

A Cost Variation Analysis of Hypolipidemic Drugs Available in the Indian Market

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ABSTRACT

Background: Cardiovascular diseases are amongst the prime reasons of increasing morbidity as well as mortality worldwide. Dyslipidemia is an important and modifiable risk factor of CVD and statins are extremely endorsed in its treatment.

Method: Data was acquired from the online edition of “Current Index of Medical Specialties” (CIMS), 1mg, netmeds. The percentage cost variation as well as cost ratio were calculated.

Result: Percentage cost variation was recorded highest in atorvastatin 10mg (3668.50%) whereas, the least percentage cost variation was recorded for pravastatin 10mg (3.61%).

Conclusion: To reduce the burden on patients, the government should cover as many as possible drugs under the drug price control order (DPCO) and develop uniformity in the pricing of the drugs.

Keywords: Hypolipidemic drugs, cardiovascular diseases, cost variation, statins, brands

INTRODUCTION

India has evolved to be a kernel for multiple number of pharmaceutical enterprises. It is, in fact, one of the greatest pharmaceutical markets globally owing to the country's lower cost resources and for producing low-

cost high quality generic medicines. Indian pharmaceutical market is ranked third when compared globally and in terms of value and production scale it stands on 13th number. [1] With reference to generic drug supply, it is leading as well as growing tremendously and has secured its place among one of the biggest suppliers in the world (20% of the volume of global generic drug exports). [2] In India, multiple pharmaceutical industries manufacture same drug at different prices which ends up in widespread variation in the price. This makes it strenuous for both the prescribers as well as the patients to choose the product which fits them the best. On August 29, 1997, the Indian government constituted the National Pharmaceutical Pricing Authority (NPPA) which implemented the national pharmaceutical pricing policy in 2012, followed by the Drug Prices Control Order in 2013, and finally the Jan Aushadi Scheme (JAS) in 2018 to control the hiking prices of medicine. [3,4] However, considering the present circumstances, the price of drugs in the Indian market differs considerably. In accordance with world health organization WHO, health expenditures pose a significant strain on country's economy. In 2019 India's health spending was anticipated to be around 64 US \$per capita. [5] In addition, over a 10-year period, the nation suffered from wreckage of approx. 237 billion \$ in healthcare costs as well

bereavement of productivity due to CVD, (WHO estimate 2005-2015). [6] Also, unlike developed countries like US, UK, India does not cover these expenses in provision of medical insurance and sufferers need to pay for their own medicines. In accordance to an Indian survey, medicines account for the majority of total Healthcare expense (72% in rural whereas 68% in urban areas) which means that some people in both urban and rural areas are unable to afford them. [7]

LITERATURE REVIEW

Globally the number of deaths reported due to cardiovascular diseases (CVD) are rising tremendously and unfortunately has made its place amongst the major causes of mortality. CVD strikes India at least a decade earlier i.e., during their prime productivity years. [8] Consistent with estimates, by 2030, 23.6 million people will lose their lives as a result of CVD. [9] Out of the total deaths caused by CVD, 52 percent of the suffering population tends to be under 70 years compared to only 23% in the western population. [10] There are certain threat elements for a person to develop CVD out of which dyslipidemia, smoking, hypertension, diabetes mellitus are the factors which can be modified. [11] In India, dyslipidemia, a metabolic disease characterized by increase in LDL cholesterol and decline in HDL cholesterol affects 25-30% of urban residents and 15-20% of rural residents. [12] According to ACC/AHA guideline, statin should be prescribed to decline the risk of atherosclerotic CVD and use of non-statin therapy [i.e., alternative agents including cholesterol absorption inhibitors, lipoprotein lipase activators (fibrates/peroxisome proliferation receptor activators), bile acid sequestrants(resin) and niacin preparations] should be used in adjuvant to statin therapy in people speculated to be at higher risk for developing CVD. Due to the fact that the pharmaceutical market is dominated by multiple branded and generic drugs, the marketed hypolipidemic drugs have a wide

range of prices. Hence, the purpose of the study was to observe the price differences of drug with same dosage form and dose manufactured by different brands, which are marketed in India.

