

Cost Variation Analysis of Oral Anti-Diabetic Drugs Currently Available in the Indian Pharmaceutical Market

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Received: January 22, 2022, Manuscript No. NPCR-22-15580; **Editor Assigned:** January 30, 2022, PreQC No. NPCR-22-15580 (PQ); **Reviewed:** February 12, 2022, QC No. NPCR-22-15580; **Revised:** February 21, 2022, Manuscript No. NPCR-22-15580 (R); **Published:** February 25, 2022, DOI: 10.37533/npcr.22.10.2.1-3.

Abstract

Diabetes Mellitus (DM) is a chronic condition that affects millions of people throughout the globe and are expected to take medicines for a longer time and even medicines for a lifetime are often needed to treat this disease. Costly branding of pharmaceuticals supplied in these circumstances adds to the burden of disease and may even result in therapeutic non-adherence. Thus, the research work was designed to determine the cost of anti-diabetic medicine from various brands. The cost of different brands of anti-diabetic medicines was calculated by referring to the Indian Depository Receipt (IDR). The cost of each brand 7 tablets in Indian rupee (INR), cost ratio, and percentage cost variance were also determined. The difference between the highest and lowest cost of the same drug produced by various pharmaceutical companies was measured, and percentage variance was also calculated in cost for 7 tablets. The cost of a total of 7 anti-diabetic medicines was analyzed. There is more variation in the prices of different brands of the same anti-diabetic medicines in the Indian market. The highest % cost variation was found for Pioglitazone 15 mg (185.7%), Tolbutamide 500 mg tablet (180%), Glipizide 5 mg (157.2%), Voglibose 0.2 mg (157.2%), Metformin 500 mg (124.21%), Bromocriptine 2.5 mg (118.3%) and lowest % cost variation was of Acarbose 25 mg (117.18%).

Keywords: Diabetes mellitus • Cost variation • Cost- analysis

Introduction

Diabetes Mellitus (DM) is a chronic condition that affects millions of people throughout the globe. According to the most recent epidemiological research, 12.8 % of Chinese adults have diabetes; however, this figure does not reflect the prevalence since many people are in the pre-DM stage or have not been identified [1]. According to the Global Burden of 2015, the prevalence of diabetes has grown from 333 million to 435 million people in ten years, with 642 million people will be affected by 2040 [2,3]. Type 1 Diabetes (T1D) is a potentially life-threatening multifactorial autoimmune illness marked by T-cell-mediated alteration pancreatic cells, resulting in deficiencies of insulin production and secretion [4]. T1D has been on the rise globally since the 1950s, with a yearly increase of 3%-4% on average over the last three decades. Childhood T1D, in particular, is on the rise, with rates rising fastest in historically low-risk areas and differing by ethnicity and race [5]. T2DM is one of the most prevalent metabolic illnesses globally, and it is caused by a combination of two basic factors: inadequate insulin production by pancreatic β -cells and the failure of insulin-sensitive tissues to react to insulin [6]. Insulin release and action must be precisely timed to satisfy metabolic demand; as a result, the molecular processes involved in insulin production and release and insulin response in tissues must be properly controlled. As a result, flaws in any of the processes involved might cause a metabolic imbalance, leading to T2DM pathogenesis.

A combination of lifestyle adjustments and pharmaceutical therapy is required to attain excellent metabolic control in diabetes and maintain it over time [7]. The risk of macrovascular and microvascular problems is greatly reduced when glycated haemoglobin is near normal. For the treatment of type 2 diabetes mellitus (T2DM), many oral and injectable therapies are now available. While insulin replacement treatment is used to treat type I diabetes, oral hypoglycaemics are used to treat type II diabetes. Insulin secretagogues, biguanides, insulin sensitizers, α -glucosidase inhibitors, incretin mimetics, amylin antagonists, and sodium-glucose co-transporter-2 (SGLT2) inhibitors are the most common drugs used to treat type 2 diabetes [8]. Patients who cannot accomplish treatment objectives with first-line oral hypoglycemic medicines as a monotherapy are often prescribed dual medication regimens. Anti-diabetic medications are available in India in various dose forms with distinct labels and a wide range of prices, which makes it difficult for physicians to choose the least expensive prescription for their patients [9]. Increased cost variety in anti-diabetic medications leads to worse compliance and, as a result, lower quality of life, further increasing the financial burden on patients. The knowledge of anti-diabetic medication cost variations may be used to develop a more cost-effective treatment regimen to increase patient compliance and reduce the risk of therapy failure [10]. Because literature is scarce on cost-effective analysis of anti-diabetic treatments, a cost analysis of existing formulations of anti-diabetic pharmaceuticals is needed in clinical practice. This research aims to look at the cost differences between different anti-diabetic medicine brands that are presently accessible in the Indian pharmaceutical market [11].

