Original article

Cost analysis of oral antihypertensive agents available in Nepal

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Abstract

Introduction: Hypertension is one of the major causes of morbidity, mortality hence requires lifelong treatment. There is a wide range of variation in the prices of antihypertensive drugs marketed in Nepal. Thus, a study was planned to find out variations in prices of 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 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 "Nepalese Innovation of Drug and Disease" January 2015 and drug price list of various pharmaceuticals companies in Nepal . 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 enalapril (5 mg): 5300.00%, enalpril (2.5 mg): 4150.00%, amlodipine(5 mg): 962.50%, Nifedipine(20mg): 794.11%. Among the combination therapy, amlodipine + atenolol (5 + 50 mg): 418.00%, amlodipine + atenolol (5 + 25 mg): 269.31%, losartan + hydrochlorothiazide (50 + 12.5 mg): 188.46%, atenolol+ chlorthalidone (100 + 25 mg): 150.00% variation.

Conclusion: There is wide variation in the prices of oral antihypertensive agents available in Nepalese market. Regulatory authorities pharma companies, physicians should maximize their efforts to reduce the cost of drugs.

Keywords: Anti-hypertensive drugs, Brands, Price variation

Introduction

Rational use of medicines is that the patient receives medication appropriate to the clinical need, at the proper dose, for the proper duration and at the lowest cost. So for rational prescribing, prescriber should also consider cost while writing prescription along with other criteria of rational use of the drug so that the patient can afford the drug.In Nepal pharmaceutical Industry has grown with tremendous pace and Nepalese markets are flooded with a huge number of branded formulations. Even though production is more in Nepal, still all people do not get medicines sometimes because of high cost.Prices of drugs are kept at high by manufacturing company and it makes the drug less affordable for poor people.[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. 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.

Nepalese health sector has been affected by economic liberalization, structural adjustment reforms by the World Bank and increasing cost of production of pharmaceuticals. Increasing cost of medicines may be a reason for people not accessing health care.[4] Ignorance and insufficient knowledge of oral antihypertensive drug prices, makes it difficult for the physician to decide and prescribe most economical treatment regime

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, alpha adenoreceptor blocker 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

The cost of oral antihypertensive drugs was derived from Nepalese Innovation of Drug and Disease January 2015 and drug price list of various pharmaceuticals companies in Nepal. Data about the cost of oral antihypertensive drugs were collected for all the strength and dosage forms. Then the data of cost (pre 10 tablets) of the specific oralantihypertensive drug in same strength and same dosage form that was manufactured by different pharmaceutical companies was compared. There was the exclusion of the some strength of drugs which are manufactured by only one pharmaceutical company.

Data analysis: The maximum price and minimum price for the different oral anti hypertensive drugs were identified, and calculation for the percentage of variation in price was done. Following formula was be used to calculate price variation.6

$$\text{Percentage cost variation} = \frac{\text{Max cost} - \text{Min cost} \times 100}{(\text{Min cost})}$$

Results

The prices of a total of 21 drugs(14 single and 7 combination preparations), available in 56 different formulations were analyzed. These 56 formulations are manufactured by different pharmaceutical companies.

Table 1 shows the price variation of a few commonly used oralantihypertensives used as a single drug therapy. Maximum percentage price variation in different groups were 5300.00% in enalapril (5mg) 4150.00% in enalapril (2.5mg), amlodipine(5 mg): 962.50% in amlodipine(5 mg), 794.11% in Nifedipine (20mg),681.25% in atenolol (12.5mg).Minimum percentage price variation in different group were14.50 % in S amlodipine 16.00% in doxazosin (4mg), 18.00% in doxazosin (2mg), 20 13% in doxazosin (1mg),54.00% in enalapril (20mg)

Table 1 Cost variation of single drug therapy

Drug	Formulation	Doses(mg)	Manufacturing companies	Min.Price NPR	Max.Price NPR	% price variation
Beta blockers						
Atenolol	4	12.5	2	3.20	25.00	681.25
		25	27	6.60	35.20	433.33
		50	34	9.91	48.00	384.36
		100	19	40.00	77.00	92.50
Metoprolol	4	12.5	10	20	64.50	222.50
		25	17	17.00	100.50	491.11
		50	19	21.60	143.00	562.00
		100	7	40.00	149.60	274.00
Propanolol	4	10	5	13.2	20	51.51
		20	4	21.20	31.80	50.00
		40	7	29.70	47.50	60.00
		60	2	47.80	60.40	26.35