MATERIALS & METHODS

This is an analytical and comparative type of study executed to assimilate the cost of multiple hypolipidemic drugs accessible in India. The cost differences among hypolipidemic drugs administered via different routes and manufactured by various pharmaceutical industries were reviewed.

1. The data which included the highest and lowest price of the drug, the dosage form and the brand name were collected using the online edition of "Current Index of Medical Specialties" (CIMS), 1mg, netmeds.
2. The price of the same drug which had same dosage form as well as strength were noted.
3. The highest and lowest price of the same drug were noted
4. Cost Percentage variation was computed by (1):

$$\frac{\text{Maximum cost} - \text{minimum cost}}{\text{Minimum cost}} \times 100 \quad (1)$$

5. Cost ratio was computed using the formula (2):

$$\frac{\text{Maximum cost}}{\text{Minimum cost}} \quad (2)$$

Inclusion criteria

1. Hypolipidemic drugs which had their individual preparations were involved in the study.
2. Drugs which are produced by two or more pharmaceutical industries.
3. Hypolipidemic drugs which have precise and concluded information about cost, strengths and brand name.
4. Price of the drug was taken per 10 tablets/capsules.

Exclusion criteria

1. Hypolipidemic drugs formulated by a single pharmaceutical industry were excluded.
2. Combination of hypolipidemic drugs were not taken into account.
3. Drugs for which information of strengths, cost and brand name is incomplete.

RESULT

Cost ratio and percentage cost variation of 10 hypolipidemic drugs available in 29 different formulations are depicted in table 1. On reviewing the collected data, out all compared drugs, atorvastatin 10mg had maximum number of brands in the market

(225), followed by atorvastatin 20mg (185) and rosuvastatin 10mg (88).

The least number of brands recorded are 2 for pravastatin 10mg, pitavastatin 1mg, pravastatin 2mg, gemfibrozil 600mg, bezafibrate 200mg, fenofibrate 135mg, fenofibrate 200mg, fenofibrate 67mg capsule.

Percentage cost variation was recorded highest in atorvastatin 10mg (3668.50%), followed by atorvastatin 20mg (3293.90%), fenofibrate 160mg (930.36%), simvastatin 5mg (766.30%) whereas, the least percentage cost variation was recorded for pravastatin 10mg (3.61%) followed by pitavastatin 1mg (5.17%), bezafibrate 200mg (9.96%).

Hypolipidemic drug	Strength (mg)	Dosage form	No. Of brands	Lowest costs (INR)	Highest cost (INR)	Cost ratio	Percentage cost variation (%)
Lovastatin	10mg	tablet	18	25.6	77	3.00	200.78
	20mg	tablet	22	45.25	130	2.87	187.29
Simvastatin	5mg	tablet	16	13	112.62	8.66	766.30
	10mg	tablet	22	26.5	171.42	6.46	546.86
	20mg	tablet	19	31.25	228	7.29	629.6
	40mg	tablet	5	53.5	300	5.60	460.74
Pravastatin	10mg	tablet	2	99	102.58	1.03	3.61
Pitavastatin	1mg	tablet	2	85.57	90	1.05	5.177
	2mg	tablet	2	71.8	150	2.08	108.91
Atorvastatin	5mg	tablet	46	10.9	90	8.25	725.68
	10mg	tablet	225	7.43	280	37.68	3668.50
	20mg	tablet	185	13.28	450.71	33.93	3293.90
	40mg	tablet	70	86.41	347.25	4.01	301.86
	80mg	tablet	32	120	532.5	4.43	343.75
Rosuvastatin	5mg	tablet	55	27.6	103.8	3.76	276.08
	10mg	tablet	88	39.6	276	6.96	596.96
	20mg	tablet	63	77	400	5.19	419.48
	40mg	tablet	22	109.9	602.95	5.48	448.63
Gemfibrozil	300mg	capsule	6	54	228.42	4.23	323
	600mg	tablet	2	239	275.2	1.15	15.14
Bezafibrate	200mg	tablet	2	87.6	96.33	1.09	9.96
	400mg	tablet	3	90	219.25	2.43	143.61
Fenofibrate	135mg	tablet	2	142	169	1.19	19.01
	145mg	tablet	4	95	194.32	2.04	104.54
	160mg	tablet	10	15.48	159.5	10.30	930.36
	200mg	tablet	2	55.85	150	2.68	168.57
	67mg	capsule	2	63.5	109.2	1.71	71.96
	200mg	capsule	10	71.4	201.19	2.81	18.77
Ezetimibe	10mg	tablet	12	58.91	157	2.66	166.50

