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Research Article

Cost analysis study of oral antihypertensive agents available in Indian market

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ABSTRACT

Background: Hypertension is one of the major causes of morbidity, mortality and needs lifelong treatment. There is a wide range of variation in the prices of antihypertensive drugs marketed in India. Thus, a study was planned to find out price variations in the oral antihypertensive drugs available either singly or in combination and number of manufacturing companies for each, also to evaluate the difference in cost of different brands of same active drug by calculating percentage variation of cost.
Methods: Cost of a particular drug being manufactured by different companies, in the same strength and dosage forms was obtained from "Current Index of Medical Specialties" July-October 2013 and "Indian Drug Review" September 2013. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies and percentage variation in price was calculated.
Results: Percentage price variation of the commonly used drugs found was amlodipine (5 mg): 1128.57%, atenolol (12.5 mg): 683.53%, enalapril (10 mg): 394.67%, telmisartan (20 mg): 288.33%. Among the combination therapy, amlodipine + atenolol (5 + 50 mg): 673.79%, amlodipine + losartan (5 + 50 mg): 284.61%, telmisartan + hydrochlorothiazide (40 + 12.5 mg): 293.85%, losartan + hydrochlorothiazide (50 + 12.5 mg): 384.62% variation.
Conclusion: The average percentage price variation of different brands of the same oral antihypertensive drug manufactured in India is very wide. The appraisal and management of marketing drugs should be directed toward maximizing the benefits of therapy and minimizing negative personal and economic consequences.

Keywords: Price variation, Anti-hypertensive drugs, Brands

INTRODUCTION

Pharmaceutical Industry in India has grown with tremendous pace and Indian markets are flooded with a huge number of branded formulations with large difference in the manufacturing cost of drugs and their maximum retail price and the cost of different brands of the same formulation. This apart from creating confusion among innocent consumers, often allows them to be misled by unfair traders.[1]

High cost of medicines has economic implications for the patients. Prices of prescription can affect users, suppliers and most importantly payers in health care system.[2] In fact, several studies have indicated that therapeutic compliance is influenced by drug prices.[3] Thus; the cost of therapy may be a barrier in controlling high blood pressure and should be an important consideration in selecting antihypertensive medication. The prices of the different antihypertensive drugs vary, and price alone is only one factor which should be taken into account when considering drugs that should be reimbursed.

Hypertension is reported to be the fourth contributor to premature death in developed countries and the seventh in developing countries. It is a major risk factor for cardiovascular disease. Recent reports indicate that nearly 1 billion adults (more than a quarter of the world's population) had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025. Review of epidemiological studies suggests that the prevalence of hypertension in the last six decades has increased from 2% to 25% among urban residents and from 2% to 15% among the rural residents in India.[4] Hypertension is one of the most expensive diseases as far as treatment is concerned, as it generates higher health care expenses than those produced by individuals with normal blood pressure. The out of

pocket expenditure in India is highest on antihypertensive drugs i.e., 64%.[5]

Drug price control order (DPCO) is an order issued by the government to fix prices of drug. Once medicine is brought under DPCO, it cannot be sold at a price higher than that fixed by the government. In India, in 1979, 80-85% of the drugs in the market were under price control. The number has slowly decreased and by 2002 only 15-20% drugs were under price control.[6] The common man therefore has to shell out more money with medicine prices spinning out of his reach.

Prices of only 74 bulk drugs and formulations (about 15-20%) containing any of these scheduled drugs from National List of Essential Medicines are under price control regime by DPCO 2013[7] until December 2013. Unfortunately, none of the antihypertensive combination feature in the list.

The current study aims to project a representative view of the existing situation of antihypertensive drugs, by collecting data about the cost of common oral antihypertensive drugs (angiotensin converting enzyme [ACE] inhibitors, angiotensin receptor blockers [ARBs], beta blockers, calcium channel blockers [CCBs] and diuretics) available either singly or in combination, number of manufacturing companies for each and to evaluate the difference in cost of different brands of same active drug by calculating percentage variation of cost.

