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Original Research Article

Cost Analysis of Anti-Hypertensive Drugs in India

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Abstract

Hypertension can be defined as a condition in which the force of blood against the artery walls is too high. This study was planned to analyses cost variations of anti-hypertensive drugs available in Indian market. There is a wide range of variations as the price of drug marketing in India. This study was conducted by taking the maximum and minimum cost of anti- hypertensive agents manufactured by different brands of same drug, strength and dosage forms. The data is obtained from the current index of medical specialties [CIMS] April-July 2018. The cost ratio and percentage cost variations were calculated for each anti-hypertensive drug. The average percentage price variation of different brands of the same oral anti-hypertensive drugs in Indian market is very wide.

Keywords: Anti-hypertensive, price comparison, CIMS, cost ratio, percentage price variation, Indian market.

INTRODUCTION

Hypertension is another name for high blood pressure. It can lead to severe complications and increase the risk of cardiac disease, stroke, and death [1]. Hypertension is usually higher when you wake up, after exercise, when you are under stress [2]. Blood pressure is the force exerted by the blood against the walls of the blood vessels. When the blood pressure raised above 140/90mmHg is stated as Hypertension [1].

According to WHO the prevalence of hypertension was highest in Africa with 46% and the lowest prevalence was in America with 35% in both genders. Men have the higher prevalence than women (39% for men and 32% for women) [3]. Globally, the overall prevalence of hypertension in adults over 25 years of age was 40% in 2008. However, because of population growth and aging, the number of people with uncontrolled hypertension rise from 600 million in 1980 to nearly 1 billion in 2008 [4].

For primary/ essential hypertension the caused is not known. When a cause can be identified (eg: a disorder of the adrenal glands, kidneys (or) arteries) the condition is known as secondary hypertension. Factors such as heredity, obesity, smoking and emotional stress are thought to play a role. Hypertension results in damage to the heart, eyes, kidneys (or) brain and ultimately lead to congestive heart failure, heart attack, kidney failure (or) stroke [1].

In patients with uncomplicated/mild hypertension, antihypertensive therapy can be can be initiated after dietary and lifestyle modifications. Which includes maintenance of healthy diet, restriction of salt and alcohol intake, increased exercise (walking, jogging, swimming etc), quit smoking for 3-6 months [5]. Research confirmed that the uptake of excess dietary salt can be the major contributor to hypertension. some studies also have shown that low calcium intake can be a cause[4]. Anti-hypertensive is prescribed based on the co-morbidities and individual patient characteristics [5]. Systolic hypertension is more prevalent in elderly people due to large vessel stiffness associated with ageing [6] and usually have lower plasma renin activity than younger patients, therefore ACE inhibitors and beta-blockers may not be as effective [7].

Monotherapy is recommended initially, especially for patients with mild hypertension (140-159/ 90-99mmHg) and people with low to moderate total cardiovascular risk [5]. Treatment guidelines from the United Kingdom recommend that ACE inhibitors/ Angiotensin Receptor Blockers are initiated for patients (<55yrs) with hypertension. Some studies have found ACE inhibitors and beta-blockers to be more effective in younger people compared to calcium channel blockers/ thiazide diuretics [8]. Diuretics or calcium channel blockers are prescribed for older patients (55yrs/ older) with hypertension [9]. Australian guidelines recommended thiazide diuretics as a first-line therapy in patients aged 65yrs and older [10]. The

use of thiazide diuretics and calcium channel blockers in older patients may have the additional benefits of managing isolated systolic hypertension [6].

METHODOLOGY

The cost of 22 oral Antihypertensive drugs available under different companies in our Indian market was analysed.

Cost of a drug available in same strength and composition being manufactured under different trades were obtained from "Current Index of Medical Specialities" April-July 2018. The drugs being manufactured by only one company were eliminated.

The percentage cost variation, the ratio of the cost of costliest to the cheapest brand of the same generic antihypertensive drug was calculated. From this, we can know that how many times costliest brands costs high compared to the cheapest brand in each generic class [11].

Percentage cost variation was calculated by using the below formula:

% cost variation= (maximum cost-minimum cost)/ (minimum cost) X 100

RESULTS

Among the Indian market, there is a large variation in the cost of different brands of similar antihypertensive drugs. The highest cost ratio and percentage cost variation was found for Amlodipine10mg [1:10.82and 982.5] and least for Lisinopril10mg [1:1.03 and 3.06] for other antihypertensive drugs (Table-1).

DISCUSSION

According to this study, we identify the difference in the cost of different trades of the same oral Antihypertensive drugs in the Indian market. Highest cost of the medication has been found to be cause for medication noncompliance. Increase in the cost of medications, there is a decrease in the use of medications by the patient, then there will be an increase in the risk of cardiac disease, stroke, and death. Decreased drug price has been corresponding with improved adherence to the medication regimen. Non-adherence of the treatment leads to the health complications which increases the cost of treatment gradually.

Treatment with generic medicines have found that it is less in cost and having the same composition as that of branded drugs. In a developing country like India, one of the smart ways to reduce the therapy cost is to use the generic drugs.

Any deviation from evidence-based guidelines in Hypertension treatment contributes to the high cost of medications and creates difficulties in providing affordable prescription drugs [10]. Use of FDC suggested that are often less expensive for high dose monotherapy [12]. Analysis of the comparative cost-effectiveness of the therapies showed that there is a wide variation in the cost of monotherapy by different trades for treating the same Hypertension.

