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Cost analysis study of commonly used oral hypoglycaemic agents available in India- a pharmacoeconomic study

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Abstract

Objectives: To assess the difference in cost percentage variation of various brands of oral hypoglycaemic drugs available in single and in combination in Indian market**.**

Materials and Methods: An observational study was carried out using 'Current index in medical specialities', 'reference Rx', & 'Indian drug referral' (July-Oct 2014), where in the difference in the maximum and minimum price of a particular drug, manufactured by different pharmaceutical companies, in the same strength, number and dosage form was compared and the percentage variation in price was calculated. Data is analysed using descriptive statistical analysis.

Results: The minimum and maximum percentage price variation for different classes of drugs respectively is as follows: In Single drug therapy, among sulfonylurea group of drugs, Glimepiride (2mg) & Glicazide (80mg) shows maximum and minimum price variation of 730.93% & 165.55% respectively. Among Biguanides & Thiazolidinediones groups, Metformin (500 mg) & Pioglitazone (15mg) show maximum price variation of 402.92% & 483.33% respectively. In α-glucosidases inhibitor group of drugs, Voglibose (0.2mg) shows maximum price variation of 451.28 %. Among newer DPP4 (Dipeptide peptidase 4) inhibitors Vildagliptin (50mg) shows maximum cost variation of 100%. In combination therapies Glimipiride & Pioglitazone combination shows the maximum variation up to 307.7%.

Conclusion: The percentage cost variation of different brands of the same drug manufactured in India is very wide and the reason behind marketing a drug should be directed towards maximizing the benefit of therapy and minimizing negative personal and economic consequences.

Keywords: Cost analysis, Oral hypoglycaemic drugs, Cost evaluation, Price variation.

Introduction

Diabetes is a chronic metabolic disorder associated with significant morbidity and mortality affecting almost 6.2% of world population.(1) Type-2 diabetes is a disease marked by high levels of blood glucose due to the action of insulin and insufficient insulin production. Type-2 diabetes accounts for approximately 90% to 95% of all diagnosed cases of diabetes.(2)

It is accompanied with abnormal carbohydrate, protein and lipid metabolism.(3) Diabetes if uncontrolled can lead to several acute and chronic complications.(4) A survey on Indian population shows that 4% of population were adults who suffered from diabetes mellitus in the year 2000 and it is expected to rise to 6% by the year 2025.(5)

Type-2 diabetes mellitus is one of the most common chronic conditions in the elderly.(6) It is a metabolic disorder that results from complex interactions of multiple factors and is out looked by 2 major defects: decreased secretion of insulin by the pancreas and resistance to the action of insulin in various tissues (muscle, liver and adipose) which results in impaired glucose uptake.(7) In India 20% of the elderly has type-2 diabetes mellitus.(8) It is the more common disease engulfing around 90% of all the diabetic cases worldwide.(9) This is due to many socio demographic factors such as increased life expectancy, high rates of obesity and changes in dietary habits.(10) In developing country like India, the majority of diabetics are in the age group of 45-64 years in contrast to developed countries it is highly Prevalent in more than 65 years of age. Since 1995, many orally administered diabetes medications or combination of medications for the management of type-2 diabetes mellitus have been approved by FDA. Traditionally in oral hypoglycaemic agent therapy, sulphonyl ureases have always been the agents of first choice, while biguanides and alpha-glucosidase inhibitors were unpopular.(11)

The oral antidiabetic drugs (OADs) are the first line treatment for type 2 diabetes mellitus.(12)

In a study, Oral hypoglycaemic agents accounted for 45% of the total drug cost.(13) The study found that 91.58% of the drugs were prescribed in oral dosage form.(14) Cost of drug therapy is a cause for non-adherence. One of the better approaches to decrease the prescription cost is to prescribe brands with cheaper cost, keeping in mind the quality of the brands, reduce the cost of treatment and better compliance of the patients. Judicious and rational use of these drugs by adhering to the proposed Guidelines will decrease the complications and cost of the drug therapy. There are many studies carried out on drug utilization in diabetic patients but a limited number of studies have focus on analysing the cost and adherence to treatment guidelines. Hence we have opted to take up this pharmacoeconomic study which will help to guide the

treating physicians about the existing cost differences among oral hypoglycaemic agent's which turns to be a burden on patients of middle and lower classes, indirectly leading to non-adherence.

Objectives

To assess and analyse the difference in cost percentage variation of various brands of oral anti diabetic drugs available in single and in combination.

Materials and Methods

The study was undertaken in the department of pharmacology at KVG medical college and teaching hospital, Sullia, D.K.