Aim & Objectives

- This research aims to look at the cost differences between different brands of anti-diabetic medications that are presently accessible in the Indian pharmaceutical market
- The major goal of this paper is to educate individuals about the cost variation analysis of diabetic medicines

Material and Methods

This analytical research (Current index) looked at the highest and lowest prices of anti-diabetic medications in all strengths and dosage forms manufactured in India by various companies [12]. The research comprised these medication formulations with the same strength, dosage, and number. Fixed dosage combinations and medications produced by a single firm were eliminated. Further analysis was conducted using the percentage cost variation of the most expensive to least expensive anti-diabetic medicine brands. We can figure out how often the most expensive brand in each category costs more than the least expensive brand.

To investigate the maximum and lowest prices of anti-diabetic medications manufactured in India by various companies in various strengths and dosage forms. Further research was conducted utilizing the percentage cost variation of the different antidiabetic medicine brands' most expensive to the least expensive (Figure 1).

The cost variation as a percentage was calculated as follows:

$$\text{Cost variation (\%)} = \frac{\text{Maximum cost} - \text{Minimum cost}}{\text{Minimum cost}} \times 100$$

Results

The prices of anti-diabetic drugs manufactured by different pharmaceutical companies were analyzed. The present study showed a very high variation in the maximum and minimum price of anti-diabetic drugs that several different Indian companies are manufacturing. There is more variation in the prices of different brands of same anti-diabetic drugs agents in Indian market, shown in Table 1 The highest % cost variation was found for Pioglitazone 15 mg (185.7%), Tolbutamide 500 mg tablet