Table-1: Mono-drug Therapy

S.no	Antihypertensive drugs	Strength	Least price	Highest price	Cost ratio	%cost variation
1	Ramipril	1.25	13.20	54.10	1: 4.09	309.84
		2.5	23.50	101.70	1:4.32	332.76
		5	46	123.90	1:2.69	160
		10	92.80	221.50	1:2.38	138.68
2	Enalapril	2.5	9.25	33.90	1:3.66	266.48
		5	16.75	55.15	1:3.29	229.25
		10	27.95	89.09	1:3.18	218.74
3	Lisinopril	2.5	18.90	21.84	1:1.15	15.55
		5	34.50	39.52	1:1.14	14.55
		10	66.50	68.90	1:1.03	3.60
4	Losartan	25	15.50	47.37	1:3.07	205.61
		50	29.50	156	1:5.28	428.81
5	Olmesartan	10	42.70	59.29	1:1.38	38.85
		20	34	95	1:2.79	179.41
		40	54	163	1:3.01	201.85
6	Telmisartan	20	27	39	1:1.44	44.44
		40	44.73	118	1:2.638	163
		80	97	131	1:1.35	35.05
7	Candesartan	4	28.48	34.95	1:1.22	22.71
		8	46.37	61.80	1:1.33	33.27

8	Metaprolol	25	10.67	90	1:8.43	743.48
		50	33	136.50	1:4.13	313.63
		100	46.20	102	1:2.20	121.73
9	Nabivolol	2.5	32	73	1:2.28	128.12
		5	52	109	1:2.09	109.61
10	Propranalol	10	8.25	17	1:2.06	106.06
		20	13.30	26	1:1.95	95.48
		40	18.60	39	1:2.09	109.67
		80	32.25	40	1:1.24	24.03
11	Atenalol	12.5	2.80	21.95	1:7.83	683.92
		25	7.40	33.40	1:4.51	351.35
		50	8.50	37.50	1:4.41	341.17
		100	32.70	54.68	1:1.67	67.21
12	Carvedalol	3.125	9	23	1:2.55	155
		6.25	16	40	1:2.5	150
		12.5	30	50	1:1.66	66.66
		25	52	100	1:1.92	92.30
13	Labetalol	100	110	120	1:1.09	9.09
14	Amlodipine	2.5	5.71	40.50	1:7.09	609.28
		5	7.54	55	1:7.29	629.44
		10	10	108.25	1:10.82	982.5
15	Cilnidipine	5	25	49	1:1.96	96
		10	29.50	63.59	1:2.15	115.55
		20	49.50	108.70	1:2.19	119.59
16	Diltiazem	30	14.75	18.23	1:1.23	23.59
		60	28.50	33.83	1:1.18	18.70
		90	32	48.50	1:1.51	51.56
		120	40	145.55	1:3.63	263.87
		180	75	193.40	1:2.57	157.86
17	Nefidipine	5	9.30	9.97	1:1.07	7.20
		10	13.63	24.70	1:1.812	81.21
		20	14.74	33.04	1:2.24	124.15
		30	29.50	260	1:8.81	781.35
18	S-amlodipine	1.25	14	27.80	1:1.98	98.5
		2.5	16.40	45.70	1:2.78	178.65
		5	24	78.30	1:3.26	226.25
19	Torsemide	5	15.95	36.74	1:2.30	130.34
		10	23.52	55	1:2.33	133.84
		20	44.28	112	1:2.52	152.93
		100	148.50	237	1:1.59	59.5
20	Indapamide	1.5	37.50	106	1:2.82	182.66
21	Hydrochlor thiazide	12.5	6	9.53	1:1.58	58.83
		25	11	16.51	1:1.50	50.09
22	Amiodarone	100	48	88	1:1.83	83.33
		200	83	102.25	1:1.23	23.19

Telisartan40mg is available with the highest number of trades (37). Number of trades for each Antihypertensive agent to be had in the Indian market are shown in our analysis (Table-2).

Table-2: Number of Trades of Antihypertensive drugs

Antihypertensive drugs	Strength(mg)	Number of trades
Ramipril	1.25	10
	2.5	19
	5	19
	10	7
Enalapril	2.5	7
	5	8
	10	7
Lisinopril	2.5	4
	5	4
	10	10
Losartan	25	25
	50	29
Olmesartan	10	3
	20	14
	40	16
Telmisartan	20	21
	40	37
	80	13
Candesartan	4	2
	8	2
Metaprolol	25	28
	50	27
	100	9
Nabivolol	2.5	7
	5	7
Propranalol	10	4
	20	5
	40	8
	80	3
Atenalol	12.5	3
	25	11
	50	15
	100	6
Carvedalol	3.125	4
	6.25	4
	12.5	4
	25	3
Labetalol	100	2
Amlodipine	2.5	18
	5	29
	10	13
Cilnidipine	5	8
	10	8
	20	5
Diltiazem	30	3
	60	3
	90	5
	120	3
	180	2
Nefidipine	5	2
	10	7
	20	5
	30	4

S-amlodipine	1.25	2
	2.5	7
	5	7
Torsemide	5	3
	10	6
	20	5
	100	4
Indapamide	1.5	3
Hydrochloro thiazide	12.5	2
	25	2
Amiodarone	100	2
	200	2

CONCLUSION

There is a wide difference in the percentage price variation of various brands of the same oral antihypertensive drugs in the Indian trade. For the successful treatment of hypertension, compliance plays a major role. Increased adherence to the treatment can be ensured by decreasing the cost of therapy and produce an awareness among the physician for switching to cost-effective therapy and decrease the price burden on patients.

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