TABLE 1. COST VARIATION AND COST RATIO OF HYPOLIPIDEMIC DRUGS

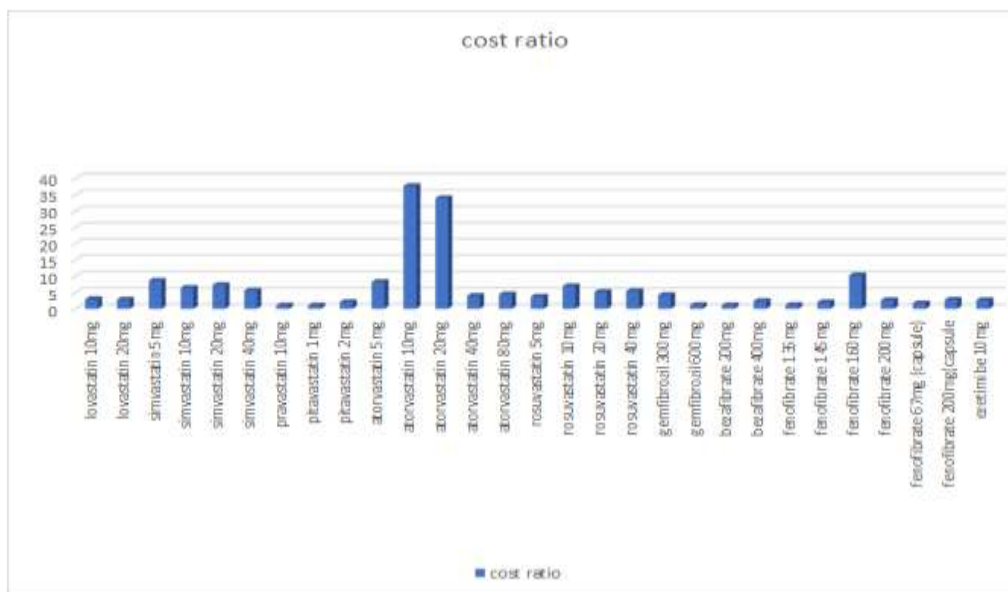


Figure 1. Cost ratio of hypolipidemic drugs.