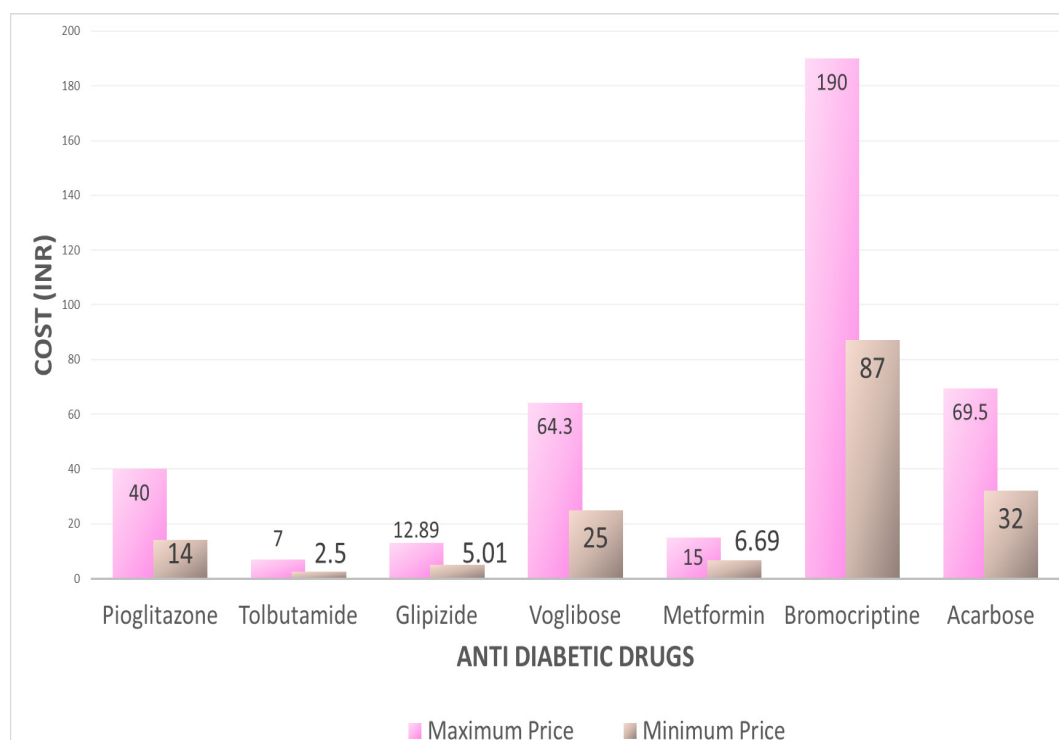


Figure 1: Cost difference (minimum and maximum) commonly used anti-diabetic medicines used as single-drug therapy.

Table 1: Percentage cost variation of commonly used anti-diabetic medicines.

S. No.	Drug Packing	Composition	MRP (Maximum rate and Minimum rate)	Ratio
1.	Pioglitazone	15 mg	Maximum: 40.00 Minimum: 14.00	185.7%
2.	Tolbutamide	500 mg	Maximum: 7.00 Minimum: 2.50	180%
3.	Glipizide	5 mg	Maximum: 12.89 Minimum: 5.01	157.2%
4.	Voglibose	0.2 mg	Maximum: 64.30 Minimum: 25.00	157.2%
5.	Metformin	500 mg	Maximum: 15.00 Minimum: 6.69	124.21%
6.	Bromocriptine	2.5 mg	Maximum: 190.0 Minimum: 87.00	118.3%
7.	Acarbose	25 mg	Maximum: 69.50 Minimum: 32.00	117.18%

(180%), Glipizide 5 mg (157.2%), Voglibose 0.2 mg (157.2%), Metformin 500 mg (124.21%), Bromocriptine 2.5 mg (118.3%) and lowest % cost variation was of Acarbose 25 mg (117.18%).

Discussion

The maximum and minimum prices of oral anti-diabetic medications were found to vary greatly in the current investigation (Figure 1). Most anti-diabetic treatments have a cost range of more than 100%, and there is a significant difference in the cost of various brands of the same anti-diabetic drug in the Indian market. Drug non-adherence has been linked to increased medication costs. Noncompliance with anti-diabetic medications is one of the most prevalent reasons for treatment failure. It is believed that up to 60% of diabetic patients do not follow their treatment plan. Noncompliance with medication treatment leads to disease progression and a significant rise in total medical care expenses [13]. The more costly brand of identical generic medicine has been scientifically demonstrated to be better than its less expensive economical counterpart. In a nation like India, where most patients pay for their medical expenditures out of pocket and are not protected by insurance systems, prescribing physicians should pay close attention to medication pricing. In India, it has been shown that patients bear more than 80% of the cost of health care. If expensive brands are recommended, people will be forced to spend unreasonably more money, creating an economic strain. The problem may be addressed if physicians' medical training programs focus on medication costs. Only a

few drugs are now subject to a price control order. The government should regulate the pricing of a larger number of anti-diabetic medications. The Medication Price Control Order (DPCO) and the National Pharmaceutical Pricing Authority (NPPA) are both effective methods for drug price control [14].

Conclusion

The current research found that the pricing of various brands of the identical anti-diabetic medications presently accessible in the Indian market varies significantly. Reduced treatment costs, changes in government laws and regulations, and increased understanding among treating doctors about the benefits of switching to cost-effective therapy may all assist with rational prescription. Practitioners should put more focus on prescribing drugs. It is also important to spread awareness that less expensive drugs are not inferior to their more expensive branded equivalents. Doctors must think about how much their patients will pay for drugs. Rising drug prices have a negative impact on patients. Given the rising expense of healthcare, there is a growing interest in prescribing that is cost-effective.

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