

## Study of variation in prices of oral antiplatelet drugs available in Indian market

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### ABSTRACT

**Background:** Coronary artery disease is one of the most prevalent causes of death and disability in developed and developing countries. There is a wide variation in the prices of oral antiplatelet drugs marketed in India. Thus, a study was planned to find out the variation in cost in the oral antiplatelet drugs available in India either as a single drug or in combination and to evaluate the difference in cost of various brands of the same antiplatelet drug by calculating percentage variation in cost.

**Methods:** Cost of oral antiplatelet drugs manufactured by different pharmaceutical companies, in the same strength and dosage forms was obtained from “current index of medical specialties” October 2015-January 2016. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies and percentage variation in cost per 10 tablets was calculated.

**Results:** Percentage variation in cost for oral antiplatelet drugs marketed in India was found to be-clopidogrel 75 mg (1067.3%), clopidogrel 150 mg tablet (148.7%), prasugrel 5 mg (94.4%), aspirin 150 mg (69.8%), prasugrel 10 mg (54.8%), aspirin 75 mg (51.5%), clopidogrel 300 mg tablet (42.9%) and ticlopidine 250 mg (32%). The lowest percent cost variation found is ticagrelor 90 mg (0%). In combination therapy the highest price variation (235.6%) was found for aspirin (75 mg)+clopidogrel (75 mg) followed by aspirin (150 mg)+clopidogrel (75 mg) (24.2%).

**Conclusions:** There is a wide difference in the cost of different brands of oral antiplatelet drugs available in India. The clinicians prescribing these drugs should be aware of these variations in cost to reduce the cost of drug therapy.

**Keywords:** Antiplatelet drugs, Price variation, Cost ratio

### INTRODUCTION

Platelets are vital components of normal haemostasis and key participants in pathologic thrombosis by virtue of their ability to adhere to injured vessels and to accumulate at sites of injury. Antiplatelet drugs interfere with one or more steps in the platelet activation process. There are 2 situations in which antiplatelet therapy should be considered:

- Secondary prophylaxis, in a patient that has had a thromboembolic event; and
- Primary prophylaxis, in the patient considered at risk.

In conditions associated with arterial thrombosis (atherosclerosis, cardiac disease), antiplatelet agents are the first line of drugs. In all others, antiplatelet drugs should be considered as adjunctive agents with anticoagulants.<sup>1</sup>

Coronary artery diseases (CAD) are the prevalent cause of mortality, accounting for around 50% of deaths resulting from non-transmissible diseases. In 2008, CADs accounted for around 25% of the mortality rate in our country. They were expected to be the fastest growing long-term disease by 2015 expanding at 9.2% every year since 2000.<sup>2</sup> Antiplatelet drugs reduce the incidence of cardiovascular events by 20-25% in people with established CAD or at high risk of CAD.<sup>3</sup>

In the WHO guide to good prescribing, “P” stands for personal, implying that a prescriber has a personal formulary of drugs selected on a rational basis, considering the efficacy, safety, suitability and cost of available drugs for a particular condition. While prescribing to patients, the prescriber considers what alterations might be needed to the standard dose, frequency or route of administration, and whether it is cost effective for patient or not. With the growth of Indian pharmaceutical industry, Indian market is flooded with branded generic drugs with a lot of variation in the cost of different brands of the same formulation.<sup>4</sup>

The current scenario shows that the Indian pharmaceutical field is the third largest with respect to volume and is the thirteenth largest in terms of value.<sup>4</sup> Needless to say there will be a wide variation among the costs of generic antiplatelet drugs. Our aim is to carry out price analysis study of conventional antiplatelet drugs which are available in the market under various brand names manufactured by different pharmaceutical companies.

## METHODS

Prices of various antiplatelet agents were obtained from the latest issue of “current index of medical specialties” (CIMS-October 2015- January 2016).<sup>5</sup>

- The minimum and the maximum cost in rupees (INR) of a particular antiplatelet drug manufactured by various pharmaceutical companies in the same strength are noted.
- The cost of 10 tablets/capsules is calculated.
- The drugs being manufactured by only one company are also included.
- Those drugs being manufactured by different companies, in different blister packs, are also included; however, the prices have been converted for a pack of 10 for standardization.
- The cost ratio, the ratio of the cost of the costliest to cheapest brand of the same generic antiplatelet drug is calculated. This tells, how many times the costliest brand costs more than the cheapest one in each generic group.
- Percentage cost variation is calculated as follows  $6\% \text{ cost variation} = (\text{maximum cost} - \text{minimum cost}) \div \text{minimum cost} \times 100$ .
- Fixed dose combinations (FDCs) of antiplatelet drugs are also analyzed in this study.

