



International Journal of Medical Research & Health Sciences

www.ijmrhs.com Volume 2 Issue 1 Jan-Mar 2013 Coden: IJMRHS Copyright ©2013 ISSN: 2319-5886

Received: 15th Nov 2012

Revised: 13th Dec 2012

Accepted: 16th Dec 2012

Original research article

COST ANALYSIS STUDY OF ORAL ANTIDIABETIC DRUGS AVAILABLE IN INDIAN MARKET

*Nisharani B Jadhav¹, Manisha S Bhosale², Charles V Adhav²

¹Department of pharmacology, B. L. D. E. U.'s S B M Patil Medical College, Bijapur, Karnataka, India.

²Department of Pharmacology, Topiwala National Medical College and B. Y. L. Nair Charitable Hospital, Mumbai-Central, Mumbai, Maharashtra, India. 400008

*corresponding author email: drnishajadhav@gmail.com

ABSTRACT

Introduction: There exists a wide range of variation in the prices of drugs marketed in India and other countries of the world. Very few studies have been conducted to reveal such price variations in the open market. **Aim & Objectives:** To evaluate the cost of oral anti-diabetics of different generic classes and different brand names of one compound, To evaluate the difference in cost of different brands for the same active drug by calculating percentage variation of cost. **Methods:** Cost of a particular drug being manufactured by different companies, in the same strength, number and dosage form was compared. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies and the percentage variation in price was calculated. **Results:** In Single drug therapy, among sulfonylurea group of drugs, Glimpiride (1 mg) shows maximum price variation of 655.38%, while Glipizide (10mg) shows variation of 38.88%. In Biguanides & Thiazolidinediones groups of drugs, Metformin (500 mg) & Pioglitazone (15 mg) show maximum price variation of 308.33% & 542% respectively. In α -glucosidases inhibitor group of drugs, Miglitol shows maximum price variation of 135.50 %. In combination therapies, Glipizide & Metformin combination shows the maximum variation up to 399.04 %. **Conclusion:** The average percentage price variation of different brands of the same drug manufactured in India is very wide and the appraisal and management of marketing drugs should be directed toward maximizing the benefits of therapy and minimizing negative personal and economic consequences.

Keywords: Cost analysis, anti-diabetic drugs, brands, price evaluation

INTRODUCTION

In the developing countries the cost of drugs is a major concern to both physician and patient; yet there are few data on prescribing patterns and

expenditure¹. Cost of drugs is an important factor influencing compliance with treatment². In the context of pharmaceutical and other health

products, differential pricing (also called tiered pricing) is the adaptation of product prices to the purchasing power of consumers in different geographical or socioeconomic segments. Differential pricing could potentially be a very effective strategy to improve access to essential medicines in low and middle-income countries where most patients pay for medicines out-of-pocket and therefore cannot afford the prices compared to high income markets.³

Diabetes is the most common non communicable disease worldwide. The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025.^{4,5} Diabetes is a chronic disorder. It requires lifelong treatment. So the cost of antidiabetic drug is the major deciding factor for the patients' compliance. Selection of oral antihyperglycaemic agents as first-line drug or combined therapy should be based on both the pharmacological properties of the compounds (efficacy and safety profile) and the clinical characteristics of the patient (stage of disease, body weight, etc.)⁶. There exists a wide range of variation in the prices of drugs marketed in India and other countries of the world.

In the Indian market various antidiabetic drugs of various brands are available. This creates a lot problem with physician to decide the drug of choice for individual patients. Also in the literature very less studies are available which compare the cost of drugs of different brands. Regarding oral hypoglycemic agents, with the best of our knowledge no study is available which compares the cost of drugs of different brands. So, we decided to carry out the study which compares prices of different oral anti-diabetic drugs.

Aim: To evaluate the cost of oral anti-diabetics of different brand names of one compound and the difference in cost of different brands of the same active drug by calculating percentage variation of cost.

Objectives This Pharmacoeconomic study is designed with the main objectives of,

1. To find different anti-diabetics available either singly or in combination and the No. of the brands available for each.
2. To evaluate the cost of oral anti-diabetics of different generic classes and different brand names of one compound.
3. To evaluate the difference in cost of different brands of the same active drug by calculating percentage variation of cost.

MATERIALS AND METHODS

CIMS (current index of medical stores) & IDR (Indian drug review) [2011 issues] were reviewed for the prices of drugs used in the management of diabetes mellitus.

1. The retail cost 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.
4. The drugs being manufactured by only one company or being manufactured by different companies however, in different strengths were excluded.

