

## Price analysis of antianginal drugs available in Indian market

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### ABSTRACT

**Background:** Coronary artery disease (CAD) is one of the most common causes of cardiovascular mortality and morbidity in developing countries like India. Initial management includes use of many antianginal drugs. There is wide variation in market prices of these drugs. This study was planned to analyse the percentage variation in prices amongst monotherapy and combination therapy of antianginal drugs manufactured and sold under different brand names in Indian market.

**Methods:** Price of antianginal drugs manufactured by different pharmaceutical companies, in the same strength and dosage forms was obtained from "Current Index of Medical Specialties (CIMS)" January-April 2016 and "Indian Drug Review (IDR)" Vol. XXII, Issue No.1, 2016. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies and percentage variation in price per 10 tablets was calculated.

**Results:** Percentage variation in price for antianginal drugs marketed in India was found to be amlodipine (5 mg) 1128.57% followed by amlodipine (10 mg) 1040% and amlodipine (2.5 mg) 780% as a monotherapy. Whereas atenolol (25 mg), atenolol (50 mg) and nicorandil (10 mg) also showed significant percentage variation in prices 525%, 426.66% and 350.84% respectively. For combination therapy, percentage variation in prices were seen with amlodipine + atenolol (5 + 50 mg) 700%, followed by atenolol + hydrochlorothiazide (50 + 12.5 mg) 362.5% and Isosorbide dinitrate + aspirin (5 + 75 mg) 300%.

**Conclusions:** There is a wide variation in the price of different brands of antianginal drugs available in India. The clinicians prescribing these drugs should be aware of these variations to reduce the financial burden of drug therapy.

**Keywords:** Antianginal drugs, Coronary artery disease, Price variation, Pharmaceutical companies

### INTRODUCTION

Coronary artery disease (CAD) is one of the most common causes of cardiovascular mortality and morbidity in developing countries like India. According to reports from the National Commission on Macroeconomics and Health, 62 million people in India suffer from CAD with 23 million of these below 40 years of age.<sup>1</sup> By 2020, 60% of the CAD are expected to occur in India.<sup>1</sup> The increase in incidence of CAD is due to rapid urbanization and changing lifestyle such as dietary changes, increased alcohol consumption, physical inactivity and increased prevalence of DM.<sup>2-4</sup>

Anginal pain is the most specific presentation seen with CAD which is caused by myocardial ischemia as a result of obstruction in the coronary arteries. Other atypical symptoms include breathlessness, palpitation, tachycardia, dizziness and extreme weakness. Initial management includes use of antianginal drugs such as nitrates, calcium channel blockers (CCB) and beta blockers. If the symptoms are not adequately controlled, coronary angioplasty or bypass graft surgery is often required.<sup>5,6</sup>

As the prevalence of CAD is highest amongst elderly population in India, community doctors must prescribe antianginal drugs considering their financial status.

Untreated CAD patients due to financial burden may lead to further complications such as cerebrovascular stroke, thromboembolic disorders and myocardial infarction. Thus it is necessary to make these antianginal agents available to the population at the minimum cost possible so that everyone can afford it and the complications of CAD can be avoided.<sup>7,8</sup>

The Indian pharmaceuticals market is the third largest in terms of volume and thirteenth largest in terms of value, as per the report by Equity Master. Also, India is the largest provider of generic drugs globally with the Indian generics accounting for 20 per cent of global exports.<sup>9</sup> There is a wide variation in prices of these drugs, manufactured by different pharmaceutical companies in India. This study was planned to analyse the percentage variation in prices amongst monotherapy and combination therapy of antianginal drugs manufactured and sold under different brand names in Indian market.

## METHODS

Price in Indian rupees (INR) of antianginal drugs manufactured by different pharmaceutical companies in India, in the same strength was obtained from "Current Index of Medical Specialties (CIMS)" January-April 2016 and "Indian Drug Review (IDR)" Vol. XXII, Issue No.1, 2016. The drug formulation being manufactured by only one pharmaceutical company or being manufactured by different pharmaceutical companies; however, in different strengths were excluded. Price of the antianginal drugs was calculated for an average of 10 tablets as the number of tablets available per strip varied.

Difference in the maximum and minimum price of the same drug formulation manufactured by different pharmaceutical companies and percentage variation in price was calculated.

