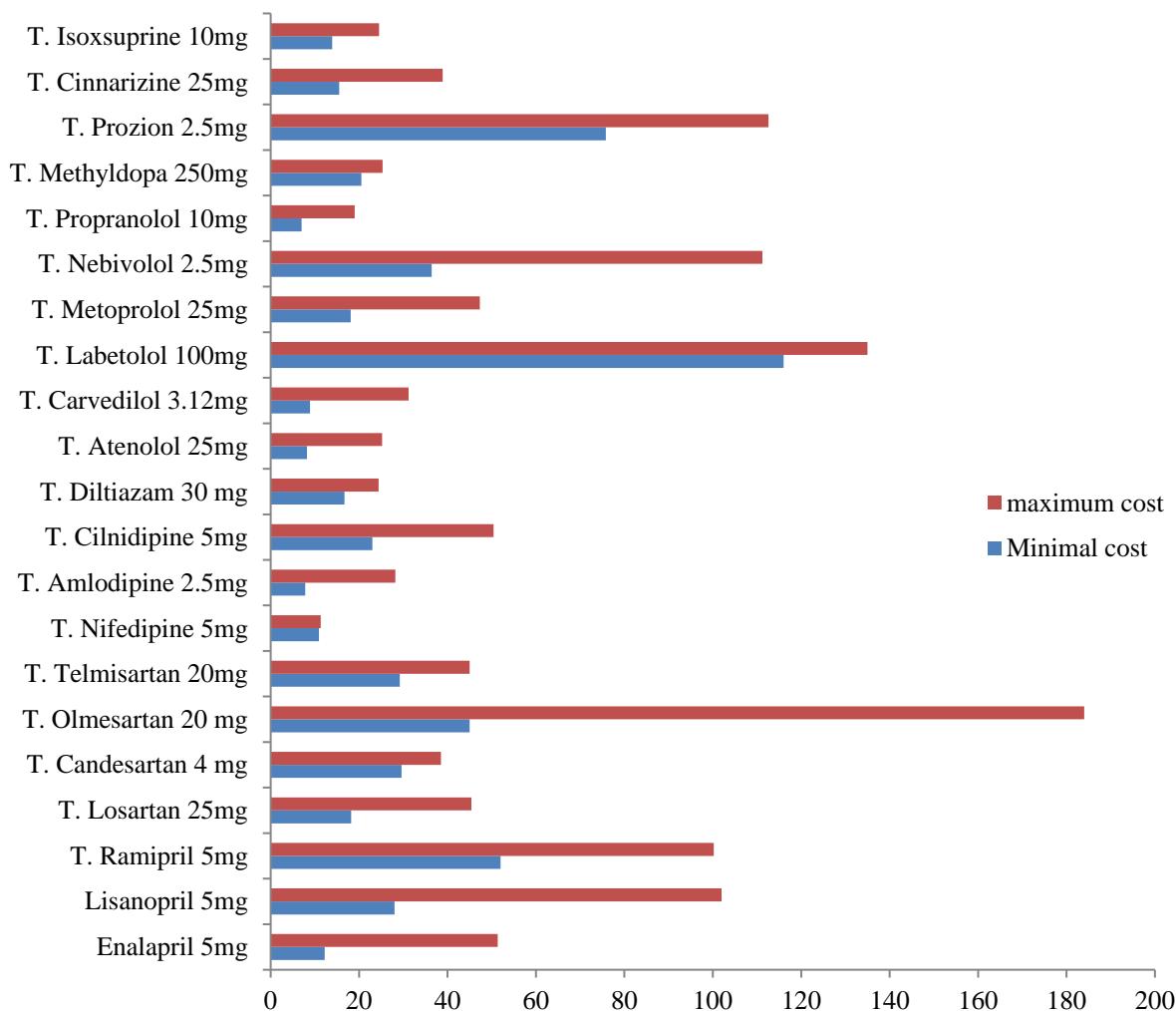


Figure 1: Cost variation analysis of commonly used antihypertensive drugs

Table 1: Cost analysis of common antihypertensive drugs

S. No	Drug Name	Dose	Maximum Cost (Inr)	Minimum Cost (Inr)	Cost Variation (%)	Cost Ratio
ACE Inhibitors						
1.	T. Enalopril	2.5 mg	30.23	6.00	403.2	5.03
		5 mg	51.34	12.23	319.7	4.1
		10 mg	100.20	32	213.2	3.1
2.	T. Lisnopril	2.5 mg	51.5	14.2	262.2	3.6
		5 mg	102	28	264.2	3.6
		10mg	120.4	53.2	126.3	2.3
3	T. Ramipril	1.25 mg	35.2	12.50	181.6	2.8
		2.5 mg	59.2	27	119.2	2.1
		5 mg	100.2	52	92.6	1.9
		10mg	143.1	78.6	82.06	1.8
4.	T. Perindopril	2 mg	120	-	N/A	N/A
		5 mg	134	-	N/A	N/A
		10mg	187	-	N/A	N/A