The percentage variation in price was calculated using the following formula²

$$= \frac{\text{Price of most expensive brand} - \text{Price of least expensive brand}}{\text{Price of least expensive brand}} \times 100$$

The drugs were classified into five categories depending on the percentage (%) range of price variation. These were as follows

- 1) 0-25% 2) 25.1-50%, 3) 50.1-75%, 4) 75.1-100% and 5) more than 100% Findings of our observational study were expressed as absolute numbers as well as percentage.

RESULTS

The prices on a total of 20 drugs (11 single and 9 combination preparations), available in 54 different formulations were analyzed. These 54 formulations are manufactured by different pharmaceutical companies.

Single drug therapy: In single drug therapy, Table 1 shows the price variation between a sulfonylurea group of drugs. In this group, Glimepiride (1 mg) shows maximum price variation of 655.38%, while Glipizide (10mg) shows variation of 38.88%.

Table 2 shows price variation in Biguanides (Metformin) & Thiazolidinediones (Pioglitazones) groups of drugs. In these groups, Metformin (500

mg) & Pioglitazone (15 mg) show maximum price variation of 308.33% & 542% respectively. Table 3 shows the price variation between α -glucosidases inhibitor group of drugs. In this group, Miglitol shows maximum price variation of 135.50 %. Table 4 shows the price variation between Meglitinides group of drugs. In this group, Rapaglinide (0.5 mg) shows maximum price variation of 90.95 %

Combination therapy: In Combination therapy, total 7 combination therapies were analysed. In this, Glipizide & Metformin combination shows the maximum variation up to 399.04 %. Table V shows price variation in combination drug therapy

Table:1. The price varies between a sulfonylurea group of drugs.

Drug	Formulations	Doses (mg)	Manufacturing companies	Min. Price (Rs)	Max. Price (Rs)	% price variation
Glibenclamide	2	2.5	8	2.6	6.05	132.69
		5	9	3.6	9.15	154.16
Gliclazide	4	30	12	19	64.9	241.57
		40	17	14	27.5	96.43
		60	10	35	99.6	184.57
		80	39	19.5	70.5	261.54
Glimepiride	4	1	53	8.36	63.15	655.38
		2	53	12.54	117.4	836.2
		3	12	45	125	177.7
		4	20	18.8	103.4	450
Glipizide	3	2.5	6	2.93	9.35	219.11
		5	14	4.74	13.03	174.89
		10	5	18	25	38.88

Table no. II: Price variation in Biguanides & Thiazolidinediones groups of drugs.

Drug	Formulations	Doses (mg)	Manufacturing companies	Min. Price (Rs)	Max. Price (Rs)	% price variation
Metformin	4	250	7	4.6	9	95.65
		500	48	6	24.50	308.33
		850	18	10	36	260
		1000	34	14	41.4	195.71
Pioglitazone	2	15	40	10	64.20	542
		30	40	18	98.20	445.55

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

Drug	Formulations	Doses (mg)	Manufacturing companies	Min. Price (Rs)	Max. Price (Rs)	% price variation
Acarbose	2	25	11	32	55	71.87
		50	9	62	89	43.55
Miglitol	2	25	8	50	65.82	31.64
		50	14	50.3	118.47	135.50
Voglibose	2	0.2	12	36	64	78.05
		0.3	9	54	84	56.74

Table:4. Price varies between Meglitinides group of drugs

Drug	Formulations	Doses (mg)	Manufacturing companies	Min. Price (Rs)	Max. Price (Rs)	% price variation
Nateglinide	2	60	4	30	45	50
		120	4	50	70	40
Repaglinide	3	0.5	6	19.90	38	90.95
		1	4	39	62	58.97
		2	4	75	98	30.66

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	8	8.15	19	133.33
		2.5 + 500	2	16	26	62.50
		5 + 500	19	12	29.9	149.16
Glicazide + Metformin	5	80 + 500	43	18.10	78.25	332.32
		60 + 500	5	39.25	68.50	74.52
		40 + 400	3	28.3	29	2.47
		40 + 500	3	35	60	71.43
		30 + 500	3	32	59	84.37
Glimepiride + Metformin	5	1 + 500	50	18	69	283.33
		2 + 500	53	26	120.4	362.07
		1 + 1000	2	38	41.75	9.86
		2 + 1000	4	51.8	60	15.83
		2 + 850	2	65	73	12.3
Glipizide + Metformin	2	5 + 500	11	6.72	14	108.33
		2.5 + 400	3	5.36	26.25	399.04
Pioglitazone + Glimepiride	3	15 + 1	12	17.1	59.3	246.78
		15 + 2	15	41.9	70	67.06
		30 + 2	2	69	80	15.94
Pioglitazone + Metformin	2	15 + 500	34	19	70.6	271.57
		30 + 500	21	32.40	86	165.43
Pioglitazone + Metformin + Glimepiride	2	15 + 500 +1	12	44	80	81.81
		15 + 500 +2	15	54	128	137.03