Analysis of data was done using **CIMS** (current index of medical stores)**, IDR** (Indian drug review) & **ref Rx** [Oct 2014 issues], they were reviewed for the prices of different oral hypoglycaemic drugs used in the management of diabetes mellitus.

1. The maximum retail price of a particular drug being manufactured by different companies, in the same strength, number and dosage form was compared.
2. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies was calculated.
3. The percentage variation in price was calculated.

The percentage variation in price was calculated using the following formula price of most expensive brand – price of least expensive brand X 100 price of least expensive brand.

Discussion

The prices on a total of 21 drugs (14 single and 8 combination preparations), available in 54 different formulations manufactured by different pharmaceutical companies were assessed for their strength, formulation, dose and cost. They were then compared with each others for the same.

Single drug therapy: Table1 shows price variations among sulfonylurea group of OHA's, Glimepiride (2mg) & Glicazide (80mg) shows maximum and minimum price variation of 730.93% & 165.55% respectively. In table 2, Biguanides & Thizolidinediones groups of drugs, Metformin (500 mg) & Pioglitazone (15mg) show maximum price variation of 402.92% & 483.33% respectively. Table 3, shows α-glucosidases inhibitor group of drugs, Voglibose (0.2mg) shows maximum price variation of 451.28%. Table 4 shows variations in cost among rapeglinide and nateglinide. Among newer DPP4 inhibitors Vildagliptin (50mg) shows maximum cost variation of 100%. Fig. 1 shows overall cost percentage variations among single drug therapy.

Table 1: The price varies between a sulfonylurea groups of drugs

Drug	Formulations	Dose (mg)	No of manufacturing companies	Minimum cost (Rs)	Maximum cost (Rs)	% price variation
Glibenclamide	3	2.5	8	2.76	7.10	157.24
		5	10	3.6	10.91	203.05
		10	11	7.2	10.8	50
Gliclazide	4	30	17	19	41.85	120.26
		40	21	15	29.5	96.66
		60	19	39	78	100
		80	41	29.5	78.34	**165.55**
Glimepiride	4	1	58	13.5	73	440.73
		2	59	16	132.95	**730.93**
		3	13	20.5	139.55	580.73
		4	19	25.14	139.55	455.09
Glipizide	3	2.5	11	2.8	5	78.57
		5	19	4	12	200
		10	9	10	10	0

Table 2: Price variation in Biguanides & Thizolidinediones groups of drugs

Drug	Formulations	Dose (mg)	No of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	% price variation
Metformin	4	250	9	5	9.4	88
		500	54	6.45	31.23	**402.92**
		850	39	11	36.5	231.81
		1000	41	17.5	60.2	244
Pioglitazones	2	**15**	47	12	70	**483.33**

		30	47	20.5	112	446.34

Table 3: Price variation among α- glucosidases inhibitor group of drugs

Drug	Formulations	Dose (mg)	No of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	% price variation
Acarbose	2	25	16	42	70	66.66
		50	12	75	120	60
Meglitol	2	**25**	15	50	78.5	**57.4**
		50	19	90	147.5	63.88
voglibose	2	**0.2**	17	19.5	107.5	**451.28**
		0.3	13	29.5	129.5	338.9

Table 4: Price varies between Meglitinides group of drugs

Drug	Formulations	Dose (mg)	No of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	% price variation
Repaglinide	3	0.5	12	22	54	145.45
		1	10	44	88	100
		2	17	78	139.5	78.84
Nateglinide	2	60	13	30	55.2	84
		120	16	50	91.10	82.2

