

Cost Analysis of Anti- Diabetic Drugs in India

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Original Research Article

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Article History

Received: 04.11.2018

Accepted: 12.11.2018

Published: 30.11.2018

DOI:

10.21276/sjmps.2018.4.11.4



Abstract: Diabetes is a chronic condition that occurs extremely due to a combination of sedentary lifestyle and following an imbalanced diet. Thus the medications are to be taken for life time. So there is a need for the prescribers to prescribe the medication which would be cost effective to the patients. This study was planned to analyse cost variations of antidiabetic drugs available in Indian market. There is a wide range of variations as the price of drug marketing in India. This paper gives the information regarding the drugs available for diabetes, their available brands, average cost and cost variations. Which help the physician in giving the drugs to the respective patient which are effective to them as well as which are cost efficient and are afforded easily by the patient. As a result of which there will less medication non-adherence and increased patient compliance. It was conducted by taking the maximum and minimum cost of anti- diabetic agents manufactured by different brands of same drug, strength and dosage forms. The data is obtained from the current index of medical specialties [CIMS] April-July 2018. The cost ratio and percentage cost variations were calculated for each anti-diabetic drug. The average percentage price variation of different brands of the same oral anti-diabetic drugs in Indian market is very wide.

Keywords: anti-diabetic drugs, price comparison, CIMS, cost ratio, percentage price variation, non-adherence, compliance.

INTRODUCTION

India is amongst the top three countries where diabetes is prevalent according to the study carried out in 2015 [1]. It further shows that the rate has escalated four folds from 108 million in 1980 to a staggering 422 million by the end of 2015, 8.7 percent, which accounts for 36 million are from India.

The pressing issue is that close to 90 percent of these cases can be controlled but not cured completely [2].

According to the data collected by the World Health Organisation, about 1.5 million fatalities were reported, making it the eighth leading cause of death. It should also be noted that about 2.2 million deaths are attributed to diabetes and associated complications like the cardiac failure, renal failure [3].

Prevalence percentage of diabetes and pre-diabetes according to their age can be, at age 30-39 it is 11%, 19%; age 40-49 it is 22%, 21%; age 50-59 it is 33%, 19%; age 60-69 it is 41%, 20%. It is speculated that the type of diabetes might be associated with the Socio-Economic factors [4].

Preliminary studies conducted by Indian council of medical research (ICMR) revealed the number of people affected with diabetes in the India is as follows Chandigarh-0.12 millions, Jharkhand-0.96 million, Maharashtra-9.2 million, Tamil Nadu-4.8 million [2]. National urban survey conducted across

metropolitan cites of India reported 11.7% in Kolkata, 6.1% in Kashmir, 11.6% in New Delhi, 9.3% in Mumbai, 13.5% in Chennai, 16.6% in Hyderabad [2].

People whose pancreas does not produce enough Insulin (a hormone produced by the beta cells of Langerhans of the pancreas) or those who cannot effectively use the insulin produced are prone to diabetes [2].

There are three major types of Diabetes, namely the Type- I, Type-II and gestational. There are a few uncommon types like monogenic diabetes, cystic fibrosis-related diabetes.

In the case of type- I diabetes, one's own immune system attacks the beta cells which produce insulin. This is common in children and young adults between 10-15 years of age. In the case of type-II, the Beta cells will not be able to produce insulin or the cells are unable to uptake insulin. This is the most common type of diabetes in middle-aged and old people. The Gestational Diabetes affects some women during pregnancy, which in turn leads to type-II in later stages

of their lives [2]. The other types are categorized as the pre-diabetic condition where patients have a rise in their blood glucose but not to the extent that it can be classified as Type-II [2].

Symptoms of diabetes include polyuria, polydipsia, hunger, weight gain, unusual weight loss, fatigue, cuts and bruises that do not heal, male sexual dysfunction, numbness, and tingling in hands and feet [5]. Many complications in the skin, eyes, Heart, Mental health and erectile dysfunction in the male are major issues faced by the patients suffering from Diabetes.

The Type-I diabetes treatments include a healthy diet, exercise, and Insulin uptake [6]. The Type-II can be treated with oral medication and insulin to control blood-glucose levels besides having a proper diet and exercise habits [7].

There are a large number of formulations available for every drug molecule in the market. Variation in pricing is found between different brands of a same generic molecule of the same strength. This study was carried out to make the prescriptions cost effective [8].

METHODOLOGY

The prices of various branded formulations of the same generic drug were analysed. Cost of particular generic drug holding similar strength (both in mono and in multidrug regimen) number. Which different companies manufactured were taken from current index of medical specialities (CIMS April-July 2018). From which maximum and minimum price of the same drug manufactured by different pharmaceutical companies were taken. Percentage variation and an average price of the drugs were calculated [9].

Formula:

$$\text{Percentage cost variation} = \frac{(\text{Maximum cost} - \text{minimum cost})}{(\text{minimum cost})} \times 100$$

RESULTS

According to the study, we found that there is an extensive variation in the cost of the anti-diabetic drugs. In the analysis of the comparative cost-effectiveness of therapies, it showed that the monotherapy is costlier than that of the combination therapy.

Study showed that there is a wide variation in the prices of different brands of anti-diabetic drugs. Highest number of trades usable are respectively Glimipride-2mg (n=42brands) Glimipride-1mg (n=42brands); followed by Metformin-500mg (n=34brands); Voglibose-0.2mg (n=22brands) as per table-1

In combination with Metformin highest number of brands are observed in Glimepride-2mg (n=69brands); Glimepride-1mg (n=59brands); Glibenclamide-5mg (n=18brands); Gliclazide-80mg (n=16brands) as given in table-2.