Relationship between percent price variation & no. of Manufacturing Companies:

When we draw a graph showing relationship between manufacturing companies and % price variation, it was noted that there is a linear relationship in between these two variables. As the no. of manufacturing companies increases, the percent price variation also increases. (As shown in figure no. 1)

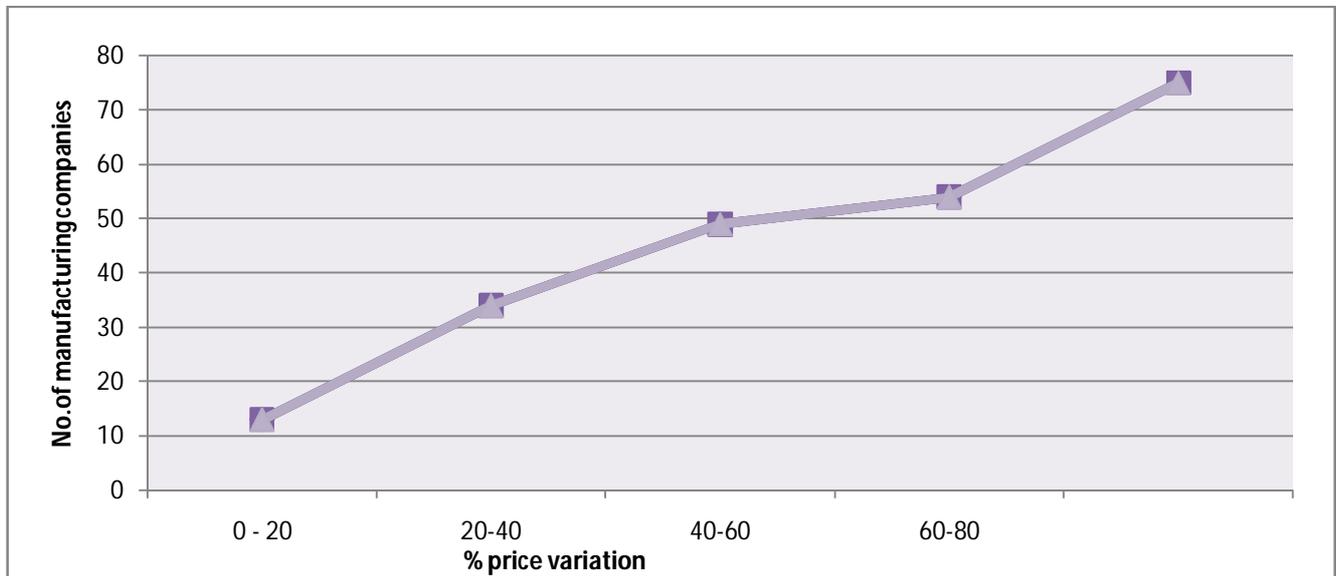


Figure 1: Graph showing relationship between percent variation & No. of manufacturing companies.

DISCUSSION

The Indian market has over 100,000 formulations and there is no system of registration of medicines². The drugs are mainly sold under brand names⁷.

A study in the United States found drug prices to be high and that price discrimination occurred across the industry⁷. But very less studies are available in our scenarios which compare the cost of drugs of different brands. Therefore we decided to carry out the study which compares the cost of different brands of drug of most common disorder.

The drug prices available in CIIMS & IDR were compared, as they are readily available source of drug information and are updated regularly. Drugs used in the management of diabetes mellitus were selected as it is one of the major causes of morbidity and mortality & the treatment requires continuous prescription drug use.

It is observed from our results that there is a wide (up to 836.20%) variation in prices of drugs manufactured by different pharmaceutical companies. The reasons for this price variation could be as follows⁸⁻¹⁴:

1. The existing market structure of the pharmaceutical industry
2. Asymmetry of information or imperfect information
3. Industry costs
4. Government regulations and pricing policies

From our study it is also clear that, price variation was directly related to the number of companies manufacturing a particular drug. So it can be concluded that the price variation increases because of the increase in competition among the manufacturing companies.

