

RESEARCH ARTICLE

A pharmaco-economic study on cost variation of antiplatelet drugs available in Indian market

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ABSTRACT

Background: Expenditure spent on pharmaceutical products accounts for a significant percent of the total health-care expenses of any country. Hence, there is a need to prioritize different and sometimes competing health-care interventions or possibly different brands of a particular medicine, especially in case of chronic illnesses for countries with fixed resources. Pharmacoeconomics helps us to make such decisions. Since antiplatelet drugs are prescribed on long-term basis, they were included in this study. **Aim and Objective:** The aim of this study was to analyze the cost variation of the antiplatelet drugs available in the market under various brand names manufactured by different pharmaceutical industries. **Materials and Methods:** A cross-sectional study was conducted to analyze the cost variation of different antiplatelet drugs available in Indian market. Cost of each drug with respect to dosage and formulation was obtained from the “current index of medical specialties” website for India. Cost ratio and percentage cost variation were then calculated. **Results:** Among the injectable and oral and drugs included in this study, the percentage cost variation was observed to be maximum with eptifibatide 75 mg vial, prasugrel 5 mg film-coated tablets, and aspirin-clopidogrel (75 + 75 mg) capsules. **Conclusion:** Even though the cost variation is found to be wide among the antiplatelet drugs available in Indian market, getting a cost-effective drug is not building castles in the air for the beneficiaries. This could be rendered possible with the help of policy-makers, pharmaceutical companies, physicians, and pharmacists when they join hands together.


KEY WORDS: Pharmacoeconomics; Cost Variation; Antiplatelet Drugs

INTRODUCTION

Pharmacoeconomics, a branch of health economics, identifies, measures, and compares the cost of a pharmaceutical product, service, or program to the outcomes delivered. Pharmacoeconomic studies include cost minimization, cost-effectiveness, cost utility, and cost benefit analyses. Cost of illness/treatment as well as cost analysis are considered to

be a part of pharmaco-economic study as they are used in all pharmaco-economic evaluations.^[1,2]

Three types of costs, namely, direct, indirect, and intangible are associated with medicines in a health-care system. Acquisition cost of the medicine (medicine price) is one of the most important direct costs incurred.^[3] Acquisition cost of the medicine is influenced by a variety of factors including the type of medicine, the formulation, and the brand prescribed. Indian pharmaceutical market, being the third largest in the world in terms of volume, is flooded with a huge number of branded generic formulations, available for every drug molecule. A wide variation in the price between different brands of the same formulation is noted.^[4]

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This apart from creating confusion among innocent consumers also adds up to the out-of-pocket health expenses. According to a daily out-of-pocket health expenses drove 55 million Indians into poverty in 2017, and of these, 69% were impoverished by expenditure on medicines alone.^[5] This can have a negative impact on the country's economy too. Hence, the government of India has introduced Drug Price Control Order (DPCO) and the National Pharmaceutical Pricing Authority (NPPA) to deal with the affordability and availability of medicines.^[6]

Similarly, availability of diverse drugs with same pharmacological effect, handful of me too drugs, numerous formulations of a single drug, and multifold brands of the same formulation are the challenges for health-care professionals in providing quality patient care with minimum cost. To ensure therapeutically sound and cost-effective use of medicines, the World Health Organization promotes the strategy of rational use of drugs by health-care professionals.^[7]

Each physician has their unique way of selecting a P-drug for their patients. Price is one of the major criteria that enable a physician to choose the P-drug. Hence, collecting data regarding the drug availability, price, and utilization may not only help the health-care professionals but also the policy-makers to make necessary decisions.^[8]

Therefore, this study was planned to analyze the price variation between different brands of a drug available in the Indian market. Since antiplatelet drugs are widely prescribed in the primary and secondary prevention of arterial thrombotic disorders on daily basis, this group of drugs was included in this study.

Aim and Objective

The aim of this study was to analyze the cost variation of the antiplatelet drugs available in the market under various brand names manufactured by different pharmaceutical industries.

MATERIALS AND METHODS

A cross-sectional study was conducted to analyze the cost variation of different antiplatelet drugs available in Indian market. Since ethics committee approval is not required for this study, the study proceeded with collection of data regarding prices of various antiplatelet drugs with respect to dosage and formulations from the "current index of medical specialties" website for India location during the month of October and November 2019. The details about minimum and the maximum cost in rupees (INR) were collected.