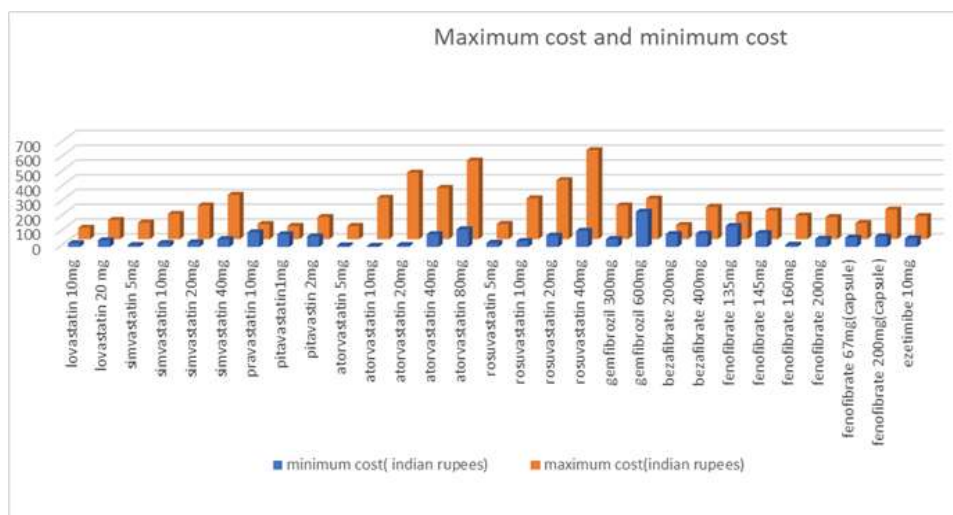


Fig 2. Maximum and minimum cost of hypolipidemic drugs

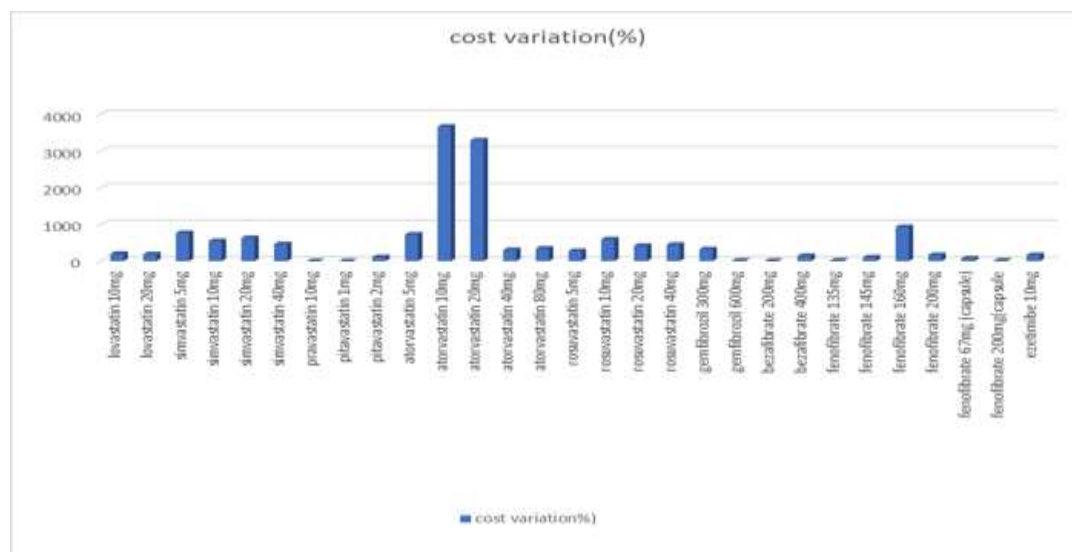


Fig 3. Cost variation of hypolipidemic drugs

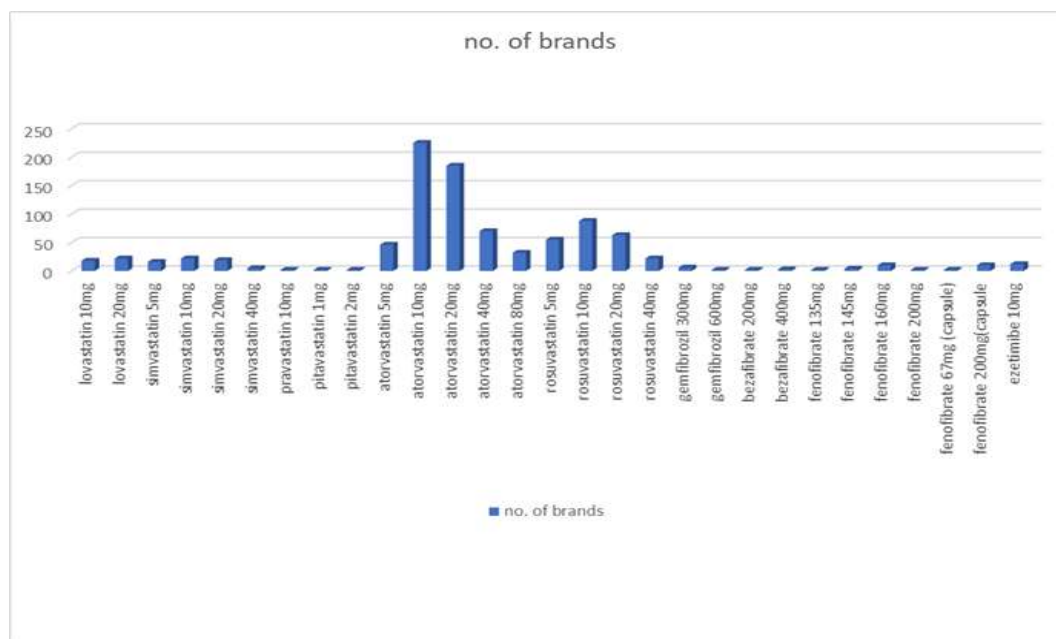


Fig 4.No of brands of hypolipidemic drugs

DISCUSSION

Hypolipidemic drugs have proved to mitigate cardiovascular morbidity and mortality. A study depicted that prescription of statins resulted in a 20 percent reduction in CVD mortality, 23% reduction in cardiovascular events, and 17% reduction in stroke, respectively, for every 39 mg/dl reduction in LDL-C. [13] These effects are more evident when the treatment is taken perpetually. On one hand, taking hypolipidemic drugs for long time have beneficial effect related to cardiovascular events but on other hand, it poses a great economic burden on the sufferers. The Indian market is flooded with large number of pharmaceutical companies, which manufacture a particular drug at different prices, leading to high variability in prices. Due to this factor, a large population is unable to complete their treatment and thus resulting in non-compliance [14] which further becomes the reason for disease progression and thereby increasing the cost by many folds and also elevating the chances of morbidity and mortality.

In developed countries the cost of treatment whether inpatient or outpatient treatment is covered under medical insurances which is not the case in India, the patients have to bear the expenses for outpatient treatment

and medicines themselves even if they have medical insurances. In our study, we observed a high-cost variation, i.e., more than 100 % for majority of drugs which is in accordance to previously conducted studies. Also, this was not only recorded with hypolipidemic drugs but also with other classes such as antihypertensives, [15] antithrombotics, [16] neuropsychiatric drugs etc. [17]