Combination therapy: 7 combination therapies were analysed

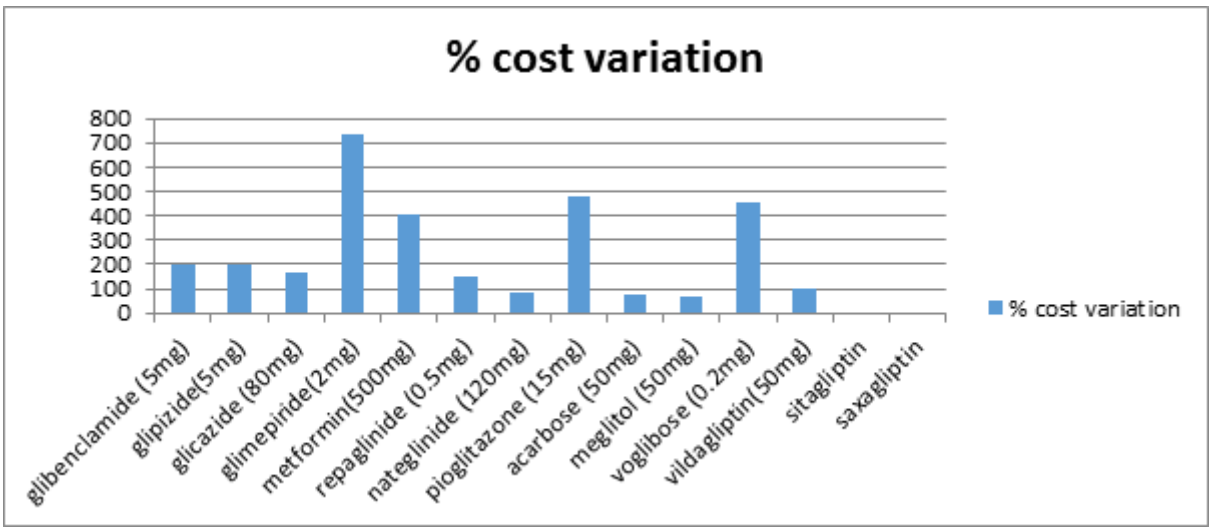

Fig. 1: Single drug therapy

Results

The prices on a total of 22 OHA's (14 single and 8 combination preparations), available in 54 different formulations and manufactured by different pharmaceutical companies were analysed. A maximum cost variation was seen with glimepiride 2mg and minimum cost percentage variation was seen with meglitol 50mg and no cost variation exists between the two available gliptins i.e., sitagliptin and saxagliptin as they are at present manufactured by single pharmaceutical company. Table 5 shows that among the combination drug therapies analysed, maximum cost percentage variation was seen with pioglitazone and glimepiride and minimum variation was with metformin and glipizide. Fig. 2 shows overall cost percentage variations among combination therapy. Also we would like to make a mention on a relation between manufacturing companies and the percentage cost variation, were existed a linear correlation between them. Which means, as the number of manufacturing companies increased, the existing cost variation among same OHS's manufactured by different companies has also increased as shown in Fig. 3.

Table 5: Price varies among combination therapy

Drugs	Formulation	Doses (mg)	Manufacturing companies	Min. price (Rs)	Max. price (Rs)	% price variation
Glibenclamide + Metformin	3	2.5+400	13	7.3	22	201.36
		2.5+500	11	16	26	62.5
		5+500	26	12	34.9	190.83
Glicazide + Metformin	5	80+500	59	21	80	280.95
		60+500	11	37.5	71	89.3
		40+400	9	28	31	10.71
		40+500	10	31	79	154.83
		30+500	11	29	65	124.13
Glimepiride + Metformin	5	1+500	63	28	121	332.14
		2+500	69	35	136.99	291.4
		1+1000	6	36	44	22.22
		2+1000	9	53.4	65	23.10
		2+850	4	66	79	19.69
Glipizide + Metformin	2	5+500	19	7.45	29.5	96.66
		2.5+400	7	6.36	26.75	320.6
Voglibose + metformin	2	0.2+500	12	30.5	100	227.86
		0.3+500	11	45.79	100	118.38
Pioglitazone + Glimepiride	3	15+1	21	17.1	59.3	246.78
		15+2	15	26	126	384
		30+2	4	69	80	15.94
Pioglitazone + Metformin	2	15+500	41	21.3	77	261.50
		30+500	26	32.4	86	165.43
Pioglitazone + Metformin + Glimepiride	2	15+500+1	16	44	80	81.81
		15+500+2	19	53	129.5	144.33

Conclusion

The average percentage price variation of the same drug manufactured by different companies is found to be very wide. So it is recommended that the DPCO [Drug pricing control organisation] should allow National Pharmaceutical Pricing Policy to regulate the prices of OHAs (Anti diabetic drugs), if the cost of these drugs are fixed by the government the economic burden on diabetic patients will reduce there by increases the quality of life in these populations, intern benefiting the India's fast growing economy. If the aim of manufacturing companies change towards maximizing the benefits of therapy and minimizing negative personal and economic consequences by costing less for the population in therapy of diabetes would help relieve the economic burden on people of a developing countries like India.

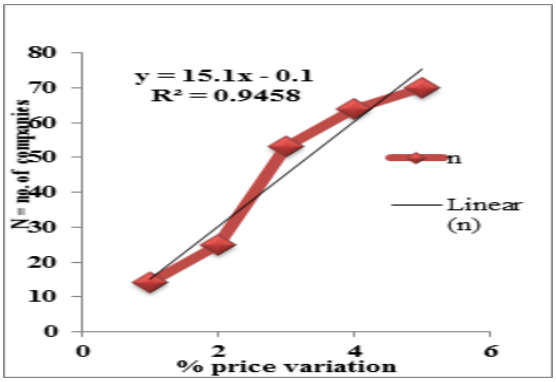

Fig. 3: Linear correlation between no of manufacturing companies and % price variation

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