For orally available drugs, the cost of 10 tablets/capsules was calculated. Those drugs being manufactured, in different blister packs, were also included. However, the prices have

been converted for a pack of 10 for standardization. If a blister pack of 10 and ≤ 10 are both available in the same brand, then the cost of the blister pack with 10 was included.

For parenteral drugs, cost per vial of the drug with respect to the strength was calculated. The cost variations of fixed-dose combinations (FDCs) of antiplatelet drugs were also analyzed in this study taking the strength of individual drugs into account.

Those drugs with single brands or no price information were excluded from the study.

Cost ratio and the percentage cost variation were then calculated for individual drug formulations marketed under more than one brand name using the following formulae.

$$\text{Cost ratio} = \frac{\text{Cost of the most expensive brand}}{\text{Cost of the least expensive brand}}$$

The cost ratio reflects the number of times the costliest brand costs more than the cheapest one in each group.

$$\text{Percentage cost variation} = \frac{\text{Maximum cost} - \text{Minimum cost}}{\text{Minimum cost}} \times 100$$

Statistical Analysis

The data collected were entered in Microsoft Office Excel 2007. The cost ratio and percentage cost variation of the individual oral and injectable antiplatelet drugs and their FDCs were calculated.

RESULTS

This study observed that three injectable antiplatelet drugs, six oral antiplatelet drugs, and three FDCs of oral drugs were available in Indian market. Aspirin is available in seven different strengths and clopidogrel and dipyridamole in three different strengths. A remarkable variation in prices of a given formulation as well as different formulations of a drug of same strength marketed under different brand names was observed and is tabulated in Tables 1-3. Among the injectable drugs, the percentage cost variation was maximum with eptifibatide 75 mg vial (238.75%) and minimum with tirofiban 5 mg vial (55.35%). The maximum percentage cost variation between brands of orally available drugs was observed in prasugrel 5 mg film-coated tablet (1433.33%) followed by 10 mg film-coated tablets (839.55%). The percentage cost variation was found to be low with ticagrelor 90 mg tablets (9.86%), aspirin 81 mg tablets (15.88%), and aspirin 162.5 mg tablets (33.33%). Among the three FDCs available commercially, aspirin + clopidogrel (75+75 mg) capsules had maximum percentage cost variation.

Table 1: Cost variation analysis of injectable antiplatelet drugs

Drug	Strength per vial	Number of brands	Minimum price (INR)	Maximum price (INR)	Cost ratio	% cost variation
Tirofiban	5 mg	8	3700	5748.10	1.55	55.35
Eptifibatide	20 mg	9	1275	3120	2.45	144.71
	75 mg	12	4000	13,550	3.39	238.75
Abciximab	2 mg	3	8100	22,629	2.79	179.37

Table 2: Cost variation analysis of oral antiplatelet drugs

Drug	Strength (mg)	Formulation	Number of brands	Minimum price (INR)	Maximum price (INR)	Cost ratio	% variation
Aspirin	50	MR*	3	2.64	8.5	3.22	221.97
		MR*	4	2.64	13.30	5.04	403.79
	81	Tablet	11	1.46	6.07	4.16	315.75
		Tablet	2	11.9	13.79	1.16	15.88
	100	Tablet	3	1.85	9.9	5.35	435.14
		MR*	4	4.43	12	2.71	170.88
	150	Tablet	8	2.30	8.50	3.7	269.56
		Tablet	2	13.5	18	1.33	33.33
Clopidogrel	75	Tablet	67	24.80	135	5.44	444.35
		FC	15	38	102.16	2.69	168.84
	150	Tablet	5	29	152.05	5.24	424.31
		FC	3	73.82	168.75	2.29	128.60
Prasugrel	5	FC	2	130	217.25	1.67	67.12
		Tablet	11	54	125.30	2.32	132.04
	10	FC	6	90	1380	15.3	1433.33
Ticagrelor	90	Tablet	13	94.82	247	2.61	160.49
		FC	7	152.20	1430	9.4	839.55
Dipyridamole	25	Tablet	2	500	549.29	1.1	9.86
		Tablet	3	2.71	13.30	4.91	390.77
Ticlopidine	75	Tablet	2	7.90	38.10	4.8	382.28
		Tablet	5	9.76	39	4	299.59
	250	Tablet	11	75.5	132.6	1.76	75.63

*Includes modified release/delayed release/extended release/enteric coated preparations. FC: Film-coated tablet