In the year 2013, seeds were sown for a scheme named Drug price control order (DPCO), by Indian government in which the prices of the drugs were fixed and no pharmaceutical company can dispense it higher than the price fixed. Currently, very small number of drugs, i.e., list of 652 formulations for 348 drugs come under DPCO due to which there is high variation in cost of drugs. [18] Therefore, attention must be paid to cover maximum number of drugs under DSCO [19,20] and make treatment affordable. Another strategy to reduce the cost of treatment could be by encouraging the utilization of generic drugs and making sure that they are available at the designated stores.

Even the physician should prescribe considering the financial status of the patient Frazier et al, concluded in their study that by providing physicians with a

manual of drug prices along with prescribing advice reduces their patient's drug expenses. [21] But there is a limitation to it. There is a possibility that the drug with least price may not be as efficacious as the drug with higher prices. The underlying reason may be variable. Hence, there is a need to frame particular guidelines keeping in mind all these factors after conducting cost effectiveness studies of drugs from various brands.

CONCLUSION

Through this study it can be concluded that Indian market is flooded with multiple brands for a single drug resulting in a wide variation in prices. Therefore, it is high time to think for a solution. More hypolipidemic drugs should be brought under the drug price control order (DPCO). The WHO's "Health for All" goal can only be achieved if healthcare providers, pharmaceutical companies, governments, and the general public come together and work for the same.

Declaration by Authors

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