METHODS

1. Cost of a particular drug (cost per 10 tablets) in the same strength and dosage forms being manufactured by different companies was obtained from "Current Index of Medical Specialties" July-October 2013 and "Indian Drug Review" (IDR) September 2013.
2. The drugs being manufactured by only one company or being manufactured by different companies; however, in different strengths were excluded.
3. Difference between the maximum and minimum cost of the same drug manufactured by different pharmaceutical companies was calculated.
4. Percentage cost variation[3] was calculated as follows:

$$\%\text{cost variation} = \frac{\text{Max cost} - \text{Min cost} \times 100}{\text{Min cost}}$$

RESULTS

The prices of a total of 21 drugs (11 single and 10 combination preparations), available in 55 different formulations were analyzed. These 55 formulations are manufactured by different pharmaceutical companies.

Table 1 shows the price variation of a few commonly used antihypertensives used as a single drug therapy. Overall amlodipine (5 mg) shows maximum price variation of 1128.57%, while olmesartan (10 mg) shows minimum variation of 25.64%. The maximum and minimum percentage price variation respectively for CCBs: Amlodipine (5 mg) 1128.57% and nifedipine (5 mg) 36.36%, ACE inhibitors: Enalapril (10 mg) 394.67% and ramipril (10 mg) 92.21%, ARBs: Telmisartan (20 mg) 288.33% and olmesartan (10 mg) 25.64%, beta blockers: Atenolol (12.5 mg) 683.53% and nebivolol (5 mg) 63.76%.

Table 2 shows price variation in combination of drugs were out of 10 combination therapies commonly used drugs like amlodipine + atenolol (5 + 50 mg) combination shows maximum variation up to 673.79%, telmisartan + hydrochlorothiazide (40 + 12.5 mg) and (80 + 12.5 mg) 293.85% and 288.74%, respectively, losartan + hydrochlorothiazide (50 + 12.5 mg) 384.62%, atenolol + hydrochlorothiazide 451.81% and amlodipine + losartan (5 + 50 mg) shows variation of 284.61%.

DISCUSSION

Indian market is predominantly a branded generic market i.e., more than one company sells a particular drug under different brand names apart from the innovator company. Hence, the number of pharmaceutical products available in the market also is very high in the range of 60,000-70,000 products. This situation has led to greater price variation among drugs marketed.[8]

Very few studies are available in Indian scenario, which compare the cost of drugs of different brands. Therefore, we decided to carry out the study which compares the cost of different brands of drug of one of the most common disorder. The drug prices available in CIIMS and IDR were compared as they are readily available source of drug information and are updated regularly. Drugs used in the management of hypertension were selected as it is one of the major causes of morbidity and mortality, and the treatment requires continuous prescription drug use.

Our findings reveal that the prices of most of the antihypertensive brands have percentage price variation above 100%, which is not acceptable situation for patients. Of 21 drugs studied, most of which are commonly prescribed, percentage price variation is very wide leading to unfair burden on the consumer.

In India, patients are paying out of their pockets for their medical bills and are not covered by insurance schemes unlike developed countries.[9] In this situation, it is prudent to revisit the costing mechanisms and the huge difference between the pricing of brands have to be regulated by concerned agencies. It is felt that physicians could provide better services and reduce costs of drugs if the information about drug prices was readily available. Studies have

Table 1: Cost variation of single drug therapy.