Alpha adrenoreceptor blocker						
Doxazosin	3	1	2	28.80	34.60	20.13
		2	2	51.50	60.80	18.00
		4	2	95.00	110.00	16.00
Terazosin	3	1	5	80.00	200.00	150.00
		2	5	150.00	260.00	73.33
		5	3	210.00	452.80	115.61
ACE inhibitors						
Enalapril	4	2.5	31	0.80	34.00	4150.00
		5	33	1.00	54.00	5300.00
		10	26	33.00	100.00	203.00
		20	2	49.60	76.40	54.00
Lisinopril	3	2.5	7	24.20	50.00	105.37
		5	7	35.60	92.00	158.40
		10	6	61.50	153.00	148.78
Ramipril	4	1.25	16	21.10	55.00	161.11
		2.5	25	18.40	117.00	535.90
		5	25	48.00	189.00	293.75
		10	6	136.00	238.00	75.30
AngiotensinII receptor blockers						
Losartan	2	25	31	19.20	65.00	238.54
		50	33	38.40	115.00	199.47
Telmisarton	3	20	9	48.00	74.50	55.20
		40	11	50.00	136.00	172.00
		80	6	80.00	214.40	168.00
Calcium channel blocker						
Amlodipine	3	2.5	30	9.00	65.60	628.90
		5	39	12.00	127.50	962.50
		10	28	24.20	183.20	657.00
S Amlodipine	2	2.5	4	33.60	38.40	14.20
		5	4	65.60	102.40	56.02
Nifedipine	4	5	6	5.00	15.90	218.00
		10	11	7.20	22.60	213.90
		20	11	13.60	121.60	794.11
		30	3	36.50	247.20	577.00
Thiazide diuretics						
Hydrochlorothiazide	2	12.5	4	6.00	10.00	66.60
		25	4	10.00	19.00	90.00

Table 2 shows price variation between variouscombination of drugs. Total 7 combination therapies were analysed. Maximum percentage price variation in different groups were 418.00% in amlodipine + atenolol (5 + 50 mg), 269.31% in amlodipine + atenolol (5 + 25 mg), 188.46% inlosartan + hydrochlorothiazide (50 + 12.5 mg) , 150.00% in atenolol+ chlorthalidone(100 + 25 mg

Table 2 Cost variation of Combination therapy

Drug	Formulation	Doses (mg)	Manufacturing companies	Min. Price NPR	Max. Price NPR	% price variation
Amlodipine+Atenolol	2	5+50	38	16.40	85.00	418.00
		5+25	6	17.60	65.00	269.31
Amlodipine+Losartan	1	5+50	2	110.00	115.00	4.50
Atenolol+ Chlorthalidone	2	100+25	2	32.00	80.00	150.00
		50+12.5	2	45.00	62.00	37.70
Enalapril+ hydrochlorothiazide	2	5+12.5	2	49.60	63.00	27.00
		10+25	4	48.20	97.50	110.00
Losartan+ hydrochlorothiazide	2	25+12.5	7	70.00	110.00	57.00
		50+12.5	22	41.60	120.00	188.46
Metoprolol+ hydrochlorothiazide	1	100+12.5	2	43.40	58.00	33.60
Nifedipine+Atenolol	1	20+50	4	32.00	65.00	103.00

Discussion

Nepalese 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. This situation has led to greater price variation among drugs marketed.

Very few studies are available in Nepalese scenario, which compare the cost of drugs of different brands. Therefore, it was decided to carry out the study which compares the cost of different brands of drug of one of the most common disorder i.e hypertension. The drug prices available in Nepalese Innovation of Drug and Disease and drug price list of various pharmaceuticals were compared as they are readily available source of drug information. 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 drug use. Findings of the study reveal that the prices of most of the oral 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 fairly wide leading to unfair burden on the consumer. In Nepal, patients are paying out of their pockets for their medical bills and are not covered by insurance schemes unlike developed countries.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 shown that providing a manual of comparative drug prices annotated with prescribing advice to physicians reduced their patients' drug expense[7].The reasons for this price variation could be as follows.[8-14]

1. Increase in competition among pharma companies
2. Asymmetry of information or imperfect information
3. Existing market structure of the pharmaceutical industry
4. Marketing/advertising costs
5. Government regulations and pricing policies

Currently, very few medicines are under drug prices control order. Hence, it is desired that the Government should bring all life saving and essential medicines under price control.

Conclusion

This study highlights that there is a huge price variation among the oral antihypertensives drugs manufactured by different companies. So the Government must take some measure to bring about the uniformity in price. It will help to reduce the economic burden on the patients to some extent.

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