Pharmacists do not dispense the same brand as prescribed by the doctor and try to substitute it

with other alternatives, quoting the reason of non availability. This is often done with vested interest for economic gains as some brands have a higher profit margin.

It is felt that physicians could provide better services and reduce costs of drugs if information about drug prices was readily available. Studies have shown that providing a manual of comparative drug prices annotated with prescribing advice to physicians reduced their patients' drug expense¹⁵.

Due to the long term treatment duration, diabetes patients usually have higher than average monthly out-of-pocket expenses and high out-of-pocket expenses can be a barrier to adherence to prescription drug regimens. Many chronically ill adults cut back on medications due to high prescription cost. Inadequate prescription coverage and out of pocket expenses is one of the strongest predictors of their medication adherence problems.

Market structure and subsequent market segmentation provide a basis for prescription agent pricing policies leading to wide variation in prices of drugs. In the absence of information on comparative drug prices and quality, it is difficult for doctors to prescribe the most economical prescription.

There is a need for concerted action from regulatory authorities, doctors, pharmacists and general public at large to address this issue of oral antidiabetic drugs price variation. At the hospital level authorities and concerned committees have to frame policies on these aspects. The situation can be improved by incorporating an analysis of prescription costs in the medical curriculum and by providing updated and complete information regarding bioequivalence, quality and cost of the pharmaceutical preparation to the doctors. Wherever possible a cheaper brand should be prescribed because the superiority of any particular brand over the others has never been proved scientifically. Currently, very few medicines are under drug prices control

order¹⁶. Hence it is desired that the Government should bring all lifesaving and essential medicines under price control.

CONCLUSION

The average percentage price variation of different brands of the same drug manufactured in India is very wide. So it is recommended that the appraisal and management of marketing drugs should be directed toward maximizing the benefits of therapy and minimizing negative personal and economic consequences.

REFERENCES

1. Kuruvilla A, George K, Rajaratnam A, John KR. Prescription patterns and cost analysis of drugs in a base hospital in south India. *Natl Med J India*. 1994 Jul-Aug; 7 (4): 167-68
2. Ravi Shankar P, Subish P, Bhandari RB, Mishra P, Saha AC. Ambiguous pricing of topical dermatological products: A survey of brands from two South Asian countries. *Journal of Pakistan Assoctn. of Dermatologists* 2006; 16: 134-40
3. World Health Organization. Introduction to drug utilization research. Oslo: 2003
4. Mohan V, Sandeep S, DeepaR, Shah B, Varghese . Epidemiology of type 2 diabetes: Indian scenario. *Indian J Med Res*. 2007;125: 217-30
5. Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. In: Gan D, editor. *Diabetes Atlas*. International Diabetes Federation. 3rd ed. Belgium: International Diabetes Federation; 2006: 15-103
6. Scheen J, Lefebvre P.J. Oral Antidiabetic Agents: A Guide to Selection : *Drugs*.1998; 55 (2): 225-36
7. Monaghan MJ, Monaghan MS. Do market components account for higher US prescription prices? *Ann Pharmacother*. 1996; 30: 1489-94
8. Sarkar P K. A rational drug policy. *Indian J Med Ethics* 2004; 12; 30-35

9. Roy V, Rewari S. Ambiguous drug pricing: a physician's dilemma. *Indian J Pharmacol* 1998; 30: 404-07.
10. Wertheimer AI, Grumer SK. Overview of international pharmacy pricing. *Pharmacoeco* 1992; 2: 449-55.
11. Berki SE, Richards JW, Weeks HA. The mysteries of prescription pricing in retail pharmacies. *Med Care* 1977; 15: 241-50.
12. Rataboli P, A Dang. Antimicrobial price variation: Conundrum of medical profession. *JPGM*. 2007;53 (1): 72-74
13. Das SC, Mandal M, Mandal SC. A critical study on availability and price variation between differ rent brands: Impact on access to medicines. *Indian Journal of pharmaceutical sciences*; 2007; 69 (1): 160-63
14. Sushma Dawadi, Rao BS, Khan GM. Pattern of Antimicrobial Prescription and its Cost Analysis in respiratory tract infection. *Kathmandu University Journal of Science, Engineering and Technology*. 2005;1(1):1-9
15. Frazier LM, Brown JJ, Divine GW. Can physician education lower the cost of prescription drugs? A prospective Controlled trial. *Ann Intern Med*. 1991; 115: 116-21.
16. Misra B, Jain SK, Mehta Y. A study on availability and prices of medicines in India. National Pharmaceutical Pricing Authority, 2002. Available from: <http://nppaindia.nic.in/index1.html>.