Drug	Formulations	Doses	Manufacturing companies	Minimum cost (Rs)	Maximum cost (Rs)	% price variation
Calcium channel blockers						
Amlodipine	3	2.5	36	4.8	44	816.67
		5	58	7	86	1128.57
		10	30	13.6	114.52	742.06
Nifedipine	3	5	2	6.82	9.3	36.36
		10	3	6.01	15.22	153.24
		20	3	7.5	12.94	72.53
Diltiazem	4	30	13	14.75	36	144.06
		60	10	28.5	64	124.56
		90	2	46.016	80.92	75.85
		120	3	57.68	88.5	54.43
Beta blockers						
Atenolol	4	12.5	4	2	15.67	683.53
		25	29	4.14	23.85	476.1
		50	41	5.71	37.92	564.1
		100	19	19.6	56.57	188.6
Metoprolol	3	25	9	10.8	41.6	285.185
		50	9	17	59.9	252.35
		100	4	54	90.6	67.78
Nebivolol	2	2.5	15	15.8	48	203.79
		5	20	46.6	76.31	63.76
Carvedilol	4	3.125	17	7	35	400
		6.25	14	12	47	291.67
		12.5	17	22	60	172.73
		25	12	42	91.3	117.38
ACE inhibitors						
Enalapril	3	2.5	20	6	22.6	276.67
		5	20	9	36.84	309.33
		10	17	12	59.36	394.67
Ramipril	4	1.25	7	12.5	40.77	226.16
		2.5	22	27	73.53	172.33
		5	21	49	123.9	152.86
		10	8	92.8	179.3	92.21
ARBs						
Losartan	2	25	48	12	45.1	275.83
		50	57	24.5	93.85	283.06
Telmisartan	3	20	32	18	69.9	288.33
		40	43	28	89	217.86
		80	15	89	160	79.77
Olmesartan medoxomil	3	10	6	39	49	25.64
		20	13	49	135	175.51
		40	12	79	230	191.13

ACE: Angiotensin converting enzyme, ARBs: Angiotensin receptor blockers

shown that providing a manual of comparative drug prices annotated with prescribing advice to physicians reduced their patients' drug expense.[10] The reasons for this price variation could be as follows:[1,11-16]

1. The existing market structure of the pharmaceutical industry

Table 2: Cost variation of combination therapy.

Drug	Formulations	Doses (mg)	Manufacturing companies	Minimum cost (Rs)	Maximum cost (Rs)	% price variation
Amlodipine + atenolol	2	5+50	72	10.3	79.7	673.79
		5+25	9	11	35.1	219.09
Amlodipine + losartan	2	5+50	18	20.8	73.35	284.61
		5+25	3	32	39	21.88
Amlodipine + lisinopril	1	5+5	19	26	75	188.46
Amlodipine + telmisartan	2	5+40	13	63	97	107.94
		5+80	3	84	145	82.5
Telmisartan + hydrochlorothiazide	2	40+12.5	44	24.7	97.28	293.85
		80+12.5	8	37.3	145	288.74
Losartan + hydrochlorothiazide	2	50+12.5	48	26	126	384.62
		25+12.5	4	28.5	50	76.78
Enalapril + hydrochlorothiazide	2	10+2.5	5	28	62	121.43
		5+12.5	2	25	31.4	25.6
Ramipril + hydrochlorothiazide	2	5+12.5	3	55	136	147.27
		2.5+12.5	13	39.5	76.5	93.67
Metoprolol + hydrochlorothiazide	2	100+12.5	2	27.15	29.71	9.43
		50+12.5	2	22.7	57	151.1

2. Asymmetry of information or imperfect information
3. Government regulations and pricing policies
4. Costs of raw supplies, distribution and promotion
5. Economic goals of the parent company, target return on investment.

Currently, very few medicines are under drug prices control order. Hence, it is desired that the Government should bring all lifesaving and essential medicines under price control. Combinations of antihypertensive drugs are not included in essential drug list (EDL) which should be taken into consideration while revising the list. Due consideration must be placed on the pricing of drugs in the EDL to increase their accessibility to common people. DPCO appears to be an effective tool to keep in rein the drug prices which should be implemented for all drugs included in EDL.

Thus, this study highlights that there is a huge price variation among the antihypertensive drugs manufactured by different companies. Some measures must be taken by the Government to bring about the uniformity in the price. It will help to reduce the economic burden on the patients to some extent.

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