S. No	Drug Name	Dose	Maximum Cost (Inr)	Minimum Cost (Inr)	Cost Variation (%)	Cost Ratio
Angiotensin antagonist						
5.	T. Losartan	25mg	45.4	18.2	149.4	2.4
		50mg	88.9	30.3	193.3	2.9
6.	T. Candesartan	4 mg	38.5	29.6	30.8	1.45
		8 mg	64.2	47.3	36.3	1.3
7.	T. Olmesartan	20mg	184.2	45	309.3	4.1
		40mg	168	58	189.6	2.8
8.	T. Telmisartan	20mg	45	29.2	54.1	1.5
		40mg	86	29	196.7	2.9
		80mg	121	79.5	52.2	1.5
Calcium channel blockers						
9.	T. Nifedipine	5 mg	11.3	10.9	3.6	1.09
		10mg	20.4	14.4	41.6	1.4
		20mg	32.1	19	68.9	1.6
10.	T. Felodipine	2.5 mg	24	-	N/A	N/A
		5 mg	42	-	N/A	N/A
		10mg	71	-	N/A	N/A
11.	T. Amlodipine	2.5 mg	28.2	7.8	261.5	3.6
		5 mg	74	10.2	625.4	7.2
		10mg	54.2	32	69.3	1.6
12.	T. Cilnidipine	5 mg	50.4	23	119.1	2.1
		10mg	82	27	203.7	3.03
		20mg	121	48.40	150	2.5
13.	T. Diltiazam	30mg	24.4	16.7	46.1	1.46
		60mg	38.2	28.2	35.1	1.3
β-blockers						
14.	T. Atenolol	25mg	25.2	8.2	207.3	3.07
		50mg	24.3	5.9	310.1	4.11
		100mg	35.4	6.98	413.0	5.1
15.	T. Carvedilol	3.125mg	31.2	8.9	250.5	3.5
		6.25 mg	45.4	16.4	177.4	2.7
		12.5 mg	78.5	29	170.6	2.7
		25mg	124	56	121.4	2.2
16.	T. Labetolol	100mg	135	116	16.3	1.16
17.	T. Metoprolol	25mg	47.3	18.1	154.3	2.6
		50mg	65.4	30.10	117.2	2.1
18.	T. Nebivolol	2.5 mg	111.2	36.4	205.4	3.05
		5 mg	115.4	52.10	121.4	2.2
19.	T. Propranolol	10mg	19	7	171.4	2.7
		20mg	23.4	17.4	40.2	1.5
		40mg	76.2	22.3	241.7	3.4

S. No	Drug Name	Dose	Maximum Cost (Inr)	Minimum Cost (Inr)	Cost Variation (%)	Cost Ratio
Centrally acting sympatholytic agents						
20.	T. Methyldopa	250mg	25.3	20.5	24.6	1.2
α-blocker						
21.	T. Prozion	2.5 mg	112.6	75.8	48.9	1.4
		5 mg	122.4	103.5	18.3	1.1
Vasodilator						
22.	T. Cinnarizine	25mg	38.90	15.5	150.9	2.5
		75mg	45.1	31.0	45.4	1.4
23.	T. Isoxsuprine	10mg	24.5	13.9	76.2	1.7
		20mg	35.3	26.7	32.3	1.3
		40mg	58.2	46.3	25.7	1.2

CONCLUSION

In India there is a wide price variation among antihypertensive drugs. The major gap in the cost variation of antihypertensive drugs to be narrowed for the benefit of the patients. So the government and the prescribing doctors should think about the huge difference in cost and work in the direction of benefitting the patient.

FINANCIAL ASSISTANCE

Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest

AUTHOR CONTRIBUTION

Avanthi E has performed the studies in laboratory and recorded observations. Allen Joe Rodrigues has performed the studies in laboratory and recorded observations. Anand Koppal has analysed and interpreted the design of experiment data related to work. Abhishek Achar has analyzed and interpreted the design of experiment data related to work. Mahesh G K has contributed in drafting the manuscript

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