Percentage price variation was calculated as follows:

$$\% \text{ Price variation} = \frac{\text{Maximum price of drug} - \text{Minimum price of drug}}{\text{Minimum price of drug}} \times 100$$

## RESULTS

The prices of a total 10 drugs (7 as a monotherapy and 3 as a combination therapy), available in 19 different formulations of antianginal drugs were analysed. These 19 different formulations were manufactured by different pharmaceutical companies.

### Monotherapy

The Table 1 represents the price variation amongst monotherapy of antianginal drugs. A total of 16 drug formulations were analysed. Maximum percentage variation in prices were seen with amlodipine (5 mg) 1128.57% followed by amlodipine (10 mg) 1040% and amlodipine (2.5 mg) 780%. Whereas atenolol (25 mg), atenolol (50 mg) and nicorandil (10 mg) also showed significant percentage variation in prices 525%, 426.66% and 350.84% respectively.

**Table 1: Price variation amongst monotherapy of antianginal agents.**

Drug	Formulation	Dose (mg)	Min price (Rs)	Max price (Rs)	% Price variation
Amlodipine	3	2.5	5	44	780
		5	7	86	1128.57
		10	10	114	1040
Atenolol	3	25	4	25	525
		50	6	31	416.66
		100	14	44	214.28
Diltiazem	3	30	15	36	140
		60	28	58	107.14
		90	32	135	321.87
Glyceryl trinitrate	2	2.5	14	31	121.42
		6.5	22	46	109.09
Isosorbide mononitrate	2	30	26	61	134.61
		60	42	97	130.95
Nicorandil	2	5	49	185	277.55
		10	59	266	350.84
Trimetazidine	1	20	20	83	315

**Table 2: Price variation amongst combination therapy of antianginal agents.**

Drug	Formulation	Dose (mg)	Min price (Rs)	Max price (Rs)	% Price variation
Amlodipine + Atenolol	1	5 + 50	10	80	700
Atenolol + Hydrochlorothiazide	1	50 + 12.5	8	37	362.5
Isosorbide dinitrate + Aspirin	1	5 + 75	10	40	300

### Combination therapy

The Table no. 2 represents the price variation amongst combination therapy of antianginal drugs. A total of 3 drug formulations were analysed. Maximum percentage variation in prices was seen with amlodipine + atenolol (5 + 50 mg) 700%. Percentage variation in prices for atenolol + hydrochlorothiazide (50 + 12.5 mg) and for Isosorbide dinitrate + aspirin (5 + 75 mg) were found to be 362.5% and 300% respectively.

### DISCUSSION

Presently the market size of the pharmaceutical industry in India stands at US\$ 20 billion. As on March 2014, Indian pharmaceutical manufacturing facilities registered with the US Food and Drug Administration (FDA) stood at 523, highest for any country outside the US.<sup>9</sup> These evolving pharmaceutical industry in India contribute to the manufacture and sell of the same drug under different brand names. Various pharmaceutical companies manufacture large number of different drug formulations which are available at different prices to the Indian population. There is paucity of data regarding the analysis of prices of various antianginal drugs available in the Indian market.

As the prevalence of CAD is increasing in Indians, early management using antianginal drugs will reduce the cardiovascular mortality and morbidity. Therefore, this study was done to compare the prices of different brands of antianginal drugs manufactured by different pharmaceutical companies in India. The prices of these drugs are available in CIMS and IDR which are updated regularly.

This study revealed a wide variation in prices of antianginal drugs. Out of 19 drug formulations studied, 4 in the monotherapy and 1 in the combination therapy of antianginal drugs showed more than 500 percentage variation in prices. Maximum percentage variation in prices were seen with amlodipine (5 mg) 1128.57% amongst monotherapy and with amlodipine + atenolol (5 + 50 mg) 700% amongst combination therapy of antianginal drugs.

Despite increasing growth in pharmaceutical market in India, the Indian population is not getting benefited because of their low socioeconomic status. Physicians play an important role in prescribing drugs to patients and they should prescribe drugs according to their financial

condition. Physicians must notify the government about the market availability of these expensive drugs so that the Indian Government could reduce the pricing of antianginal agents by bringing them under Drug Pricing Control Order (DPCO). The drugs under DPCO have minimum percentage variation in prices than the drugs which do not come under it.<sup>10,11</sup>

Some previous price analysis studies of oral hypolipidemic drugs, antiepileptic drugs, oral fluoroquinolone antibiotics and anxiolytic drugs have also showed such a wide variation in prices in Indian market.<sup>12-15</sup> This study also highlights the wide variation in prices amongst antianginal drugs marketed in India.

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