Table 3: Cost variation analysis of different brands of FDCs

FDC (mg)	Formulation	Number of brands	Minimum price (INR)	Maximum price (INR)	Cost ratio	% Cost variation
Aspirin + Clopidogrel (75 + 75)	Capsule	18	3.10	62.50	20.16	1916.13
	CT*	7	30	47.19	1.575	57.3
	Tablet	34	20	78	3.9	290
Aspirin + Clopidogrel (150 + 75)	Capsule	13	20.50	165.60	8.08	707.80
	CT*	4	37.67	43.27	1.15	14.86
	Tablet	24	22	157.80	7.17	617.27
Prasugrel + Aspirin (10 + 75)	Capsule	2	227	236.30	1.04	4.10

*Coated tablets. FDCs: Fixed-dose combinations

DISCUSSION

This study observed an influx of newer antiplatelet drugs into the Indian pharmaceutical market as well as an

increase in the number of pharmaceutical manufacturing companies when compared to the previous studies done between 2015 and 2019.^[9-11] The salient finding of this study was more than 1 pharmaceutical company sells an

antiplatelet drug under different formulation and brand names along with the innovator company in India. Similarly, a single pharmaceutical company sells an antiplatelet drug in particular formulation with different brand names. This implicates that the pharmaceutical industry in India is highly competitive and has become one of the sunrise sectors of the Indian economy.^[9]

This situation has led to greater cost variation among the drugs marketed and most of the drugs and the FDCs included in this study had a percentage cost variation of more than 100%. The maximum percentage cost variation between brands of orally available drugs was observed in prasugrel 5 mg (1433.33%) and 10 mg film-coated tablets (839.55%). This finding was inconsistent with that of the previous one done in 2018, which claimed clopidogrel (726.9%) as the drug with maximum cost variation.^[10] The findings of cost variation of the FDCs were similar to that of the previous study where aspirin-clopidogrel (75+75 mg) tablets had maximum variation.^[10] These wide variations in the prices of different formulations of the same drug might have implications on the consumers, Indian economy, and the physicians.

Hence, the Government of India has introduced Drug Price Control Order and the NPPA to deal with the issue of affordability and availability of medicines. Even though this appears to be the rough bridle controlling the horse, the Government of India has taken initiatives like “Pharma vision 2020” to make the industry viable.^[12] In spite of this, the acquisition costs of many drugs are found to be higher than that of the ceiling price prescribed by the government. Hence, the government should monitor and draft strict rules against the violators of NPPA. Furthermore, in this group of drugs, only the ceiling price of certain drugs and their formulations are mentioned. It would be really good if the policy-makers take necessary steps to include all the commercially available oral and injectable antiplatelet drugs in the list.^[13]

The customers being the patients are the bottom line of the pharmaceutical market and the cost of the medicine has a direct impact on their adherence to medication, especially if they are “super-utilizers” with multiple chronic conditions. Literature review reveals that people decline to pick up prescriptions because of their price tags. Even the most effective drug is useless if people do not take it because it is so expensive.^[14] Hence, if the medications are available at an affordable price to all the patients, the medication adherence may improve.^[15]

The escalation in global health-care expenditure can be minimized by physicians. Physicians’ ignorance of costs, along with the tendency to under or overestimate the price of drugs, could have profound implications for overall drug expenditures. Hence, regular updates to the physicians regarding cost-effective treatment/drug/brand and provision of information about this are the need of the moment. One such effort of the Medical Council of India is the amendment to the

code of conduct for doctors in October 2016 which recommends all physicians to prescribe drugs with generic names and to ensure that there is a rational prescription which promotes the use of generic drugs. In this case of prescribing drugs with generic names, the responsibility and role of pharmacists are noteworthy. The pharmacists are ought to dispense generic name medicines and/or cost-effective equivalent brands.^[16] Similarly, the budding physicians must also be sensitized about the importance of pharmacoeconomics.

The strength of this study was that it analyzed the cost variation with respect to different formulations available including the injectable drugs available in Indian market. The limitation was that the data collected were limited to CIMS website.

CONCLUSION

This study concludes that providing a cost-effective treatment is everyone’s responsibility right from the pharmaceutical companies which manufacture the drugs in different brand names to the pharmacists who dispense the drug to the consumers along with the government which regulates the manufacture, sale, and price of the drugs. Apart from this, physicians can lead on drug price reform if they follow the rationale use of medicine prescribed by the World Health Organization.

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