From the above data we assume that, if a mon-drug regimen is given to the patient for a month the least cost prescription would be Glibenclamide-2.5mg (195rs) and costlier prescribed drug would be Glimepride-4mg (3210.60rs). In case of combination drug regimen least would be Metformin 400mg + Glipizide 2.5mg (99rs) whereas costlier will be Metformin 1000mg + Glimepride 4mg (2070.00).

DISCUSSION

The study was done to investigate and compare the cost difference in various brands of same generic drug. In India, particular drugs of same dose and amount are being sold by different pharmaceutical companies under different brand names with wide variation in their cost. It is therefore, necessary for the health care providers to have an idea on the cost of various formulations of the same drug and chooses the most cost effective drug [8]. Generally, clinicians do not go with the cost of the drug, which can attribute to the ignorance of drug cost eventually leads to increase in overall drug expenditure [8]. Increase in drug cost is associated with the decline in medication adherence, which in turn leads to the poor patient outcome [8]. Decrease in drug cost is associated with improved adherence to the medication regimen [9]. Non-compliance of drug therapy results in progression of disease which increases the overall medical care cost dramatically. Increase in price has found to be associated with the marketing strategies of the manufacturers and are not associated with the quality of the drug [10]. Thus, it appears that the huge variation in cost of the drug is regulated by the pharmaceutical companies which are not associated with the generic drug. This study highlights the difference in pricing of the generic drug by different marketing agencies. This will foster the awareness about the impact of cost on the medication adherence [11].

Table-1: Minimum and Maximum cost among Mono-drug regimen

S.no	Generic name	Strength [mg]	Least cost brand	Price	Highest cost brand	Price	Number of brands	Average price	Percentage variation[%]
1	Glipizide	5	Glynase	4.61	Glucotrol	10.00	5	7.30	116.91
2	Gliclazide	30	Glysis	19.00	Diamicron	69.00	4	44.00	263.15
		40	Zuker	17.50	Glital	38.00	8	19.45	117.41
		60	Glysis	39.00	Diaemeron	167.00	5	103.00	328.80
		80	Diazide	30.00	Reclide	78.34	12	54.17	161.13
3	Glibenclamide	2.5	Semidaonil	5.04	Semieuglucon	6.50	2	5.54	28.96
		5	Euglucon	9.50	Daonil	10.91	3	10.20	14.84
4	Glimepride	1	Glimkap	13.50	Nabal	73.40	42	43.45	443.70
		2	Glimestar	18.90	Glimy	111.70	42	64.99	510.71
		3	Glimestar	20.95	Gp	86.95	5	53.95	310.50
		4	Glimestar	25.14	Gp	107.02	10	66.08	325.61
5	Repaglinide	0.5	Page	22.00	Restrict	48.40	4	35.20	120.00
		1	Page	44.00	Restrict	78.90	4	61.45	79.31
		2	Regan	78.00	Restrict	124.80	3	101.40	58.97
6	Metformin	250	Glyciphage	7.40	Q-met	9.00	3	8.20	21.52
		500	Diform	9.91	Glycomet	34.86	34	22.36	251.76
		850	Forminal	10.85	Metadoze-ipr	36.56	9	23.70	236.95
		1000	Zoform	22.97	Scodia	55.61	21	39.29	142.09
7	Pioglitazone	7.5	Pioz	39.45	Pozitiv	50.40	2	44.92	27.70
		15	Geoglit	19.00	Pioglar	70.00	13	44.50	268.40
		30	Zipio	29.00	Pioglar	112.00	13	70.50	286.20
8	Voglibose	0.2	Vogs	19.50	Vogliurin	80.00	22	49.75	310.20
		0.3	Vogs	29.50	V-bose	110.00	21	69.75	272.80
9	Acarbose	25	Diabose	42.00	Glucobary	67.00	4	54.50	59.52
		50	Diabose	75.00	Glucobary	117.00	5	96.00	56.00
10	Miglitalol	25	Miglit	60.00	Mignar	78.70	2	69.35	31.16
		50	Miglit	108.00	Mignar	147.50	2	127.75	36.57

Table-2: Minimum and Maximum cost among Combination drugs

S.no	Biguanides	Sulfonyl ureas	Strength[mg]	Least price	Highest price	Number of brands	Mean	Percentage variation[%]
1	Metformin	Glipizide	400+2.5	3.30	26.25	3	11.58	14.77
			500+5	10.48	34.75	6	14.82	22.61
2	Metformin	Gliclazide	500+30	40.00	80.00	3	53.50	100.00
			500+40	33.00	70.00	4	57.00	112.12
			500+60	58.30	203.00	3	130.10	248.19
			500+80	40.00	110.00	16	62.33	175.00
3	Metformin	Glibenclamide	250+1.25	12.50	22.90	3	16.93	83.20
			400+2.5	7.30	27.00	6	18.21	269.86
			500+5	10.00	36.85	18	24.95	268.50
4	Metformin	Glimepride	500+1	12.00	119.50	59	53.09	895.80
			500+2	25.00	163.50	69	67.10	554.00
			1000+3	65.00	75.00	3	70.00	15.38
			1000+4	69.00	149.00	4	97.72	115.90

CONCLUSION

Diabetes is a chronic condition where compliance with the drug plays a key role. Adherence of the drugs can be ensured by decreasing the cost of the drug prescribed. This can be achieved by prescribing with combinations, the cost of independent drug is found to be costlier. Wide variation on the drug cost was identified using this study.

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