## RESULTS

**Table 1: Variation in cost of single drug therapy.<sup>5</sup>**

Drug	Dose formulations	No. of manufacturing companies	Minimum cost (INR)	Maximum cost (INR)	Cost ratio	% variation in price of 10 tablets
Aspirin	50 mg	1	1.88	1.88	1	0
	75 mg	3	1.94	2.94	1.5	51.5
	100 mg	1	18.00	18.00	1	0
	150 mg	2	2.85	4.84	1.7	69.8
	325 mg	1	4.62	4.62	1	0
Clopidogrel	75 mg	24	11.94	139.38	11.7	1067.3
	150 mg	5	57.40	142.77	2.5	148.7
	300 mg	2	105.00	150.00	1.4	42.9
Dipyridamole	25 mg	1	11.29	11.29	1	0
	100 mg	1	35.66	35.66	1	0
Ticlopidine	250 mg	3	75.50	99.73	1.3	32.0
Prasugrel	5 mg	4	54.00	105.00	1.9	94.4
	10 mg	4	99.00	153.30	1.5	54.8
Ticagrelor <sup>7,8</sup>	90 mg	2	500.00	500.00	1	0

This study shows that there is a noticeable variation in the prices of different brands of same Antiplatelet drugs in Indian market. The highest cost variation (1067.3%) is found for clopidogrel 75 mg tablet, followed by clopidogrel 150 mg tablet (148.7%). Other significant

cost variations are: prasugrel 5 mg (94.4%), aspirin 150 mg (69.8%), prasugrel 10 mg (54.8%), aspirin 75 mg (51.5%), clopidogrel 300 mg tablet (42.9%) and ticlopidine 250 mg (32%). The lowest percent cost variation found is ticagrelor 90 mg (0%) (Table 1).

**Table 2: Variation in cost of combination therapy.<sup>5</sup>**

Drug	Dose formulations	No of manufacturing companies	Minimum cost (INR)	Maximum cost (INR)	Cost ratio	% variation in price of 10 tablets
Aspirin+clopidogrel	50 mg+75 mg	1	42.00	42.00	1	0
	75 mg+75 mg	18	23.60	79.20	3.4	235.6
	150 mg+75 mg	12	24.80	30.80	1.2	24.2
	150 mg+150 mg	1	27.50	27.50	1	0
Aspirin+prasugrel <sup>9</sup>	75 mg+10 mg	1	180.00	180.00	1	0

Eptifibatide and tirofiban, despite being antiplatelet drugs are not included in our present study as they are injectable formulations and we have taken only oral preparations in our study.<sup>5</sup> Although, combinations of Aspirin+clopidogrel+statins are also available in the market, but we have not taken them in account.<sup>5</sup>

In combination therapy the highest price variation (235.6%) is found for aspirin (75 mg)+clopidogrel (75 mg) followed by aspirin (150 mg)+clopidogrel (75 mg) (24.2%) (Table 2).

## DISCUSSION

It has been estimated that over two billion people in developing countries have no access to drugs. They lack access because prices are high and their purchasing power is low.<sup>10</sup> In India, 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.<sup>11</sup> In a large survey significant percentage of even high income respondents indicated cost of the drugs as an important factor.<sup>12</sup> Subsequently it can lead to poor patient compliance, especially in case of drugs like antiplatelets which need lifelong therapy. Poor patient compliance is a worldwide problem and can result in patients receiving inappropriate doses of medication.<sup>13</sup>

Studies lack in India comparing the cost of the same drug sold under different brand names by different pharmaceutical companies. Therefore, this study was conducted to compare the cost of different brands of the same oral antiplatelet drug. Antiplatelet drugs are selected as they affect the morbidity and mortality in patients with CVD and these drugs are used continuously on a long term basis.

The findings in our study show a percentage variation in cost above 100% for many available oral antiplatelet drugs in India. These percentage variations in cost cannot be accepted in a developing country like ours. Out of 6 commonly prescribed oral drugs which are studied, there is a wide percentage variation in cost leading to an

unnecessary economic burden on Indian population. Different studies have shown that if a comparative manual of drug prices is available to the physicians, it will reduce the cost of therapy tremendously.<sup>14</sup>

As far as antiplatelet drugs are concerned, our study results are supporting the study done by Jean- Michel Gaspoz et al. Aspirin for secondary prevention of coronary disease is actually attractive from the cost-effectiveness perspective. Clopidogrel, as currently priced, does not have an attractive cost-effectiveness perspective for patients who can tolerate aspirin, whether used alone or in combination with aspirin. This gap could be eliminated by reduction in the price of clopidogrel.<sup>15</sup>

According to a study done in UK, first-line therapy with the co-formulation of modified-release dipyridamole and low dose aspirin to patients with a previous ischaemic stroke is likely to generate significant health benefits at modest extra costs to health and social services. The extra costs of treatment are balanced by the savings in future costs of acute care and long term care of the disabled.<sup>16</sup> Though this combination is not available in our country, but the information provided by this study will always be beneficial for our set up.

The limitations of this study was only oral preparations are taken into account for our study. Antiplatelet combinations with Statins are also available in Indian market, but they have not been considered in our study.

## CONCLUSION

Thus, this study highlights that there is a wide variation in cost among the oral Antiplatelet drugs manufactured by different pharmaceutical companies. The Government of India should take effective measures in bringing uniformity in the cost incurred by patients. It will help to reduce the economic burden on the patients to some extent, and it also may ease physician's dilemma, of prescribing efficacious, safe and cost effective drug to match socio-economic status of the patient.

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